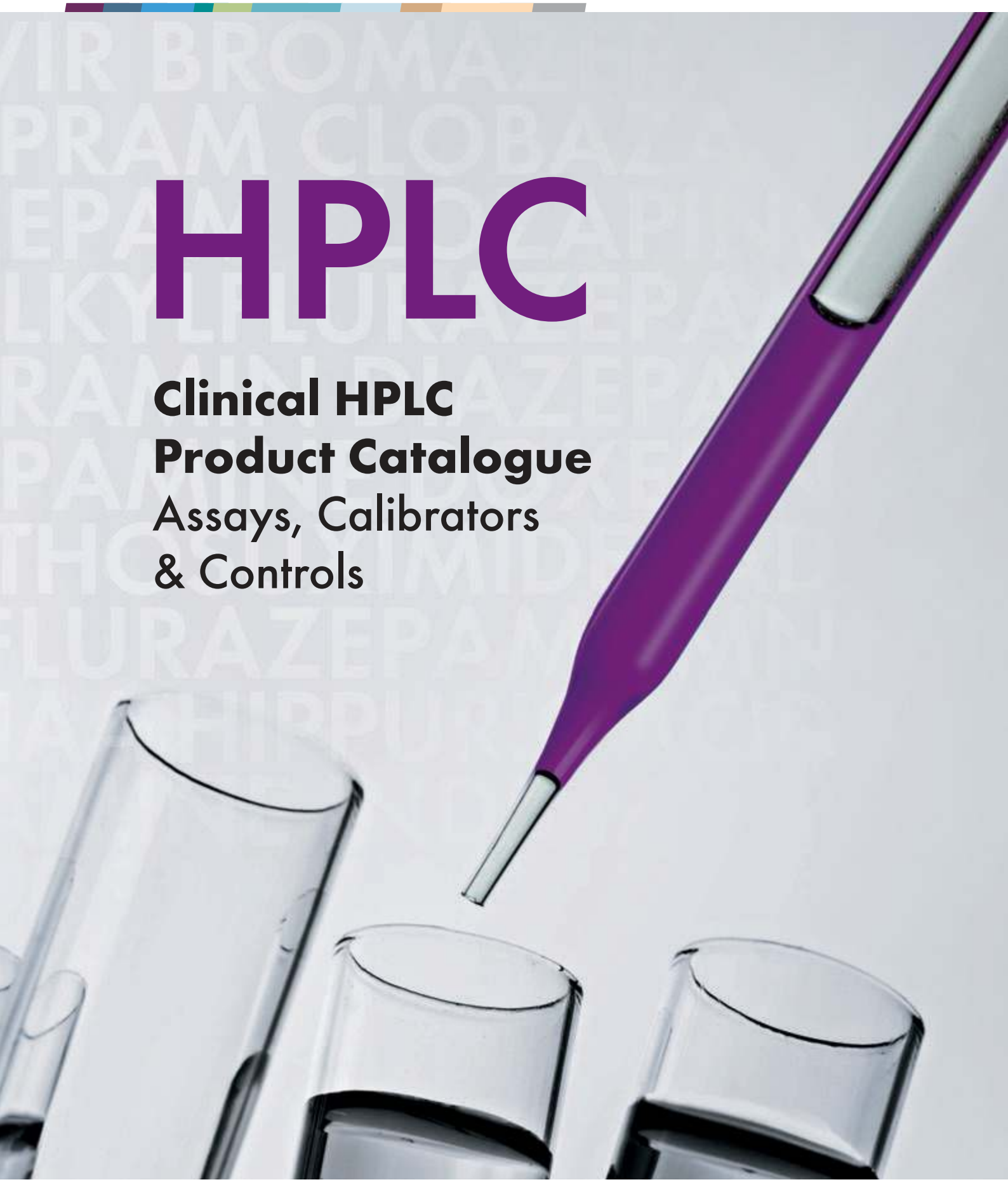
CHROMSYSTEMS

DIAGNOSTICS BY HPLC & LC-MS/MS

HPLC

Clinical HPLC Product Catalogue

Assays, Calibrators & Controls



CHROMSYSTEMS

DIAGNOSTICS BY HPLC & LC-MS/MS

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Warning notices on products and/or in the instruction manuals must be complied with.

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Management system
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ISO 9001, ISO 13485 (including MDSAP)

Content


CHROMSYSTEMS

Automation Test Menu for Clinical HPLC and UHPLC

About Chromsystems

Chromsystems is a leading global company providing ready-to-use solutions for routine clinical diagnostics by high performance liquid chromatography (HPLC) and tandem mass spectrometry (LC-MS/MS). Our product portfolio includes complete assays as well as quality controls and calibrators, all ensuring highly accurate as well as cost-effective methods for the laboratory. We continuously optimise our assays and expand our broad range of products with new tests, automated solutions or with other techniques such as UHPLC.

All products are CE-IVD compliant, satisfying most stringent requirements for your laboratory. Quality controls and calibrators are uniquely based on human matrices such as serum, plasma and urine, ensuring you achieve maximum result accuracy and regulatory fulfillment. Benefit from our know-how in clinical diagnostics with in-depth HPLC/UHPLC and LC-MS/MS workshops. They provide you with essential and helpful theory as well as practical courses, aimed at enabling you to achieve quick and reliable results in the laboratory. Moreover you are in the best hands with our excellent support: our competent and dedicated team will enable any laboratory to implement HPLC and LC-MS/MS methods without specific prior knowledge in the diagnostic routine.

Über Chromsystems

Chromsystems ist weltweit einer der führenden Hersteller von Lösungen für die klinische Routinediagnostik mittels Hochleistungs-Flüssigkeitschromatographie (HPLC) und Tandem-Massenspektrometrie (LC-MS/MS). Unser Produktportfolio, das sowohl komplette Kits als auch Qualitätskontrollen und Kalibratoren umfasst, garantiert Ihnen präzise und ökonomische Methoden im Routinelabor. Wir optimieren unsere Kits und erweitern unser Produktportfolio mit neuen Tests, Automationslösungen sowie weiteren Technologien wie der UHPLC.

Alle Produkte sind CE-IVD konform, was es Ihrem Labor wesentlich erleichtert selbst strengsten Anforderungen gerecht zu werden. Ergänzend basieren die Qualitätskontrollen und Kalibratoren auf Humanmatrizes wie Serum, Plasma und Urin, wodurch Sie eine maximale Genauigkeit der Ergebnisse erreichen und regulatorische Ansprüche erfüllen. Profitieren Sie von unserem Know-how in der klinischen Diagnostik durch unsere praxisbezogenen Workshops: Erweitern Sie Ihr theoretisches Wissen und vertiefen Sie das Erlernte im praktischen Teil, sodass Sie schnell zuverlässige Ergebnisse erhalten. Darüber hinaus sind Sie bei unserem ausgezeichneten Support in den besten Händen: Kompetente und spezialisierte Mitarbeiter ermöglichen es jedem Labor, HPLC- und LC-MS/MS-Methoden ohne spezifische Vorkenntnisse in die diagnostische Routine zu implementieren.

Biogenic Amines

Biogenic amines are biologically active compounds that play critical roles in physiological functions, such as brain activity as well as in regulating body temperature and stomach pH. They are formed in the human body by enzymatic decarboxylation from amino acids. Biogenic amines such as catecholamines are important parameters for the diagnosis of a number of diseases such as phaeochromocytoma or other tumors of the nervous system.

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Biogene Amine

Biogene Amine sind biologisch aktive Substanzen, die eine wichtige Aufgabe bei physiologischen Prozessen erfüllen, wie zum Beispiel der Hirnaktivität oder der Regulation von Körpertemperatur und pH-Wert des Magens. Sie werden im menschlichen Körper durch enzymatische Decarboxylierung von Aminosäuren gebildet. Biogene Amine wie die Katecholamine sind wichtige Parameter für die Diagnose einer Reihe von Krankheiten wie der Phäochromozytome oder anderer Tumore des Nervensystems.

Overview Biogenic Amine Assays by HPLC

Chromsystems offers various CE-IVD validated complete assays for the determination of biogenic amines in plasma, serum, urine and whole blood:

> **Combined analysis of catecholamines and metanephrines in urine available**
> **Single 5-HIAA assay or determination of VMA, HVA and 5-HIAA in one run**
> **Automated methods for Gilson® ASPEC™**

Chromsystems bietet einige CE-IVD-Kits zur Bestimmung von Biogenen Aminen im Plasma, Serum, Urin und Vollblut an:

> **Kombinierte Analytik der Metanephrine und Katecholamine im Urin möglich**
> **Kit zur Einzelmessung von 5-HIAA oder Methode, um VMA, HVA und 5-HIAA in einem Lauf zu messen**
> **Automatisierte Methoden für Gilson® ASPEC™**

Assay no.	Substance/Group	Matrix	Parameters	Automation	Page
6000	Catecholamines	Urine	Adrenaline/Epinephrine Noradrenaline/Norepinephrine Dopamine	Gilson® ASPEC™	14
5000	Catecholamines	Plasma	Adrenaline/Epinephrine Noradrenaline/Norepinephrine Dopamine		17
2020	Metanephrines	Urine	Metanephrine Normetanephrine 3-Methoxytyramine	Gilson® ASPEC™	20
6000/COMBI 2020/COMBI	Catecholamines and Metanephrines	Urine	Adrenaline/Epinephrine Noradrenaline/Norepinephrine Dopamine Metanephrine Normetanephrine 3-Methoxytyramine		22
4000	Serotonin	Urine	Serotonin		25
3030	Serotonin	Serum Plasma Whole Blood	Serotonin		26
1000/B	VMA, HVA, 5-HIAA	Urine	Vanillylmandelic acid (VMA) Homovanillic acid (HVA) 5-Hydroxyindoleacetic acid (5-HIAA)	Gilson® ASPEC™	28
51000	5-HIAA	Urine	5-Hydroxyindoleacetic acid (5-HIAA)		31

2.1 Catecholamines

CE IVD

The catecholamines adrenaline, noradrenaline, and dopamine are produced during the metabolism of the aromatic amino acids phenylalanine and tyrosine and play a central role in the organism as hormones and neurotransmitters. The catecholamine metabolites are also important indicators in the diagnosis of tumours such as pheochromocytomas, neuroblastomas, ganglioneuromas and melanoblastomas. Their determination, in addition to vanillylmandelic acid and homovanillic acid, substantially reduces the risk of false positive results.
The concentrations of noradrenaline and adrenaline are indicative for the activity of the sympathetic nervous system and are important parameters in congestive cardiac insufficiency, coronary heart disease, diabetes mellitus, arteriosclerosis and acute asthma.

Our catecholamine reagent kits allow the routine determination of adrenaline, noradrenaline and dopamine in urine or plasma using an isocratic HPLC system and an electrochemical detector. A very specific sample preparation through solid phase extraction allows an easy and safe handling and guarantees reproducible results.

- **Optimised solid phase extraction and analyte recovery**
- **Kits for combined analysis of catecholamines and metanephrines in urine available**
- **Easy and safe handling**

Die Katecholamine Adrenalin, Noradrenalin und Dopamin entstehen durch die Metabolisierung der aromatischen Aminosäuren Phenylalanin und Tyrosin und spielen im Organismus als Hormone und Neurotransmitter eine zentrale Rolle. Neben den Katecholaminen sind auch deren Abbauprodukte wichtige Indikatoren bei der Diagnose verschiedener Tumore wie Phäochromozytom, Neuroblastom, Ganglioneurom und Melanoblastom. Sie müssen zusätzlich zu den Parametern VMA und HVA bestimmt werden, um das Risiko falsch positiver Ergebnisse zu reduzieren.
Die Konzentrationen von Noradrenalin und Adrenalin gelten als Indikatoren für die Aktivität des sympathischen Nervensystems und sind darüber hinaus eine wesentliche Kenngröße für das Vorliegen von kongestiven Herzinsuffizienzen, koronaren Herzkrankheiten, Diabetes mellitus, Arteriosklerose und akutem Asthma.

Unsere Katecholamin-Reagenzienkits erlauben die routinemäßige Bestimmung von Adrenalin, Noradrenalin und Dopamin im Urin oder Plasma mit einem isokratischen HPLC-System und elektrochemischem Detektor. Eine sehr spezifische Probenvorbereitung mittels Festphasenextraktion garantiert die einfache und sichere Handhabung sowie reproduzierbare Ergebnisse.

- **Optimierte Festphasenextraktion und Wiederfindung**
- **Kits für die kombinierte Analytik der Katecholamine und Metanephrine im Urin verfügbar**
- **Einfache und sichere Handhabung**

Parameters:
adrenaline, noradrenaline, dopamine

2.1.1 Catecholamines in Urine

Order no.	Product
6000	Catecholamines in Urine For 100 tests
	Automated Assay for Gilson® ASPEC™:
6000/A1	For 100 tests
6000/A5	For 500 tests
6000/A9	For 1000 tests

	Components available separately
5001	Mobile Phase, 1000 ml
5002	Mobile Phase, 10 x 1000 ml
6003	Catecholamines Calibration Standard, 10 ml
6004	Internal Standard, 10 ml
6055	Neutralisation Buffer, 300 ml
6006	Elution Buffer, 300 ml
6007	Sample Clean Up Columns, 100 pcs.

	Accessories
6100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
6009	Urine Calibration Standard (lyoph.), 5 x 10 ml

	Accessories for electrochemical detectors
41203	Glassy Carbon Working Electrode, 1 pc.
41211	Reference Electrode Ag/AgCl, 1 pc.
41239	KCl Solution, 3 mol/l, 50 ml

More accessories see page 166

	Chromsystems Urine Controls (lyoph.)
0040	Endocrine Urine Control, Normal Range, 10 x 8 ml
0050	Endocrine Urine Control, Pathological Range, 10 x 8 ml

Specifications

Linearity:	noradrenaline up to 1450 µg/l adrenaline up to 1800 µg/l dopamine up to 2200 µg/l
Limit of quantification:	1.6–3.6 µg/l
Intraassay:	CV < 3 %
Interassay:	CV < 4.1 %
Recovery:	68–80 % (dopamine 91 %)
Analysis time:	< 15 min

Pre-analytic Treatment

Specimens: 24 h urine is collected in a suitable container with 10 ml 25 % HCl. Stable at least 5 days at +2 to +8 °C. For longer storage aliquots should be frozen below -18 °C.

Sample Preparation

STABILISATION

→ 3 ml urine + 100 µl Internal Standard + 6 ml Neutralisation Buffer, add 2 N NaOH until the colour changes from yellow to green or green-grey.
If the urine mixture shows a purple colour (too alkaline) lower the pH value by careful addition of 2 N HCl until the colour changes to green (see figure below).

EXTRACTION

→ Apply the entire volume of the stabilised urine to the sample clean up column. Discard the effluent.

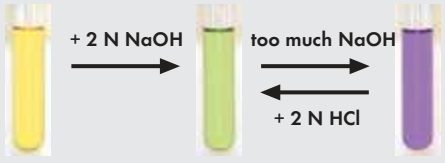
WASHING

→ Apply approximately 10 ml HPLC water on the sample clean up column. Discard the effluent. Repeat the wash step.

ELUTION

→ Apply 6 ml Elution Buffer to the sample clean up column, and collect the eluate.
→ Add 180 µl 5N HCl to the eluted sample.
→ Inject 20 µl into the HPLC system.

Adjusting the correct pH range with pH indicator:

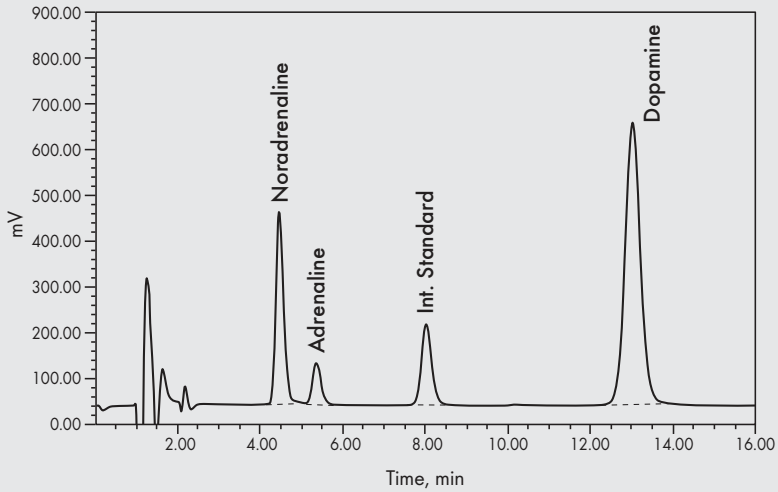


after addition of the Neutralisation Buffer: **strongly acidic**

pH **correct**

pH **too alkaline**

Catecholamines in Urine



HPLC Parameters

Isocratic HPLC system with electro-chemical detector.

Injection volume: 20 µl
Flow rate: 0.8–1.3 ml/min
Potential: +400 to +500
Column temp.: ambient (~ 25 °C)

Endocrine Urine Controls

Substance	Method	Unit	Normal Range Target Value*	Pathological Range Target Value*
Catecholamines				
Adrenaline	CS HPLC test	µg/l nmol/l	12.7 69.2	50.3 275
Noradrenaline	CS HPLC test	µg/l nmol/l	63.0 372	206 1215
Dopamine	CS HPLC test	µg/l nmol/l	195 1274	440 2875
Metanephrines				
Metanephrine	CS HPLC test	µg/l nmol/l	155 788	349 1771
Normetanephrine	CS HPLC test	µg/l nmol/l	271 1480	968 5284
3-Methoxytyramine	CS HPLC test	µg/l nmol/l	152 911	345 2066
Serotonin	CS HPLC test	µg/l nmol/l	153 867	414 2348
5-Hydroxyindole-3-acetic acid (5-HIAA)	CS HPLC test	mg/l µmol/l	4.02 21.0	12.1 63.3
Homovanillic acid (HVA)	CS HPLC test	mg/l µmol/l	4.44 24.4	13.1 71.7
Vanillylmandelic acid (VMA)	CS HPLC test	mg/l µmol/l	4.39 22.1	15.3 77.2
3,4-Dihydroxymandelic acid (DOMA)	spiked value	mg/l µmol/l	0.40 85.5	3.60 85.5
3,4-Dihydroxyphenylacetic acid (DOPAC)	spiked value	mg/l µmol/l	3.00 17.8	10.0 59.5
3,4-Dihydroxyphenylalanine (L-DOPA)	spiked value	µg/l nmol/l	85.0 431	250 1268
3,4-Dihydroxyphenylglycol (DHPG)	spiked value	mg/l µmol/l	0.60 3.51	2.6 15.3
3-Methoxy-4-hydroxyphenylglycol (MHPG)	spiked value	mg/l µmol/l	1.21 6.58	3.8 20.6

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0040	Endocrine Urine Control, Normal Range (lyoph.), 10 x 8 ml
0050	Endocrine Urine Control, Pathological Range (lyoph.), 10 x 8 ml

Stability of Endocrine Urine Controls

Please check instruction manual for detailed information

> Stable to expiry date at +2 °C to +8 °C
> Reconstituted up to 5 days at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

2.1.2 Catecholamines in Plasma

Order no.	Product
5000	Catecholamines in Plasma For 200 tests
	Components available separately
5001	Mobile Phase, 1000 ml
5002	Mobile Phase, 10 x 1000 ml
5011	Extraction Buffer, 100 ml
5003	Calibration Standard, 10 ml
5004	Internal Standard, 10 ml
5005	Wash Buffer, 300 ml
5007	Sample Clean Up Columns, 50 pcs.
5006	Elution Buffer, 25 ml
	Accessories
5100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
5007/Vi	Plastic Vials for Sample Clean Up Columns, 50 pcs.
5009	Plasma Calibration Standard (lyoph.), 10 x 2.5 ml
	Accessories for electrochemical detectors see page 166
	L-DOPA, DHPG, DOPAC determination
5031	Mobile Phase for L-DOPA, DHPG, DOPAC, 1000 ml
5130	HPLC Column for L-DOPA, DHPG, DOPAC, equilibrated, with test chromatogram,1 pc.
	Chromsystems Plasma Controls (lyoph.)
0010	Endocrine Plasma Control, Normal Range, 10 x 5 ml
0020	Endocrine Plasma Control, Pathological Range, 10 x 5 ml

Specifications

Linearity:	up to 2000 ng/l
Limit of quantification:	18–43 ng/l
Intraassay:	CV < 4 %
Interassay:	CV < 6 % (dopamine ~ 13 %)
Recovery:	> 7 % (dopamine > 40 %)
Analysis time:	< 20 min

Pre-analytic Treatment

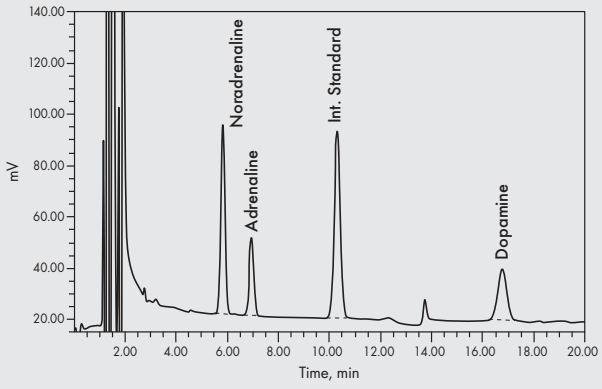
Specimens: plasma. Samples can be stored at +2 to +8 °C for up to 2 days, at -18 °C up to 1 month.
Samples stabilised with glutathione can be stored below -18 °C for up to 6 months.

Sample Preparation

EXTRACTION
→ Add 0.5 ml Extraction Buffer to a sample preparation column. Shake briefly.
→ Add 1.0 ml plasma and 50 µl Internal Standard. Shake 10 min.
→ Remove the cap from the bottom of the sample clean up column and suck the column dry or centrifuge it. Discard the effluent.

WASHING
→ 3 times: add 1 ml Wash Buffer, suck through or centrifuge, discard the effluent.

ELUTION
→ Mount sample tube to the outlet of the sample clean up column; discard bottom plug.
→ Add 120 µl Elution Buffer, shake, wait 5 min.
→ Mix 30 s (vortex).
→ Centrifuge for 1 min at 2000 rpm.
→ Mix eluate well.
→ Inject 20–50 µl eluate into the HPLC system.



HPLC Parameters

Isocratic HPLC system with electrochemical detector.

Injection volume: 20–50 µl
Flow rate: 0.8–1.3 ml/min
Potential: +400 to +500 mV
Column temp.: ambient (~ 25 °C)

Endocrine Plasma Controls

Substance	Method	Unit	Normal Range Target Value*	Pathological Range Target Value*
Catecholamines				
Adrenaline	CS HPLC test	ng/l pmol/l	87.5 478	477 2605
Noradrenaline	CS HPLC test	ng/l pmol/l	269 1587	2012 11892
Dopamine	CS HPLC test	ng/l pmol/l	176 1150	848 5536
Metanephrines				
Metanephrine	spiked value	ng/l pmol/l	60 304	1500 7605
Normetanephrine	spiked value	ng/l pmol/l	100 546	7000 38220
3-Methoxytyramine	spiked value	ng/l pmol/l	– –	1500 8970
Serotonin	CS HPLC test	µg/l nmol/l	146 829	347 1968
5-Hydroxyindole-3-acetic acid (5-HIAA)	spiked value	µg/l nmol/l	8.0 41.8	40.0 209
Homovanillic acid (HVA)	spiked value	µg/l nmol/l	10.0 54.9	100.0 549
Vanillylmandelic acid (VMA)	spiked value	µg/l nmol/l	7.50 37.8	80.0 403
3,4-Dihydroxymandelic acid (DOMA)	spiked value	µg/l nmol/l	0.80 4.34	5.0 27.2
3,4-Dihydroxyphenylacetic acid (DOPAC)	spiked value	µg/l nmol/l	4.00 23.8	55.0 326
3,4-Dihydroxyphenylalanine (L-DOPA)	spiked value	µg/l nmol/l	1.5 7.61	6.0 30.4
3,4-Dihydroxyphenylglycol (DHPG)	spiked value	µg/l nmol/l	3.0 17.6	15.0 88.2
3-Methoxy-4-hydroxyphenylglycol (MHPG)	spiked value	µg/l nmol/l	5.0 27.1	30.0 163

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0010	Endocrine Plasma Control, Normal Range (lyoph.), 10 x 5 ml
0020	Endocrine Plasma Control, Pathological Range (lyoph.), 10 x 5 ml

Stability of Endocrine Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date at +2 °C to +8 °C
> Reconstituted up to 2 days at +2 °C to +8 °C
> Reconstituted aliquots up to 2 months below -18 °C

2.2 Metanephrines in Urine

CE IVD

The biogenic amines normetanephrine, metanephrine and 3-methoxytyramine, major metabolites of catecholamine metabolism, are important parameters in the diagnosis of pheochromocytoma, neuroblastoma, ganglioneuroma and melanoblastoma. Their determination, in addition to noradrenaline, dopamine, vanillylmandelic acid and homovanillic acid, substantially reduces the risk of false positive results.

The chromatographic determination is run on an isocratic HPLC system with electrochemical detector. An optimised HPLC column and mobile phase ensure the reliable separation of possible interferences.

> Reliable separation of interferences
> Kits for combined analysis of metanephrines and catecholamines in urine available
> Only one Clean Up Column required

Die biogenen Amine Normetanephrin, Metanephrin und 3-Methoxytyramin, Hauptmetabolite des Katecholaminstoffwechsels, sind wichtige Parameter bei der Diagnose der Tumore Phäochromozytom, Neuroblastom, Ganglioneurom und Melanoblastom. Sie müssen zusätzlich zu den Parametern Noradrenalin, Dopamin, VMA und HVA bestimmt werden, um das Risiko falsch positiver Ergebnisse zu reduzieren.

Für die chromatographische Bestimmung wird ein isokratisches HPLC-System mit elektrochemischem Detektor benötigt. Die optimierte Trennsäule und mobile Phase gewährleisten eine sichere Abtrennung möglicher Interferenzen.

> Sichere Abtrennung von Interferenzen
> Kits für die kombinierte Analytik der Metanephrine und Katecholamine im Urin verfügbar
> Nur eine Clean Up Column erforderlich

Parameters:
metanephrine, normethanephrine, 3-methoxytyramine

Metanephrines in Urine

Order no.	Product
2020	Metanephrines in Urine For 100 tests
	Automated Assay for Gilson® ASPEC™:
2020/A1	For 100 tests
2020/A5	For 500 tests
2020/A9	For 1000 tests

	Components available separately
2021	Mobile Phase, 1000 ml
2022	Mobile Phase, 10 x 1000 ml
2023	Calibration Standard, 10 ml
2024	Internal Standard, 10 ml
2025	Neutralisation Buffer, 300 ml
2026	Wash Buffer, 250 ml
2027	Elution Buffer, 250 ml
2028	Sample Clean Up Columns, 100 pcs.

	Accessories
2120	HPLC Column, equilibrated, with test chromatogram, 1 pc.
2009	Urine Calibration Standard (lyoph.), 5 x 5 ml
2010	Tubes with screw caps for hydrolysis, 50 pcs.
2099	Interference Mix Metanephrines, for identification of possible interferences, 10 ml
2044/HR	Internal Standard, High Resolution, 10 ml
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18002	Precolumn Cartridge 4/10, 1 pc.

	Accessories for electrochemical detectors
41203	Glassy Carbon Working Electrode, 1 pc.
41211	Reference Electrode Ag/AgCL, 1 pc.
41239	KCl Solution, 3 mol/l, 50 ml

More accessories see page 166

	Chromsystems Urine Controls (lyoph.)
0040	Endocrine Urine Control, Normal Range, 10 x 8 ml
0050	Endocrine Urine Control, Pathological Range, 10 x 8 ml

For more details on these controls see page 16

Specifications

Linearity:	up to 5000 µg/l (normetanephrine 5–2500 µg/l)
Limit of quantification:	5–11 µg/l
Intraassay:	CV < 3 %
Interassay:	CV < 4 %
Recovery:	> 94 %
Analysis time:	< 15 min

Pre-analytic Treatment

Specimens: 24 h urine is collected in a suitable container containing 10 ml 25 % HCl. Stable for at least 5 days at +2 to +8 °C. For longer storage aliquots should be frozen below –18 °C.

Sample Preparation

ACIDIC HYDROLYSIS

→ Add 100 µl Internal Standard to 1 ml urine in a hydrolysis tube and adjust the pH to 0.8–1.0 with 2 M HCl. Incubate the capped vial 30 min at 90–100 °C, then cool down immediately.

EXTRACTION

→ Add 6 ml Neutralisation Buffer, if the sample does not turn purple, add 2 M NaOH until colour change occurs.

→ Apply the complete sample to the sample clean up column, discard the effluent.

WASHING

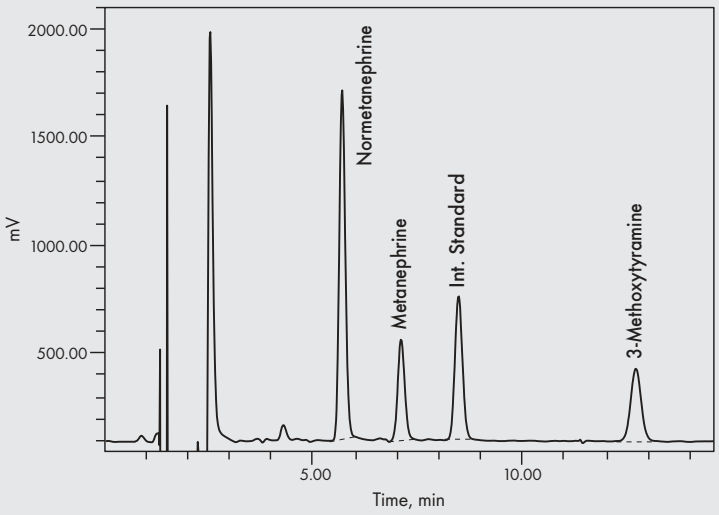
→ Wash with 10 ml of dist. water and subsequently with 5 ml of Wash Buffer, discard the effluent.

ELUTION

→ Elute metanephrines by applying 5 ml Elution Buffer to the sample clean up column and collect the eluate.

→ Add 30 µl of conc. acetic acid per ml eluate, inject 20 µl into the HPLC system.

Metanephrines in Urine



HPLC Parameters

Isocratic HPLC system with electro-chemical detector.

Injection volume: 20 µl
Flow rate: 1.0–1.2 ml/min
Potential: +780 to +820 mV
Column temp.: ambient (~ 25 °C)

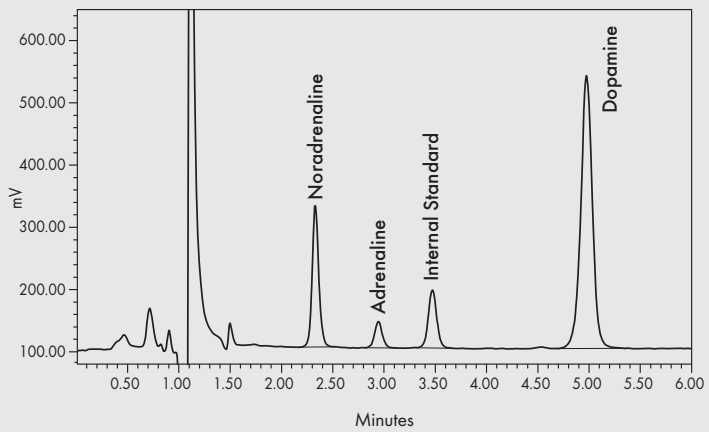
2.2.1 Combined Method: Catecholamines, Metanephrines in Urine

Order no.	Product
2020/COMBI	Metanephrines in Urine, Combined Analysis For 100 tests
	Components available separately
2031/COMBI	Mobile Phase, 1000 ml
2032/COMBI	Mobile Phase, 10 x 1000 ml
2023	Metanephrines Calibration Standard, 10 ml
2024	Internal Standard, 10 ml
2025	Neutralisation Buffer, 300 ml
2026	Wash Buffer, 250 ml
2027	Elution Buffer, 250 ml
2029/COMBI	Stabilisation Reagent, 10 ml
2028	Sample Clean Up Columns, 100 pcs.
	Accessories
2130/COMBI	HPLC Column, equilibrated with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
2010	Tubes with screw caps for hydrolysis, 50 pcs.
2099	Interference Mix Metanephrines, for the identification of potential interferences in metanephrine analysis, 10 ml
2044/HR	Internal Standard, High Resolution, 10 ml
2009	Metanephrines Urine Calibration Standard (lyoph.), 5 x 5 ml

Order no.	Product
6000/COMBI	Catecholamines in Urine, Combined Analysis For 100 tests
	Components available separately
2031/COMBI	Mobile Phase, 1000 ml
2032/COMBI	Mobile Phase, 10 x 1000 ml
6003	Catecholamines Calibration Standard, 10 ml
6004	Internal Standard, 10 ml
6055	Neutralisation Buffer, 300 ml
6006	Elution Buffer, 300 ml
6010/COMBI	Stabilisation Reagent, 20 ml
6007	Sample Clean Up Columns, 100 pcs.
	Accessories
2130/COMBI	HPLC Column, equilibrated with test chromatogram, 1 pc.
6009	Catecholamines Urine Calibration Standard (lyoph.), 5 x 10 ml
	Chromsystems Urine Controls (lyoph.)
0040	Endocrine Urine Control, Normal Range, 10 x 8 ml
0050	Endocrine Urine Control, Pathological Range, 10 x 8 ml

For more details on these controls see page 16

Catecholamines in Urine



HPLC Parameters

Isocratic HPLC system with column oven and electrochemical detector.

Injection volume: 10 µl
Flow rate: 0.9 ml/min (Cat)/
1.3 ml/min (Met)
Potential: between +580 and 640 mV (Cat)
between +770 and +840 mV (Met)
Column temperature: 30 °C

Combined Method: Catecholamines, Metanephrines in Urine

Specifications

Linearity:	1–1000 µg/l (cat), 4–5000 µg/l (met)
Limit of quantification:	1 µg/l (Cat), 4 µg/l (met)
Intraassay:	CV = 0.9–2.7 % (cat), CV = 0.6–2.6 % (met)
Interassay:	CV = 2.1–4.1 % (cat), CV = 1.6–2.7 % (met)
Recovery:	81–88 % (cat), 93–95 % (met)
Analysis time:	< 6 min (cat), < 10 min (met)

Pre-analytic Treatment

Specimens: 24 h urine is collected in a suitable container with 10 ml 25 % HCl.
Stable for at least 5 days at +2 to +8 °C.
For longer storage aliquots should be frozen below -18 °C.

Sample Preparation Catecholamines

STABILISATION

→ 3 ml urine + 100 µl Internal Standard + 6 ml Neutralisation Buffer.
→ Adjust pH value.

EXTRACTION

→ Apply the sample on the sample clean up column, discard effluent.
→ Fill up twice with ultrapure water (HPLC grade) and discard the effluent.

ELUTION

→ Apply 6 ml Elution Buffer on the sample clean up column and collect the eluate.
→ Add 200 µl Stabilisation Reagent. Mix each eluate thoroughly.
→ Inject 10 µl into the HPLC system.

Sample Preparation Metanephrines

ACIDIC HYDROLYSIS

→ Add 100 µl Internal Standard to 1 ml urine in a hydrolysis tube.
→ Adjust pH value to 0.8–1.0, incubate for 30 min at 90–100 °C, then cool down immediately.

NEUTRALISATION

→ Add 6 ml Neutralisation Buffer to hydrolysed urine.

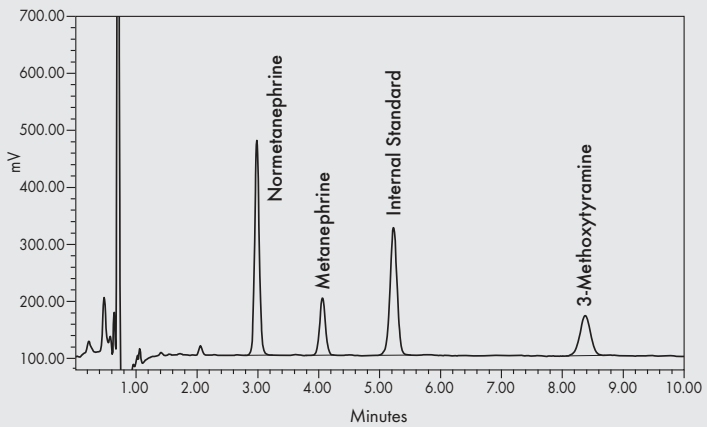
EXTRACTION

→ Apply the sample on the sample clean up column, discard effluent. Successively wash with 10 ml ultrapure water (HPLC grade), then add 5 ml Wash Buffer. Discard effluent each time.

ELUTION

→ Apply 5 ml Elution Buffer on the sample clean up column and collect the eluate.
→ Add 100 µl Stabilisation Reagent. Mix eluate thoroughly.
→ Inject 10 µl into the HPLC system.

Metanephrines in Urine



2.3 Serotonin

CE IVD

Serotonin (5-hydroxytryptamine) is frequently found in both plants and animals; chemically it is a biogenic amine. In humans serotonin is involved in a huge number of physiological processes, which are the result of its function as neurotransmitter in the central nervous system, the enteric nervous system and the cardiovascular system.

A number of diseases are accompanied by pathological changes in serotonin metabolism. The most important of these as far as routine clinical chemistry is concerned is the determination of serotonin in the diagnosis of the carcinoid syndrome and a hormone-producing tumour occurring particularly in the gastro-intestinal tract. It also occurs in the bronchioles, the liver and the ovaries. The determination of serotonin or its metabolite 5-hydroxyindoleacetic acid (5-HIAA) belongs today to the standard diagnostic test when carcinoid syndrome is suspected. Determination of serotonin can also assist in the confirmation of depression and schizophrenia.

Chromsystems offers reliable and routine HPLC determination tests for urine as well as for serum, plasma and whole blood. For the chromatographic determination of serotonin in both kits an isocratic HPLC system with electrochemical detector is necessary.

> Easy and quick sample preparation
> Short analysis time
> Easy pH adjustment with pH indicator

Serotonin (5-Hydroxytryptamin) ist ein im Tier- und Pflanzenreich häufig vorkommendes biogenes Amin. Im menschlichen Organismus vermittelt das Serotonin eine Vielzahl physiologischer Vorgänge, die auf seine Funktion als Gewebshormon und Neurotransmitter des Zentralnervensystems, Darmnervensystems und Herz-Kreislauf-Systems zurückzuführen sind.

Eine Reihe von Erkrankungen stehen im Zusammenhang mit pathologischen Veränderungen des Serotonin-Stoffwechsels. Für den routinemäßigen Einsatz am wichtigsten ist die Bestimmung des Serotonins für die Diagnostik der Karzinoide, hormonproduzierende Tumore, die speziell im Verdauungstrakt, an den Bronchien, der Leber oder den Ovarien entstehen können. Beim Verdacht auf Vorliegen eines Karzinoids gehört heute die Bestimmung von Serotonin und seinem Metaboliten 5-Hydroxyindolessigsäure (5-HIAA) zur Standarddiagnostik. Weitere typische Einsatzgebiete der Messung des Serotoninspiegels sind Krankheitsbilder wie Depression und Schizophrenie.

Zur zuverlässigen, routinemäßigen HPLC-Bestimmung von Serotonin bietet Chromsystems Tests im Urin sowie im Serum, Plasma oder Vollblut an. Für die chromatographische Bestimmung wird bei beiden Kits ein isokratisches HPLC-System mit elektrochemischem Detektor benötigt.

> Einfache und schnelle Probenvorbereitung
> Kurze Analysendauer
> Einfache pH-Einstellung durch Farbindikator

Parameter:
serotonin

2.3.1 Serotonin in Urine

Order no.	Product
4000	Serotonin in Urine For 100 tests
	Components available separately
3031	Mobile Phase, 1000 ml
3032	Mobile Phase, 10 x 1000 ml
3003	Serotonin Calibration Standard, 10 ml
4004	Internal Standard, 10 ml
4055	Neutralisation Buffer, 300 ml
4006	Wash Buffer, 300 ml
4007	Elution Buffer, 500 ml
4008	Sample Clean Up Columns, 100 pcs.
4009	Urine Calibration Standard (lyoph.), 5 x 12 ml
	Accessories
4100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
	Accessories for electrochemical detectors see page 166
	Chromsystems Urine Controls (lyoph.)
0040	Endocrine Urine Control, Normal Range, 10 x 8 ml
0050	Endocrine Urine Control, Pathological Range, 10 x 8 ml

For more details on these controls see page 16

Specifications

Linearity:	5–1000 µg/l
Limit of quantification:	5 µg/l
Intraassay:	CV < 2 %
Interassay:	CV < 4 %
Recovery:	> 94 %
Analysis time:	< 6 min

Pre-analytic Treatment

Collect the 24 h urine in a suitable container with 10 ml HCl 25 %. Stable at least 5 days at +2 to +8 °C. For longer storage, aliquots should be frozen below -18 °C.

Sample Preparation

EXTRACTION

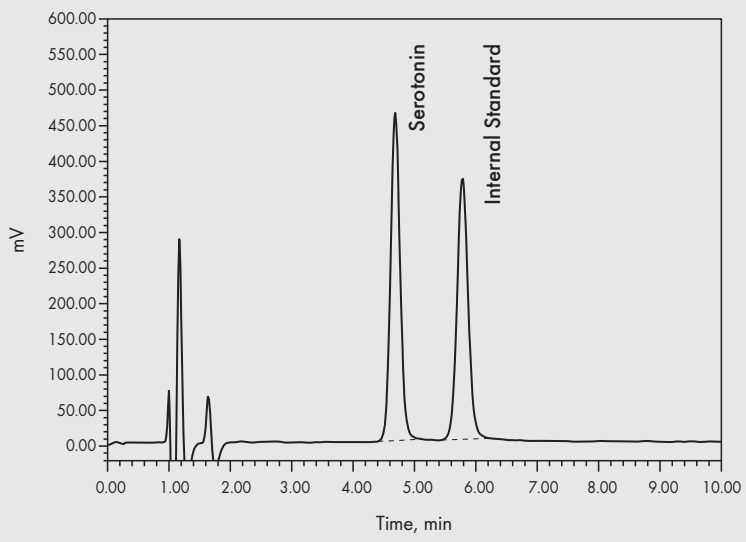
→ Mix 4 ml urine + 100 µl Internal Standard, and dilute with 6 ml Neutralisation Buffer.
→ Add 2 N NaOH until the colour changes from yellow to green or green-grey. If the urine mixture shows a purple colour (too alkaline) lower the pH value by careful addition of 2 N HCl until the colour changes to green (see figure page 14).
→ Apply the entire volume of the stabilised urine to the sample clean up column. Discard the effluent.

WASHING

→ Apply approx. 10 ml ultrapure water to the sample clean up column. Discard the effluent.
→ Apply 3 ml of Wash Buffer. Discard the effluent.

ELUTION

→ Apply 20 ml Elution Buffer to the sample clean up column, collect the eluate, and mix well.
→ Inject 20–50 µl of the eluate into the HPLC system.



HPLC Parameters

Isocratic HPLC system with electro-chemical detector.

Injection volume: 20–50 µl
Flow rate: 1 ml/min
Potential: 400–500 mV
Column temp.: ambient (~ 25 °C)

2.3.2 Serotonin in Serum/Plasma/Whole Blood

Order no.	Product
3030	Serotonin in Serum/Plasma/Whole Blood For 100 tests
	Components available separately
3031	Mobile Phase, 1000 ml
3032	Mobile Phase, 10 x 1000 ml
3033	Calibration Standard, 10 ml
3034	Internal Standard, 10 ml
3035	Precipitation Reagent, 10 ml
3006	Reaction Vials, 100 pcs.
	Accessories
3130	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
3009	Plasma Calibration Standard (lyoph.), 5 x 1 ml
	Accessories for electrochemical detectors
41203	Glassy Carbon Working Electrode, 1 pc.
41211	Reference Electrode Ag/AgCL, 1 pc.
41239	KCl Solution, 3 mol/l, 50 ml
	More accessories see page 166
	Chromsystems Plasma Controls (lyoph.)
0010	Endocrine Plasma Control, Normal Range, 10 x 5 ml
0020	Endocrine Plasma Control, Pathological Range, 10 x 5 ml

For more details on these controls see page 18

Specifications

Linearity:	3–1000 µg/l
Limit of quantification:	3 µg/l
Intraassay:	CV < 2 %
Interassay:	CV < 1.5 %
Recovery:	87–98 %
Analysis time:	< 9 min

Pre-analytic Treatment

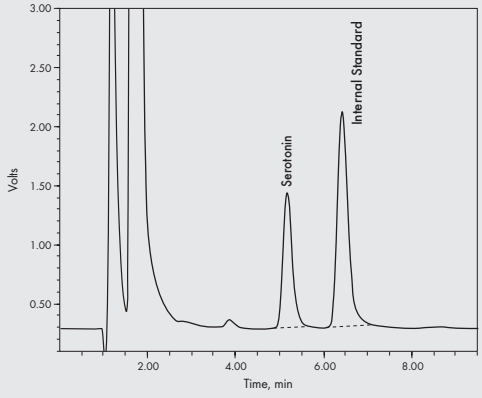
Specimens: serum, plasma or whole blood.
Stability: stable up to 12 h at +4 °C. For longer storage the samples have to be frozen below -18 °C.

Sample Preparation

Serum:
→ Place 100 µl sample into a reaction vial. Add 100 µl Internal Standard and 100 µl Precipitation Reagent. Vortex-mix for 30 s.
→ Incubate 10 minutes at +2 to +8 °C.
→ Centrifuge 10 minutes at 16 000 x g.
→ Inject 20 µl of the supernatant into the HPLC system.

Plasma:
The Internal Standard has to be diluted 1:10 with ultrapure water (HPLC grade).

Whole Blood:
Place 50 µl whole blood (EDTA, heparin) and add 50 µl ultrapure water (HPLC grade) into the reaction vial prior to adding the Internal Standard. Before adding the Precipitation Reagent incubate the sample 10 min at room temperature.



HPLC Parameters

Isocratic HPLC system with electrochemical detector.

Injection volume: 20 µl
Flow rate: 1.0–1.2 ml/min
Potential: +400 to +500 mV
Column temp.: ambient (~ 25 °C)

2.4 VMA, HVA, 5-HIAA in Urine

CE IVD

Neuroblastoma is a neoplastic disease of infants and in early childhood and is one of the most common cancer diseases in children. Because of the close histological relationship of this tumour to the autonomic sympathetic nervous system, these patients excrete increased amounts of the catecholamine metabolites vanillylmandelic acid (VMA) and homovanillic acid (HVA) into urine. The measurement of VMA and HVA serves as a screening test for neuroblastoma.

The concentration of 5-hydroxyindole acetic acid (5-HIAA) in urine is a diagnostic marker for the carcinoid syndrome. This malignant proliferation of the enterochromaffin cells of the gastrointestinal tract leads to an excessive production of the tissue hormone serotonin, the major metabolite of which is 5-HIAA.

This reagent kit allows the easy and safe routine determination of VMA, HVA and 5-HIAA in urine with an isocratic HPLC system and an electrochemical detector.

> No pH adjustment necessary
> Safe and easy sample preparation
> Two internal standards available
> Automated workflow for Gilson® ASPEC™ available

Das Neuroblastom ist eine neoplastische Erkrankung von Säuglingen und Kleinkindern und ist unter den bösartigen Tumoren im Kindesalter einer der häufigsten. Es handelt sich um neuroendokrine Tumore und die Betroffenen scheiden im Urin erhöhte Mengen an den Katecholaminmetaboliten VMA (Vanillinmandelsäure) und HVA (Homovanillinsäure) aus. Der Nachweis dieser Metabolite spielt eine große Rolle bei der Diagnose des Neuroblastoms.

Erhöhte Mengen an 5-HIAA (5-Hydroxyindolessigsäure) im Urin hingegen sind ein Hinweis auf ein Karzinoid. Diese bösartige Vermehrung von enterochromaffinen Zellen des Magen-Darm-Trakts führen zu einer erhöhten Produktion des Gewebehormons Serotonin, dessen Hauptmetabolit 5-HIAA ist.

Dieser Chromsystems-Reagenzienkit ermöglicht die routinemäßige und zuverlässige HPLC-Bestimmung von VMA, HVA und 5-HIAA im Urin mit einem isokratischen HPLC-System und einem elektrochemischen Detektor.

> Keine pH-Einstellung erforderlich
> Einfache und sichere Probenvorbereitung
> Auf Wunsch zwei interne Standards
> Automatisierter Workflow für Gilson® ASPEC™ verfügbar

Parameters:
5-HIAA, HVA, VMA

VMA, HVA, 5-HIAA in Urine

Order no.	Product
1000/B	VMA, HVA, 5-HIAA in Urine For 100 tests
	Automated Assay for Gilson® ASPEC™:
1000/B/A1	For 100 tests
1000/B/A5	For 500 tests
1000/B/A9	For 1000 tests

	Components available separately
1011	Mobile Phase, 1000 ml
1012	Mobile Phase, 10 x 1000 ml
1003/B	Calibration Standard (lyoph.), 5 x 1.0 ml
1004/B	Internal Standard (iso-VMA), 100 ml
1005	Wash Buffer 1, 300 ml
1006	Wash Buffer 2, 300 ml
1077	Elution Buffer, 200 ml
1013	Finisher, 10 ml
1008	Sample Clean Up Columns, 50 pcs.

	Accessories
1100/B	HPLC Column, equilibrated, with test chromatogram, 1 pc.
1009	Urine Calibration Standard (lyoph.), 5 x 5 ml
1099	Potential Optimisation Mix (lyoph.), 5 x 0.5 ml
	Optional additional Internal Standard for 5-HIAA:
51303/B	Internal Standard (HICA), 5 ml

	Accessories for electrochemical detectors
41203	Glassy Carbon Working Electrode, 1 pc.
41211	Reference Electrode Ag/AgCL, 1 pc.
41239	KCl Solution, 3 mol/l, 50 ml

More accessories see page 166

	Chromsystems Urine Controls (lyoph.)
0040	Endocrine Urine Control, Normal Range, 10 x 8 ml
0050	Endocrine Urine Control, Pathological Range, 10 x 8 ml

For more details on these controls see page 16

Specifications

Linearity:	up to 78 mg/l (VMA, 5-HIAA), up to 51 mg/l (HVA)
Limit of quantification:	0.5 mg/l
Intraassay:	CV = 3.8 %
Interassay:	CV = 4.5 %
Recovery:	70 % (VMA), 82 % (HVA), 66 % (5-HIAA)
Analysis time:	< 18 min

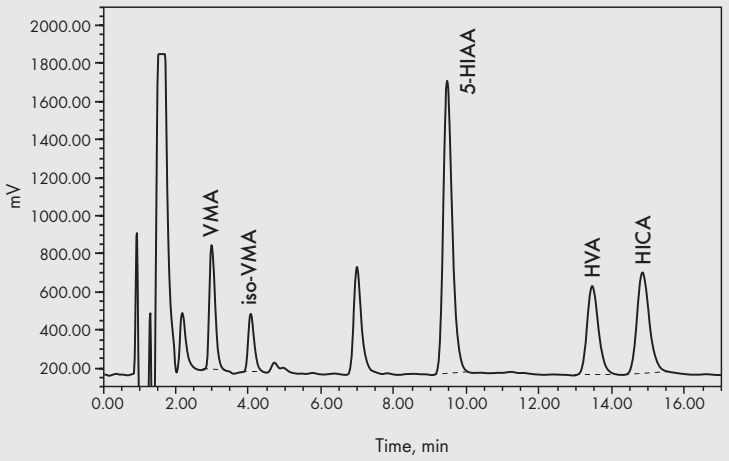
Pre-analytic Treatment

Specimens: urine
Determination of VMA/HVA: collect urine in 10 ml HCl 10–25 %. Stability at room temperature 7 days, at +2 to +8 °C 14 days, below -18 °C at least 3 months.
Determination of 5-HIAA: collect urine in 10 ml glacial acetic acid. Stability at +2 to +8 °C light protected up to 2 weeks.

Sample Preparation

→ Add 1 ml Internal Standard (buffered solution) to 50 µl urine and mix.
→ Apply sample to the sample clean up column. Draw through by vacuum or centrifugation; discard the effluent.
→ Apply 3 ml Wash Buffer 1 to the sample clean up column. Draw through by vacuum or centrifugation, discard the effluent.
→ Apply 3 ml Wash Buffer 2 to the sample clean up column. Draw through by vacuum or centrifugation, discard the effluent. Repeat this step once.
→ Apply 2 ml Elution Buffer. Draw through by vacuum or centrifugation. Collect the eluate, add 100 µl Finisher and mix well.
→ Inject 10–20 µl eluate into the HPLC system.

VMA, HVA, 5-HIAA in Urine



HPLC Parameters

Isocratic HPLC system with electro-chemical detector.

Injection volume: 10–20 µl
Flow rate: 1.0 ml/min
Potential: ~ 760 mV
Column temp.: ambient (~ 25 °C)

2.5 5-HIAA in Urine

5-HIAA

CE IVD

A number of diseases are associated with pathological changes in serotonin metabolism. In carcinoid tumour, a malignant hyperplasia of the enterochromaffin cells of the gastrointestinal tract, there is a marked increase in serotonin released into blood plasma. This tissue hormone is metabolised enzymatically in the liver by monoamine oxidase (MAO) and alcohol dehydrogenase (ADH) to 5-hydroxyindole-3-acetic acid (5-HIAA) and subsequently excreted via the kidney. Endocrine-active carcinoid thus results in an increased concentration of 5-HIAA in the urine. The quantitative determination of 5-hydroxyindoleacetic acid in urine is therefore employed in the diagnosis of carcinoid and for monitoring the therapy.

The Chromsystems reagent kit for the determination of 5-hydroxyindole-3-acetic acid in urine provides a rapid and reliable sample preparation procedure with only one precipitation step. The assay contains all the components in a ready-to-use form for sample preparation and HPLC determination. A carefully optimised chromatographic separation is part of the Chromsystems complete solution. A selected HPLC column and a mobile phase optimised specifically for this separation permit a certain and reliable quantification.

Urine samples prepared with this assay can also be tested with column and mobile phase of the VMA/HVA/5-HIAA assay.

> Easy sample preparation
> No exact pH adjustment required
> The alternative to immunoassay methods
> Compatible with the VMA/HVA/5-HIAA method

Eine Reihe von Erkrankungen steht im Zusammenhang mit pathologischen Veränderungen des Serotonin-Stoffwechsels. Beim Karzinoidtumor, einer malignen Wucherung der enterochromaffinen Zellen des Magen-Darm-Traktes, wird vermehrt Serotonin in den Kreislauf abgegeben. Dieses Gewebshormon wird in der Leber enzymatisch mit Hilfe der Monoaminoxidase (MAO) und der Alkoholdehydrogenase (ADH) zu 5-Hydroxyindolessigsäure (5-HIAA) verstoffwechselt und anschließend über die Niere ausgeschieden. Endokrin-aktive Karzinoide zeigen daher eine erhöhte Konzentration von 5-Hydroxyindolessigsäure im Urin. Die quantitative Bestimmung von 5-Hydroxyindolessigsäure im Urin wird daher zur Diagnose und Therapieüberwachung des Karzinoids herangezogen.

Mit Hilfe des Chromsystems Reagenzienkits ist die Bestimmung von 5-Hydroxyindolessigsäure im Urin mit nur einem Fällungsschritt als Probenvorbereitung schnell und zuverlässig möglich. Der Kit enthält alle zur Probenvorbereitung und HPLC-Bestimmung notwendigen Komponenten gebrauchsfertig vorbereitet. Eine ausgewählte HPLC-Säule zusammen mit einer für diese Trennung optimierten mobilen Phase erlauben eine sichere und zuverlässige Quantifizierung.

Die mit diesem Kit vorbereiteten Urinproben können auch mit der HPLC-Säule und mobilen Phase des VMA/HVA/5-HIAA-Kits getestet werden.

> Einfache Probenvorbereitung
> Keine exakte pH-Einstellung der Proben notwendig
> Die Alternative zum Immunassay
> Kompatibel mit der VMA/HVA/5-HIAA Methode

Parameter:
5-HIAA

5-HIAA in Urine

Order no.	Product
51000	5-Hydroxyindoleacetic Acid (5-HIAA) in Urine For 100 tests
	Components available separately
51001	Mobile Phase, 1000 ml
51002	Mobile Phase, 10 x 1000 ml
51003	Internal Standard, 10 ml
1009	Urine Calibration Standard (lyoph.), 5 x 5 ml
51005	Precipitation Reagent, 75 ml
3006	Reaction Vials, 100 pcs.
	Accessories
51100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
	Accessories for electrochemical detectors
41203	Glassy Carbon Working Electrode, 1 pc.
41211	Reference Electrode Ag/AgCL, 1 pc.
41239	KCl Solution, 3 mol/l, 50 ml
	More accessories see page 166
	Chromsystems Urine Controls (lyoph.)
0040	Endocrine Urine Control, Normal Range, 10 x 8 ml
0050	Endocrine Urine Control, Pathological Range, 10 x 8 ml

For more details on these controls see page 16

Specifications

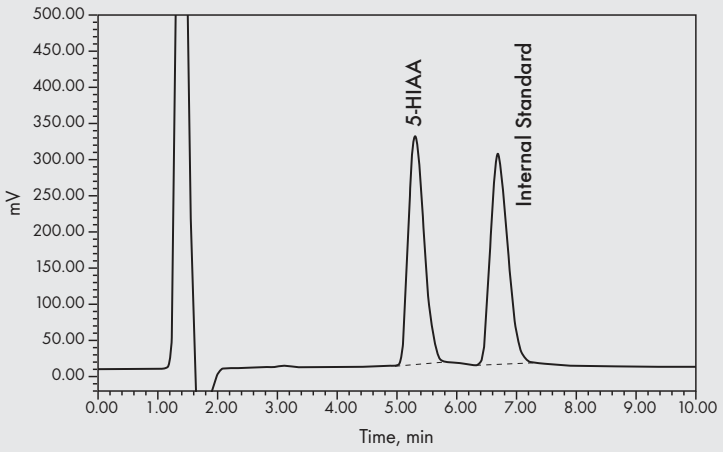
Linearity:	up to at least 25mg/l
Limit of quantification:	0.5 mg/l
Intraassay:	CV = 2.6–6.9 %
Interassay:	CV = 4.0–4.1 %
Recovery:	101 %
Analysis time:	~ 9 min

Pre-analytic Treatment

Specimens: 24 h urines collected with 10 ml glacial acetic acid. The samples should have a pH of 4–6 and can be stored up to 3 days at +2 to +8 °C in the dark.

Sample Preparation

→ Place a 200 µl aliquot of the acidified urine sample in a test tube or reaction vial.
→ Add 100 µl Internal Standard.
→ Then add 700 µl Precipitation Reagent. Mix thoroughly.
→ Centrifuge in a bench-top centrifuge (2 min at 10000 x g).
→ Dilute 500 µl supernatant with 500 µl ultrapure water (HPLC grade). Mix thoroughly.
→ Inject 10–20 µl of this solution into the HPLC system.



HPLC Parameters

Isocratic HPLC system with electro-chemical detector.

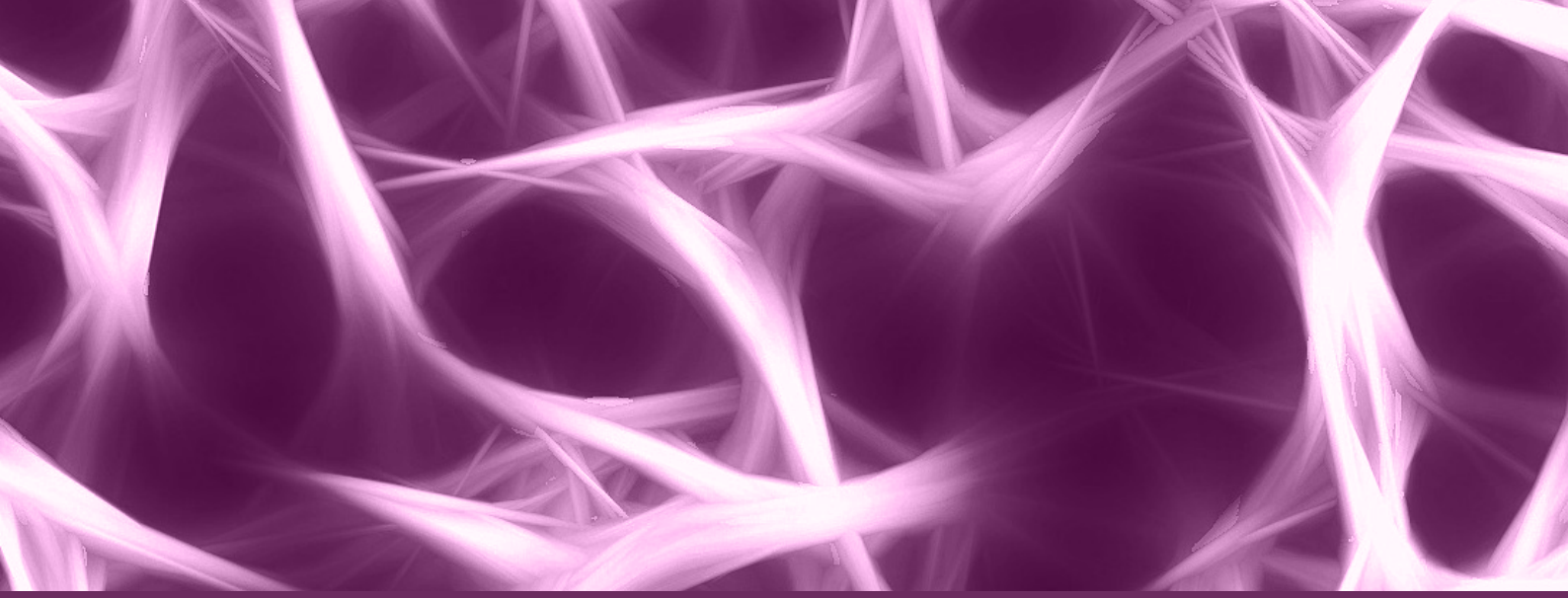
Injection volume: 10–20 µl
Flow rate: 0.8–1.3 ml/min
Potential: ~ +620 to +680 mV
Column temp.: ambient (~ 25 °C)

3

Osteoporosis Diagnosis

Osteoporosis is a disease that leads to low bone mass and deterioration of bone tissue, thereby increasing the risk of fractures. Bone density decreases after 35 years of age, and bone loss occurs more rapidly in women after menopause. Some of the risk factors are a genetic disposition, lack of calcium and vitamin D, smoking and excessive alcohol consumption. Disease treatment options include calcium and vitamin D supplementation.

Vitamin D is essential in the regulation of calcium homeostasis and bone metabolism. A deficiency of this vitamin leads to a decrease of the calcium level and to disturbances in bone mineralisation. Associated symptoms are rickets (children) and osteoporosis (adults). Patients with vitamin D deficiency show increased excretion of collagen crosslinks, which is indicative of a bone resorption process.



Knochenstoffwechselmarker

Osteoporose ist eine Krankheit, die zu einer reduzierten Knochenmasse und Verschlechterung des Knochengewebes führt, was das Risiko von Knochenbrüchen erhöht. Die Knochendichte vermindert sich ab einem Alter von 35 Jahren, und Knochenschwund erfolgt bei Frauen nach der Menopause schneller. Einige der Risikofaktoren sind neben genetischer Disposition ein Mangel an Calcium und Vitamin D, Rauchen sowie übermäßiger Alkoholkonsum. Die Krankheit wird unter anderem mit Calcium und Vitamin D behandelt.

Vitamin D erfüllt wichtige regulatorische Funktionen in der Calciumhomöostase und im Knochenstoffwechsel. So führen Vitamin-D-Mangelzustände zu Hypocalcämie und einer gestörten Knochenmineralisierung, wie Rachitis bei Kindern und Osteoporose bei Erwachsenen. Der Zusammenhang zwischen Vitamin-D-Mangel und knochenabbauenden Prozessen lässt sich durch erhöhte Ausscheidung von Kollagen-Crosslinks (Pyridinium-Crosslinks) nachweisen.

3.1 25-OH-Vitamin D_3/D_2 in Serum/Plasma

CE IVD

For the diagnosis of bone mineralisation malfunction 25-OH-vitamin D_3 is a recognized clinical determinant. 25-OH-vitamin D_2 is measured for monitoring the therapy of vitamin D deficiency in case of using vitamin D_2 supplements.

Chromsystems offers for the determination of Vitamin D by HPLC, a standard kit as well as an online method that is provided with a selective online solid phase extraction. Both assays allow for the simultaneous and safe chromatographic determination of the main metabolites of the vitamins D_3 and D_2, 25-hydroxycholecalciferol and 25-hydroxyergocalciferol on an isocratic HPLC system with UV detection. The analytes are quantified by the inclusion of a stable internal standard.

> Combined vitamins D_3 and D_2 test
> Reliable separation
> Online sample preparation available
> Small sample volume (100 µl) with Online Method

Zur Diagnostik einer gestörten Knochenmineralisierung gilt der Hauptmetabolit des Vitamin D (25-OH-Vitamin D_3) als anerkannte klinisch-chemische Messgröße. 25-OH-Vitamin D_2 wird zur Beurteilung der Therapie des Vitamin-D-Mangels bei Supplementierung mit Vitamin D_2 herangezogen.

Chromsystems bietet zur HPLC-Bestimmung von Vitamin D eine Standardmethode an sowie eine Online-Methode mit einer selektiven Online-Festphasenextraktion. Beide Kits ermöglichen eine sichere und simultane chromatographische Bestimmung der Hauptmetabolite der Vitamine D_3 und D_2, 25-Hydroxycholecalciferol und 25-Hydroxyergocalciferol mittels HPLC und UV-Detektor. Zur sicheren Quantifizierung wird ein stabiler interner Standard verwendet.

> Kombinierter Test von Vitamin D_3 und D_2
> Zuverlässige Trennung
> Online-Methode verfügbar
> Geringes Probenvolumen (100 µl) bei der Online-Methode

Parameters:
25-OH-vitamin D_3, 25-OH-vitamin D_2

3.1.1 Standard Method: 25-OH-Vitamin D_3/D_2 in Serum/Plasma

Order no.	Product
38038	25-OH-Vitamin D_3/D_2 in Serum/Plasma For 100 tests
	Components available separately
38031	Mobile Phase, 1000 ml
38032	Mobile Phase, 10 x 1000 ml
38033	Vitamin D_3/D_2 Serum Calibration Standard (lyoph.), 5 x 2 ml
38004	Internal Standard, 5 ml
38005	Precipitation Reagent, 50 ml
38006	Wash Buffer 1, 200 ml
38007	Wash Buffer 2, 7.5 ml
38009	Elution Buffer, 20 ml
38008	Sample Clean Up Columns, 50 pcs.
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
38130	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15010	PEEK Prefilter Housing, 1 pc.
15011	PEEK-encased Prefilter, 2 µm, 5 pcs.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18038	Precolumn Cartridge 4/10, 1 pc.
	Multilevel Calibrator and Controls (lyoph.)
62028	3PLUS1® Multilevel Serum Calibrator Set 25-OH-Vitamin D_3/D_2, 4 x 1 ml
0028	25-OH-Vitamin D_3/D_2 Serum Control, Bi-Level (I + II), 2 x 5 x 2 ml
0029	25-OH-Vitamin D_3/D_2 Serum Control, Level I, 5 x 2 ml
0030	25-OH-Vitamin D_3/D_2 Serum Control, Level II, 5 x 2 ml

Specifications

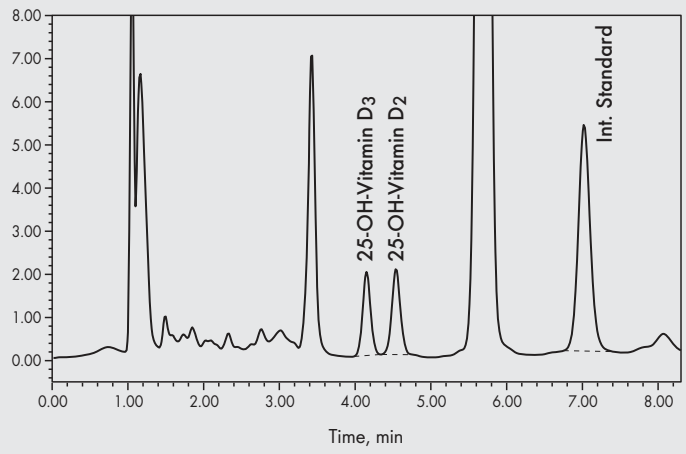
Linearity:	2–250 µg/l
Limit of quantification:	1.1–1.4 µg/l
Intraassay:	CV = 0.9–3.0 % (25-OH-vit. D_3) CV = 0.8–1.9 % (25-OH-vit. D_2)
Interassay:	CV = 2.3–3.3 % (25-OH-vit. D_3) CV = 1.9–4.6 % (25-OH-vit. D_2)
Recovery:	86 % (25-OH-vitamin D_3) 87 % (25-OH-vitamin D_2)
Analysis time:	12 min

Pre-analytic Treatment

Specimen: serum or plasma is used. Samples are stable up to 1 week at +2 to +8 °C.
For longer storage (maximum 1 year), deep-freeze samples below -18 °C.

Sample Preparation

→ Mix 500 µl serum/plasma with 50 µl Internal Standard in a light-protected reaction vial.
→ Add 500 µl Precipitation Reagent, vortex-mix for 20 s.
→ Cool down 10 min to 4 °C.
→ Centrifuge 5 min at 15 000 x g.
→ Apply complete supernatant to the sample clean up column and draw through by centrifugation or suction, discard effluent.
→ Draw 75 µl Wash Buffer 2 through column by centrifugation (400 x g, approx. 1 min) or suction, discard effluent.
→ Change collection vial, apply 200 µl Elution Buffer to the column, draw through completely by centrifugation (1 min at 400 x g) or suction. The eluates must be collected into glass vials. Dilute the eluate with 20 µl ultrapure water (HPLC grade) and mix.



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 25 µl
Flow rate: 0.7 ml/min
Wavelength: 265 nm
Column temp.: ambient (~ 25 °C)

3.1.2 Online Method: 25-OH-Vitamin D_3/D_2 in Serum/Plasma

Order no.	Product
38900/ 1000	25-OH-Vitamin D_3/D_2 in Serum/Plasma Online Method For 1000 tests

Components available separately

38901	Mobile Phase A, 1000 ml
38902	Mobile Phase B, 1000 ml
38904	Internal Standard, 25 ml
38033	25-OH-Vitamin D_3/D_2 Serum Calibration Standard (lyoph.), 5 x 2 ml
38910	HPLC Column, equilibrated, with test chromatogram, 1 pc.
38920	Trap Column, 1 pc.
15010	PEEK Prefilter Housing, 1 pc.
15011	PEEK-encased Prefilter, 2 µm, 5 pcs.
33006	Reaction Vials, transparent, 100 pcs.

Multilevel Calibrator and Controls (lyoph.)

62028	3PLUS1® Multilevel Serum Calibrator Set 25-OH-Vitamin D_3/D_2, 4 x 1 ml
0028	25-OH-Vitamin D_3/D_2 Serum Control, Bi-Level (I + II), 2 x 5 x 2 ml
0029	25-OH-Vitamin D_3/D_2 Serum Control, Level I, 5 x 2 ml
0030	25-OH-Vitamin D_3/D_2 Serum Control, Level II, 5 x 2 ml

Specifications

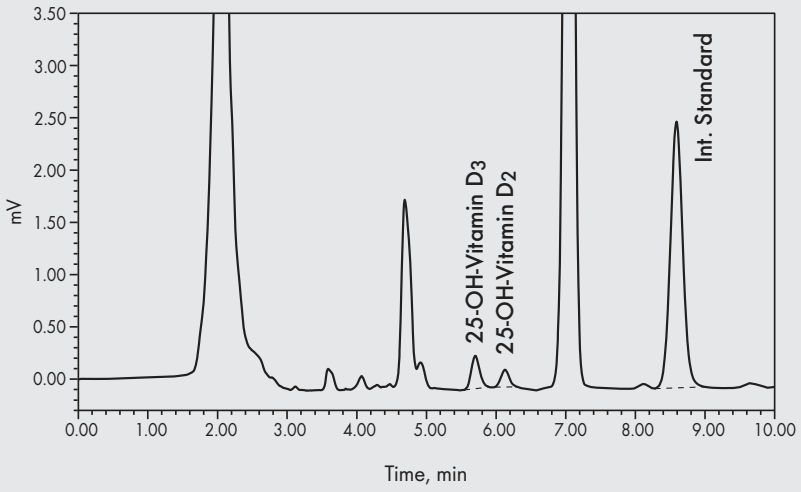
Linearity:	5–250 µg/l
Limit of quantification:	5 µg/l
Intraassay:	CV = 0.7–3.2 % (25-OH-Vit. D_3) CV = 1.4–4.1 % (25-OH-Vit. D_2)
Interassay:	CV = 4.0–5.6 % (25-OH-Vit. D_3) CV = 2.9–5.7 % (25-OH-Vit. D_2)
Recovery:	99 % (25-OH-Vitamin D_3) 93 % (25-OH-Vitamin D_2)
Analysis time:	10 min

Pre-analytic Treatment

Specimens: serum or plasma.
Stability of specimens: up to 1 week, stored at +2 to +8 °C. For longer storage (maximum 1 year) deep-freeze the samples below -18 °C. Samples should be cooled for transport.

Sample Preparation

→ Pipette 100 µl specimen/calibrator/control into a 1.5 ml reaction vial. Add 250 µl Internal Standard and vortex-mix for 20 s.
→ Incubate 10 min at +4 °C.
→ Centrifuge 5 min at 15 000 x g.
→ Inject 75 µl of the supernatant into the HPLC system.



HPLC Parameters

HPLC system with 2 HPLC pumps, a 6- or 10-port valve, an injector and an UV detector.

Injection volume: 75 µl
Flow rates:
Mobile Phase A (trap column)
1.0 ml/min
Mobile Phase B (analytic column)
0.7 ml/min
Wavelength: 265 nm
Column temp.: ambient (~ 25 °C)

3PLUS1® Multilevel Serum Calibrator Set 25-OH-Vitamin D_3/D_2

Substance	Unit	Calibrator 1*	Calibrator 2*	Calibrator 3*	Blank Calibrator*
25-OH-vitamin D_3	µg/l nmol/l	4.16 10.4	33.0 82.4	67.5 169	< LOQ < LOQ
25-OH-vitamin D_2	µg/l nmol/l	5.19 12.6	29.7 72.0	58.9 143	< LOQ < LOQ

** Please check packaging leaflet for specific lot concentrations*
LOQ = Limit of Quantification

Order no.	Product
62028	3PLUS1® Multilevel Serum Calibrator Set 25-OH-Vitamin D_3/D_2 (lyoph.), 4 x 1 ml

Stability of Serum Calibrator Set

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 1 week at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

25-OH-Vitamin D_3/D_2 Serum Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
25-OH-vitamin D_3	µg/l nmol/l	13.6 33.9	53.9 135
25-OH-vitamin D_2	µg/l nmol/l	13.3 32.2	53.7 130

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0028	25-OH-Vitamin D_3/D_2 Serum Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0029	25-OH-Vitamin D_3/D_2 Serum Control, Level I (lyoph.), 5 x 2 ml
0030	25-OH-Vitamin D_3/D_2 Serum Control, Level II (lyoph.), 5 x 2 ml

Stability of Serum Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 2 weeks at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

3.2 Crosslinks in Urine

CE IVD

This reagent kit allows the simple and reliable quantification of the total amount of the two urinary crosslinks, pyridinoline (PYD) and deoxypyridinoline (DPD), with an isocratic HPLC system. The use of an acidic hydrolysis resistant internal standard compensates losses and variation in the extraction procedure and increases precision and accuracy. After extraction on sample clean up columns as well as several washing steps in order to remove interfering substances, PYD, DPD, and internal standard are eluted. HPLC analysis is performed on an isocratic HPLC system with fluorescence detector.

Dieser Reagenzienkit erlaubt die gleichzeitige Bestimmung von Pyridinolin (PYD) und Desoxypyridinolin (DPD) im Urin mit einem einfachen isokratischen HPLC-System. Durch Verwendung eines hydrolysestabilen internen Standards können etwaige Verluste durch die Probenvorbereitung kompensiert, zudem Präzision und Richtigkeit der Bestimmung maximiert werden. Mittels Festphasenextraktion werden störende Fluorophore entfernt und anschließend PYD, DPD und interner Standard gemeinsam eluiert. Die chromatographische Trennung erfolgt isokratisch an einer RP-Säule mit nachfolgender Fluoreszenzdetektion.

> Hydrolysis resistant internal standard
> Easy sample preparation
> Accurate and reliable calibration

> Hydrolysestabiler interner Standard
> Einfache Probenvorbereitung
> Präzise und zuverlässige Kalibrierung

Parameters:
pyridinoline, deoxypyridinoline

Crosslinks in Urine

Order no.	Product
48000	Crosslinks (pyridinoline, deoxypyridinoline) in Urine For 100 tests
	Automated Assay for Gilson® ASPEC™:
48000/A1	For 100 tests
48000/A5	For 500 tests
48000/A9	For 1000 tests

	Components available separately
48001	Mobile Phase, 1000 ml
48002	Mobile Phase, 10 x 1000 ml
48003	Crosslinks Calibration Standard (lyoph.), 5 x 1 ml
48004	Internal Standard, 5 ml
48005	Extraction Buffer, 250 ml
48006	Wash Buffer, 250 ml
48007	Elution Buffer, 100 ml
48008	Sample Clean Up Columns, 50 pcs.

	Accessories
48100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
48009	Test Mix (incl. Internal Standard, ready-to-use), 2.5 ml
48010	Glass Tubes for hydrolysis, 10 pcs.
48011	Screw Caps, 10 pcs.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18048	Precolumn Cartridge 4/10, 1 pc.

	Chromsystems Urine Controls (lyoph.)
0045	Crosslinks Urine Control, Bi-Level (I + II), 2 x 5 x 2 ml
0046	Crosslinks Urine Control, Level I, 5 x 2 ml
0047	Crosslinks Urine Control, Level II, 5 x 2 ml

Specifications

Linearity:	up to 3200 pmol/ml for PYD up to 1200 pmol/ml for DPD
Limit of quantification:	15 pmol/ml for PYD 15 pmol/ml for DPD
Recovery:	95.5 % for PYD (CV = 1.4 %) 93.6 % for DPD (CV = 2 %)
Analysis time:	< 15 min

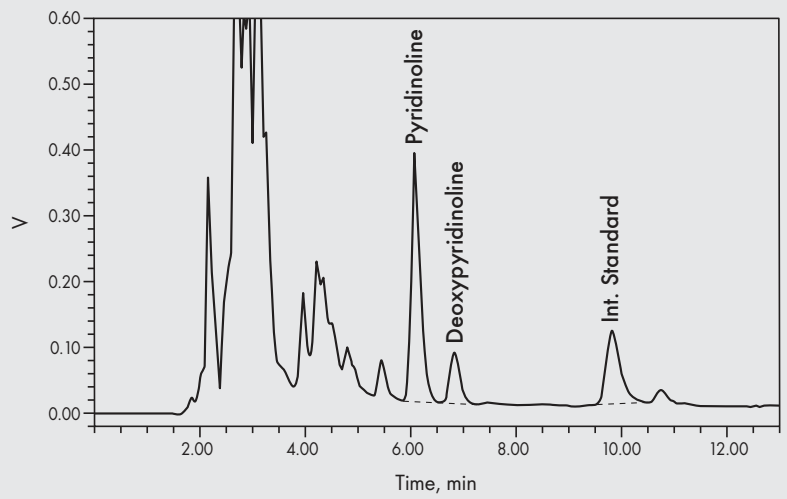
Pre-analytic Treatment

Specimens: spontaneous urine or collected for a period.
Stability of specimens: at +4 °C up to 7 days.
For longer storage samples should be frozen below -18 °C.
Protect samples from light.

Sample Preparation

→ Add 50 µl IS to 250 µl urine and hydrolyse with 250 µl 12 N HCl in screw capped glass tubes overnight (12–16 h) at 100 °C.
→ Add 2.5 ml Extraction Buffer, mix briefly.
→ To condition the SPE-columns, apply 2.0 ml Wash Buffer and drain by centrifugation.
→ Pipette entire sample volume to conditioned columns, drain by centrifugation at approx. 170 x g, discard the effluents.
→ Pipette to each column 2.5 ml Wash Buffer, drain sharply by centrifugation at approx. 700 x g, discard the effluents, repeat this step twice.
→ Change the collection tubes.
→ Pipette 1.0 ml Elution Buffer to each column and drain completely by centrifugation at approx. 700 x g, collect each eluate and mix well.
→ Inject 50 µl of each eluate into the HPLC system.

Crosslinks in Urine



HPLC Parameters

Isocratic HPLC system with fluorescence detector.

Injection volume: 50 µl
Flow rate: 1.2 ml/min
Wavelengths: EX 290 nm,
EM 395 nm
Column temp.: ambient (~ 25 °C)

Crosslinks Urine Controls

Substance	Unit	Target Value Level I*	Target Value Level II*
Pyridinoline	pmol/l µg/l	785 337	2034 873
Deoxypyridinoline	pmol/l µg/l	131 54.0	336 139
Free pyridinoline	pmol/l µg/l	265 114	646 277
Free deoxypyridinoline	pmol/l µg/l	45.9 19.0	108 44.6

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0045	Crosslinks Urine Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0046	Crosslinks Urine Control, Level I (lyoph.), 5 x 2 ml
0047	Crosslinks Urine Control, Level II (lyoph.), 5 x 2 ml

Stability of Urine Controls

Please check instruction manual for detailed information

> Stable to expiry date at +2 °C to +8 °C
> Reconstituted up to 1 month at +2 °C to +8 °C
> Reconstituted aliquots up to 6 months below -18 °C

Notes

4

Vitamin Profiling

Vitamins play an important role in a variety of biochemical pathways, in the regulation of cell and tissue growth and as antioxidants or enzyme cofactors. A lack of vitamins as well as increased vitamin levels can be identified by the determination of whole blood or urine from patients, which enables physicians to optimise patients´ vitamin intake, for example by changes to the diet or by supplementation, as well as to monitor changes in the vitamin status.

Vitaminstatus

Vitamine spielen eine wichtige Rolle bei einer Vielzahl von biochemischen Stoffwechselprozessen, bei der Regulation des Zell- und Gewebewachstums und fungieren als Antioxidantien oder Enzym-Cofaktoren. Ein Vitaminmangel sowie erhöhte Vitaminwerte können im Vollblut oder Urin eines Patienten bestimmt werden. Dies ermöglicht dem Arzt, beispielsweise durch Änderungen der Ernährungsweise oder durch Supplementierung die Vitaminaufnahme zu optimieren und den Vitaminstatus kontinuierlich zu beobachten.

Overview Vitamin A and E, B_1 and B_6 Assays

Chromsystems offers CE-IVD validated complete assays for the determination of vitamins A and E, vitamins B_1 and B_6, as well as calibrators and controls. There are solutions available for any requirements:

- **Standard method**
- **Method with pre-mixed tubes for simplified sample preparation**
- **UHPLC method for short analysis time and high sample throughput**
- **Automated methods**

Chromsystems bietet CE-IVD validierte, komplette Kits zur Bestimmung von Vitamin A and E, Vitamin B_1 und B_6 sowie Kalibratoren und Kontrollen an. Für jedes Labor gibt es die passende Lösung:

- **Standardmethode**
- **Methode mit pre-mixed Tubes für die vereinfachte Probenvorbereitung**
- **UHPLC-Methode für kurze Analysendauer und hohen Probendurchsatz**
- **Automatisierte Methoden**

Combined Vitamin A and E Assays

	Manual Methods			**Automated Methods**	
Order no.	34000	34000/Premix	34900/UHPLC	34700/F	34900/F
Parameter	Vitamin A Vitamin E	Vitamin A Vitamin E	Vitamin A Vitamin E	Vitamin A Vitamin E	Vitamin A Vitamin E
Specimen	Serum, plasma	Serum, plasma	Serum, plasma	Serum, plasma	Serum, plasma
Method	HPLC	HPLC	UHPLC	HPLC	UHPLC
Number of tests	100	100	1000	5 x 96	10 x 96
Injection volume	50 µl	50 µl	5 µl	50 µl	5 µl
Analysis time	9 min	9 min	3.5 min	9 min	3.5 min
Characteristics	Standard method	One-step sample preparation with pre-mixed tubes	One-step sample preparation with pre-mixed tubes Short analysis time, high sample throughput	HPLC method, automated	UHPLC method, automated Short analysis time, high sample throughput
Page	47	48	49	50	50

Combined Vitamin B_1 and B_6 Assays

	Manual Methods			Automated Methods	
Order no.	52052	52052/Premix	52952/UHPLC	52752/F	52952/UHPLC/F
Parameter	Vitamin B_1 Vitamin B_6	Vitamin B_1 Vitamin B_6	Vitamin B_1 Vitamin B_6	Vitamin B_1 Vitamin B_6	Vitamin B_1 Vitamin B_6
Specimen	B_1: whole blood B_6: whole blood and plasma	B_1: whole blood B_6: whole blood and plasma	B_1: whole blood B_6: whole blood and plasma	Whole blood	Whole blood
Method	HPLC	HPLC	UHPLC	HPLC	UHPLC
Number of tests	100	100	1000	960	960
Injection volume	25–50 µl	25–50 µl	2.5–10 µl	25–50 µl	2.5–5 µl
Analysis time	7–9 min	7–9 min	3 min	9 min	3 min
Characteristics	Standard method	Simplified sample preparation with pre-mixed tubes	Simplified sample preparation with pre-mixed tubes Short analysis time, high sample throughput	HPLC method, automated	UHPLC method, automated Short analysis time, high sample throughput
Page	63	64	66	67	67

Single Vitamin B_1 and B_6 Assays

	Manual Methods		
Order no.	35000	31000/S	31000/WB
Parameter	Vitamin B_1	Vitamin B_6	Vitamin B_6
Specimen	Whole blood	Plasma/serum	Whole blood
Method	HPLC	HPLC	HPLC
Number of tests	100	100	100
Injection volume	50 µl	25–50 µl	25–50 µl
Analysis time	< 6 min	< 8 min	< 8 min
Characteristics	Standard method	Standard method	Standard method
Page	54	60	60

4.1 Vitamins A and E in Serum/Plasma

CE IVD

Vitamin A (retinol) is essential for the formation of rhodopsin, for bone metabolism, and for the synthesis of steroid hormones. Deficiency of vitamin A leads to night blindness, dry skin, and loss of hair. Vitamin E (a-tocopherol) is a potent antioxidant that protects LDL cholesterol and cellular membranes from lipid peroxidation, which mainly occurs as a result of increased oxidative stress in the organism.

Chromsystems offers kits for the combined determination of vitamin A and E by HPLC and UHPLC. Both vitamins can be determined in a single isocratic HPLC/UHPLC run with UV-detection. The HPLC sample preparation is available as standard method as well as in a one step procedure with pre-mixed tubes. The use of a stable internal standard as well as the easy sample preparation guarantee rapid and reliable results. For very large sample numbers, there is also a method available for automated sample preparation of 96 samples in less than 30 minutes.

> Specific method
> Easy handling
> Low costs per test
> Methods for HPLC and UHPLC
> Automated assays available

Vitamin A (Retinol) erfüllt im Körper wichtige Aufgaben beim Sehvorgang, im Knochenstoffwechsel und bei der Bildung von Steroidhormonen. Ein Mangel kann unter anderem zu Nachtblindheit, Hautaustrocknung und Haarausfall führen. Vitamin E (a-Tocopherol) schützt als Antioxidans die ungesättigten Fettsäuren der Zellmembranen und das LDL-Cholesterin vor dem Angriff reaktiver freier Radikale, die bei erhöhtem oxidativen Stress vermehrt im Körper auftreten.

Chromsystems bietet Kits für die kombinierte Bestimmung von Vitamin A und E mittels HPLC und UHPLC an. Die Vitamine werden in einem einzigen isokratischen HPLC/UHPLC-Lauf mit UV-Detektion bestimmt. Die Probenvorbereitung für die HPLC ist verfügbar als Standardmethode sowie mit Pre-mixed Tubes, die nur einen Vorbereitungsschritt benötigen. Die Verwendung eines stabilen internen Standards sowie die einfache Probenvorbereitung stellen schnelle und zuverlässige Ergebnisse sicher. Für eine hohe Probenzahl ist auch eine Methode zur automatisierten Probenvorbereitung verfügbar, mit der 96 Proben in weniger als 30 Minuten aufbereitet werden können.

> Spezifische Methode
> Einfache Probenvorbereitung
> Geringe Kosten pro Analyse
> Methoden für HPLC und UHPLC
> Automatisierte Methoden verfügbar

Parameters:
vitamin A (retinol), vitamin E (a-tocopherol)

4.1.1 Standard Method: Vitamins A and E in Serum/Plasma

Order no.	Product
34000	Vitamins A and E in Serum/Plasma For 100 tests
	Components available separately
34001	Mobile Phase, 1000 ml
34002	Mobile Phase, 10 x 1000 ml
34006	Precipitation Reagent I, 2.5 ml
34003	Precipitation Reagent II, 40 ml
34004	Vitamins A and E Serum Calibration Standard, 5 x 1 ml (lyoph.)
34008	Internal Standard, 2 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
34100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18034	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Serum Controls (lyoph.)
0032	Vitamins A and E Serum Control Bi-Level (I + II), 2 x 5 x 2 ml
0036	Vitamins A and E Serum Control Level I, 5 x 2 ml
0037	Vitamins A and E Serum Control Level II, 5 x 2 ml

Specifications

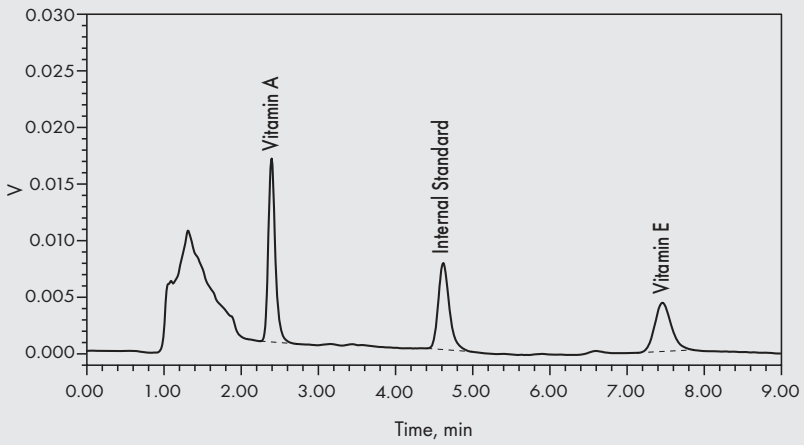
Linearity:	vitamin A 0.02–5.0 mg/l vitamin E 0.25–45 mg/l
Intraassay:	CV ≤ 2.5 %
Interassay:	CV ≤ 3.8 %
Recovery:	vitamin A 106–111 % vitamin E 101–104 %
Analysis time:	approx. 9 min

Pre-analytic Treatment

Specimens: serum or plasma. After centrifugation the obtained plasma/serum should be separated as soon as possible and stored below -18 °C respectively.
Protect samples from light.

Sample Preparation

→ To 200 µl plasma/serum add 20 µl Internal Standard and 25 µl Precipitation Reagent I.
→ Mix 30 s (vortex).
→ Add 400 µl Precipitation Reagent II.
→ Mix 30 s (vortex).
→ Centrifuge 10 min at 9000 x g.
→ Inject 50 µl of the supernatant into the HPLC system.



HPLC Parameters

Isocratic HPLC system with programmable UV detector.

Injection volume: 50 µl
Flow rate: 1.5 ml/min
Wavelength: 325 nm, after 3.5 min switch to 295 nm
Column temp.: ambient (20–25 °C)

4.1.2 One Step Vitamins A and E in Serum/Plasma with Pre-mixed Tubes

Sample preparation with one single step

Order no.	Product
34000/ Premix	One Step Vitamins A and E in Serum/ Plasma using Pre-mixed Reaction Tubes For 100 tests

Components available separately

34001	Mobile Phase, 1000 ml
34002	Mobile Phase, 10 x 1000 ml
34906	Pre-mixed Reaction Tubes, 100 pcs.
34004	Vitamins A and E Serum Calibration Standard, 5 x 1 ml (lyoph.)

Accessories

34100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18034	Precolumn Cartridge 4/10, 1 pc.

Chromsystems Serum Controls (lyoph.)

0032	Vitamins A and E Serum Control Bi-Level (I + II), 2 x 5 x 2 ml
0036	Vitamins A and E Serum Control Level I, 5 x 2 ml
0037	Vitamins A and E Serum Control Level II, 5 x 2 ml

Specifications

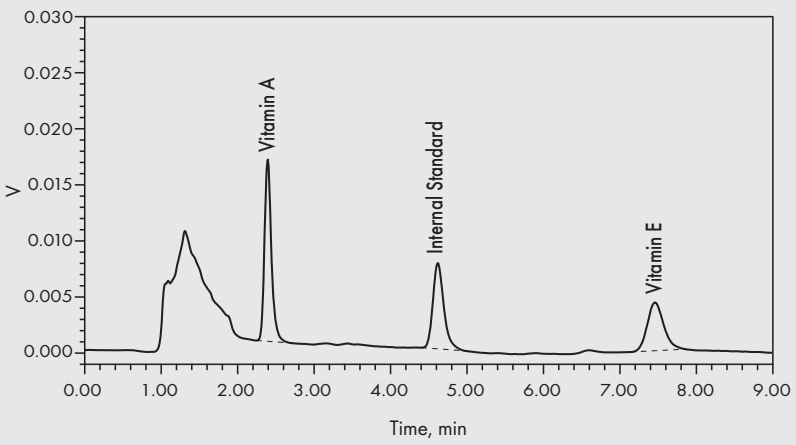
Linearity:	vitamin A 0.02–4.5 mg/l vitamin E 0.60–38 mg/l
Intraassay:	serum CV ≤ 1 % (Vitamin A) serum CV < 3 % (Vitamin E) plasma CV < 5 %
Interassay:	serum CV < 5.5 % (Vitamin A) serum CV < 4 % (Vitamin E) plasma CV ≤ 3.5 %
Recovery:	vitamin A 99–100 % vitamin E 96–107 %
Analysis time:	approx. 9 min

Pre-analytic Treatment

Specimens: serum or plasma. After centrifugation the obtained plasma/serum should be separated as soon as possible and stored below -18 °C respectively.
Protect samples from light.

Sample Preparation

→ Pipette into a labelled pre-mixed reaction tube 100 µl plasma/serum.
→ Mix 30 s (vortex).
→ Centrifuge 10 min with at least 9000 x g.
→ Inject 50 µl of the supernatant into the HPLC system.



HPLC Parameters

Isocratic HPLC system with programmable UV detector.

Injection volume: 50 µl
Flow rate: 1.5 ml/min
Wavelength: 325 nm, after 3.5 min switch to 295 nm
Column temp.: ambient (20–25 °C)

4.1.3 UHPLC: One Step Vitamins A and E in Serum/Plasma with Pre-mixed Tubes

Fast method with high throughput

Order no.	Product
34900/ UHPLC	**UHPLC:** One Step Vitamins A and E in Serum/Plasma using Pre-mixed Reaction Tubes, column and mobile phases also included For 1000 tests
	Components available separately
34906	Pre-mixed Reaction Tubes, 100 pcs.
34004	Vitamins A and E Serum Calibration Standard, 5 x 1 ml (lyoph.)
	Accessories
19001	UHPLC Precolumn Cartridge Holder, 1 pc.
19034	UHPLC Precolumn Cartridge,1 pc.
	Chromsystems Controls (lyoph.)
0032	Vitamins A and E Serum Control Bi-Level (I + II), 2 x 5 x 2 ml
0036	Vitamins A and E Serum Control Level I, 5 x 2 ml
0037	Vitamins A and E Serum Control Level II, 5 x 2 ml

Specifications

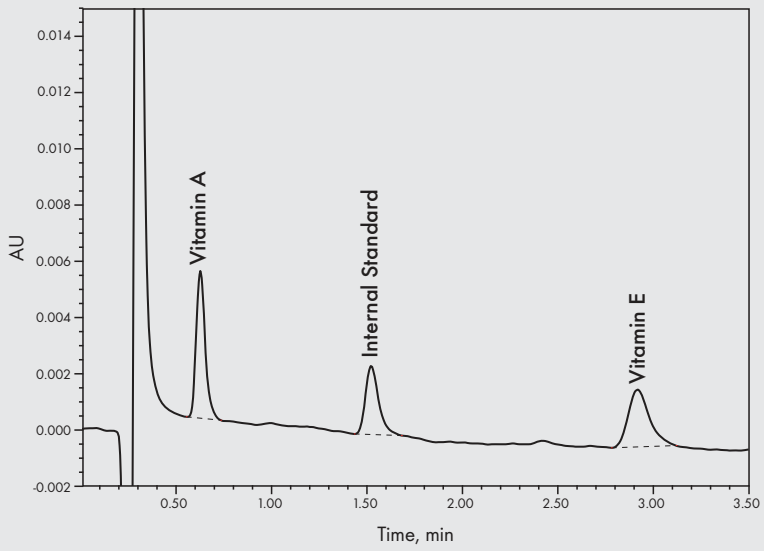
Linearity:	vitamin A 0.005–4.5 mg/l vitamin E 0.10–38 mg/l
Intraassay:	CV = 0.6–1.3 % (vitamin A) CV = 0.5–1.4 % (vitamin E)
Interassay:	CV = 2.9–3.1 % (vitamin A) CV = 2.3–3.0 % (vitamin E)
Recovery:	vitamin A 104 % vitamin E 101 %
Analysis time:	3.5 min

Pre-analytic Treatment

Specimens: serum or plasma. After centrifugation the obtained plasma/serum should be separated as soon as possible and stored below -18 °C respectively. Protect samples from light.

Sample Preparation

→ Pipette into a labelled pre-mixed reaction tube 100 µl plasma/serum.
→ Mix 30 s (vortex).
→ Centrifuge 10 min with at least 9000 x g.
→ Inject 5 µl of the supernatant into the UHPLC system.



UHPLC Parameters

UHPLC system with isocratic pump, column oven and programmable UV detector.

Pressure: approx. 400 bar
Injection volume: 5 µl
Flow rate: 0.60 ml/min
Wavelengths: start EX 325 nm, after 1.30 min switch to 295 nm.
Column temperature: 35 °C

4.1.4 Automated Vitamins A and E in Serum/Plasma for HPLC and UHPLC

Automated with 96 Well Filter Plates

Order no.	Product
34700/F	**HPLC:** Automated Vitamins A and E in Serum/Plasma using Well Filter Plates For 5 x 96 tests
	Components available separately
34001	Mobile Phase, 1000 ml
34002	Mobile Phase, 10 x 1000 ml
34004	Vitamins A and E Serum Calibration Standard (lyoph.), 5 x 1 ml
34006	Precipitation Reagent I, 2.5 ml
34708	Internal Standard, 100 ml
34757	96 Well Filter Plates, 5 pcs.
34758	Collection Plates, 5 pcs.
34760	Pierceable Heat Seals for 96 Well Plates, 6 pcs.
	Accessories for HPLC
34100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18034	Precolumn Cartridge 4/10, 1 pc
42740	Chromsystems Heat Sealer
34900/F	**UHPLC:** Automated Vitamins A and E in Serum/Plasma using Well Filter Plates, column and mobile phases also included For 10 x 96 tests
	Components available separately
34004	Vitamins A and E Serum Calibration Standard (lyoph.), 5 x 1 ml
34006	Precipitation Reagent I, 2.5 ml
34708	Internal Standard, 100 ml
34757	96 Well Filter Plates, 5 pcs.
34758	Collection Plates, 5 pcs.
34760	Pierceable Heat Seals for 96 Well Plates, 6 pcs.
	Accessories for UHPLC
19034	UHPLC Precolumn Cartridge, 1 pc.
19001	UHPLC Precolumn Cartridge Holder, 1 pc.
42740	Chromsystems Heat Sealer

	Chromsystems Controls (lyoph.)
0032	Vitamins A and E Serum Control Bi-Level (I + II), 2 x 5 x 2 ml
0036	Vitamins A and E Serum Control Level I, 5 x 2 ml
0037	Vitamins A and E Serum Control Level II, 5 x 2 ml

Specifications

Linearity: vitamin A up to 4.5 mg/l
vitamin E up to 38 mg/l

Limit of quantification
HPLC: vitamin A 0.02 mg/l
vitamin E 0.5 mg/l
UHPLC: vitamin A 0.02 mg/l
vitamin E 0.4 mg/l

Recovery: vitamin A > 94 %
vitamin E > 90 %
Intraassay: CV < 5 %
Interassay: CV ≤ 5.6 %
Analysis time: HPLC 9 min
UHPLC 3.5 min

Pre-analytic Treatment

Specimens: serum or plasma.
After centrifugation the obtained plasma/serum should be separated as soon as possible and stored below -18 °C respectively. Protect samples from light.

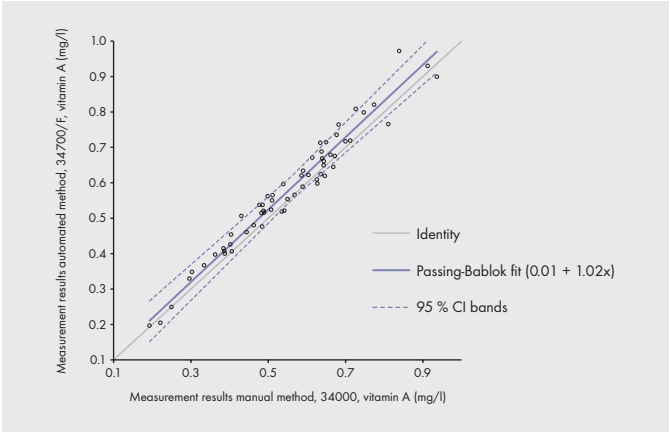
Automated Workflow

→ Load liquid handling device with samples, reagents, 96 well filter plate and collection plate.
→ Start the **automation routine***.
→ After completion remove collection plate from the liquid handling device, seal with a heat seal and transfer to autosampler.
→ Inject 50 µl eluate into the HPLC system or 5 µl eluate into the UHPLC system.

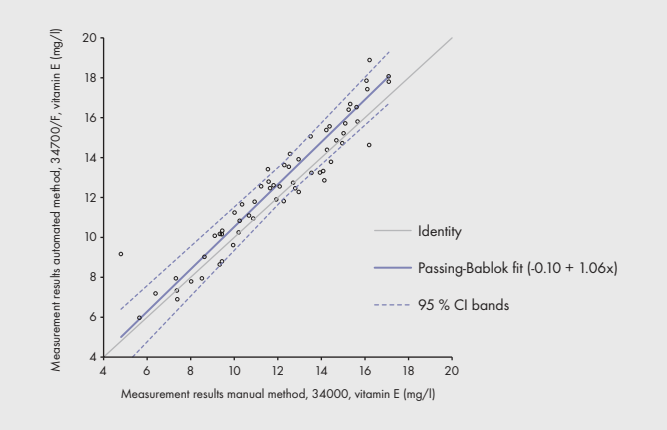
* *Ready to use automation routine provided with the installation by Chromsystems.*

Automated Vitamins A and E in Serum/Plasma for HPLC and UHPLC

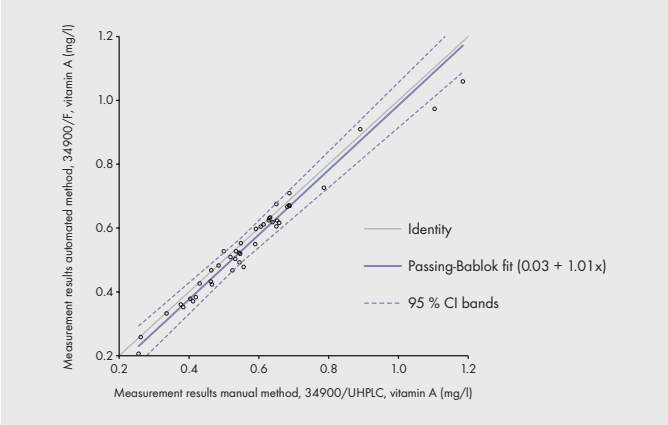
Vitamin A, HPLC



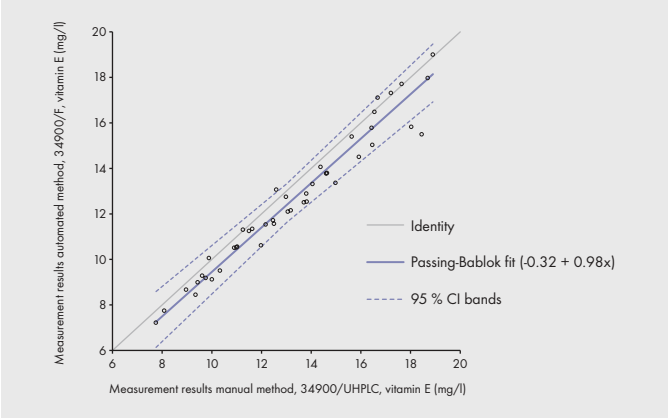
Vitamin E, HPLC



Vitamin A, UHPLC



Vitamin E, UHPLC



Vitamins A and E Serum Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Retinol	mg/l µmol/l	0.47 1.66	1.05 3.65
a-Tocopherol	mg/l µmol/l	8.21 19.1	15.5 36.1

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0032	Vitamins A and E Serum Control Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0036	Vitamins A and E Serum Control Level I (lyoph.), 5 x 2 ml
0037	Vitamins A and E Serum Control Level II (lyoph.), 5 x 2 ml

Stability of Serum Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 3 weeks at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

4.2 Vitamin B_1 in Whole Blood

CE IVD

Vitamin B_1 (thiamine) is a coenzyme involved in the normal function of the nervous system, mucous and heart. It plays a role in the physiological energy metabolism on the basis of carbohydrates and fatty acids and is essential for normal growth and development. Vitamin B_1 helps to maintain the health of mucous membranes such as those lining the intestines. Thiamine diphosphate (also refered to as "thiamine pyrophosphate") is the physiologically active form of vitamin B_1, thus the monitoring of this diphosphate should be preferred to the determination of total thiamine.

This reagent kit allows the easy and safe determination of vitamin B_1 in whole blood using a simple isocratic HPLC system. The derivatisation, necessary for fluorescence detection, is included in the sample preparation procedure.

A method for the combined analysis of vitamin B_1 and B_6 is also available (see chapter 4.5).

> No post-column derivatisation
> Easy handling
> Highly stable calibration standards and controls

Vitamin B_1 (Thiamin) ist ein wasserlösliches Coenzym und übernimmt im Körper wichtige Steuerfunktionen, um Kohlenhydrate, Fette und Alkohol in Energie umzuwandeln. Darüber hinaus ist es für die Funktion von Nervengewebe und den Herzmuskel von Bedeutung. Ferner spielt Vitamin B_1 auch eine wichtige Rolle in der Physiologie von Schleimhautmembranen wie z. B. jene der Darmwände. Die physiologisch aktive Form ist das Thiamindiphosphat, auch als Thiaminpyrophosphat (TPP) bezeichnet. Die Bestimmung von TPP sollte jener des Gesamt-Thiamins bevorzugt werden.

Dieser Reagenzienkit ermöglicht die einfache und sichere Bestimmung von Vitamin B_1 im Vollblut mit einem isokratischen HPLC-System. Die für die Fluoreszenzdetektion notwendige Derivatisierung erfolgt während der Probenaufbereitung. Es ist kein zusätzlicher Geräteaufwand nötig.

Eine kombinierte Analyse von Vitamin B_1 und B_6 ist ebenfalls erhältlich (siehe Kapitel 4.5).

> Keine Nachsäulenderivatisierung
> Einfache Handhabung
> Stabile Kalibratoren und Kontrollen

Parameter:
vitamin B_1 (thiamine pyrophosphate)

Vitamin B_1 in Whole Blood

Order no.	Product
35000	Vitamin B_1 in Whole Blood For 100 tests

Components available separately

35021	Mobile Phase, 1000 ml
35022	Mobile Phase, 10 x 1000 ml
37003	Extraction Buffer, 10 ml
37004	Precipitation Reagent, 30 ml
35005	Derivatisation Reagent 1 (lyoph.), 5 x 0.3 ml
35006	Derivatisation Reagent 2, 20 ml
35009	Neutralisation Buffer, 10 ml
35007	Stabilisation Buffer, 10 ml
37008	Whole Blood Calibration Standard Vitamins B_1/B_2 (lyoph.), 5 x 1 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.

Accessories

35110	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18035	Precolumn Cartridge 4/10, 1 pc.

Chromsystems Controls (lyoph.)

0033	Vitamin B_1/B_2 Whole Blood Control Bi-Level (I + II), 2 x 5 x 2 ml
0034	Vitamin B_1/B_2 Whole Blood Control Level I, 5 x 2 ml
0035	Vitamin B_1/B_2 Whole Blood Control Level II, 5 x 2 ml

Specifications

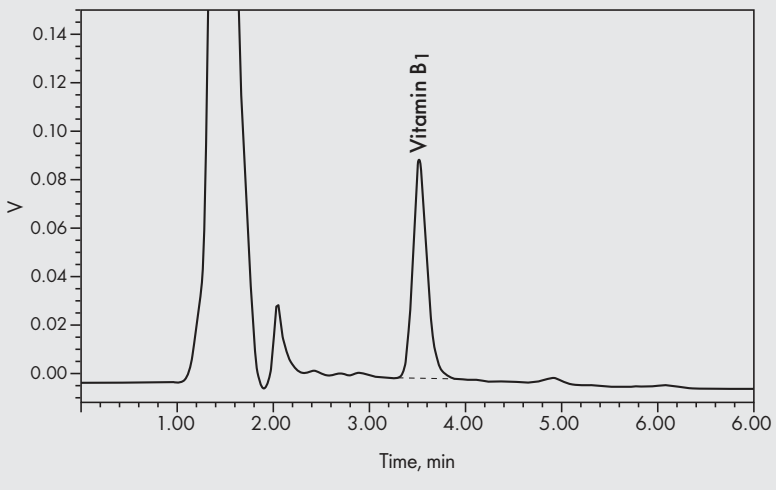
Linearity:	up to at least 750 µg/l
Limit of quantification:	0.8 µg/l
Intraassay :	CV = 2.8–4.9 %
Interassay:	CV = 4.3–4.7 %
Recovery:	91 %
Analysis time:	6 min

Pre-analytic Treatment

Specimens: whole blood.
Protect samples from light. In a closed vial samples are stable for 24h at +2 °C to +8 °C. For longer storage period (up to 6 months) keep samples frozen below -18 °C.

Sample Preparation

→ To 200 µl sample add 100 µl Extraction Buffer.
→ Mix 2 s (vortex).
→ Add 300 µl Precipitation Reagent, mix 30 s (vortex).
→ Centrifuge 5 min at 9000 x g.
→ Prepare 200 µl derivatisation mix (Derivatisation Reagent 1 + Derivatisation Reagent 2) in a fresh reaction vial.
→ Add 100 µl of the supernatant and mix briefly.
→ Add 100 µl Neutralisation Buffer.
→ Add 100 µl Stabilisation Buffer and mix.
→ Incubate 20 min.
→ Inject 50 µl to the HPLC system.



HPLC Parameters

Isocratic HPLC system with fluorescence detector.

Injection volume: 50 µl
Flow rate: 1.0 ml/min
Wavelengths: EX 367 nm,
EM 435 nm
Column temp.: ambient (~ 20 °C)

Vitamin B_1/B_2 Whole Blood Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Flavin adenine dinucleotide (FAD)	µg/l nmol/l	110 140	368 468
Flavin mononucleotide (FMN)	µg/l nmol/l	4.80 10.5	6.22 13.6
Riboflavin	µg/l nmol/l	7.77 20.6	28.5 75.8
Total riboflavin	µg/l nmol/l	64.4 171	210 558
Thiamine pyrophosphate (TPP)	µg/l nmol/l	26.0 61.3	101 238

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0033	Vitamin B_1/B_2 Whole Blood Control Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0034	Vitamin B_1/B_2 Whole Blood Control Level I (lyoph.), 5 x 2 ml
0035	Vitamin B_1/B_2 Whole Blood Control Level II (lyoph.), 5 x 2 ml

Stability of Whole Blood Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 24 hours at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

4.3 Vitamin B_2 in Whole Blood

CE IVD

Riboflavin (vitamin B_2) is the precursor of two coenzymes known as flavin adenine dinucleotide (FAD) and flavin mononucleotide (FMN). Both are essential for tissue respiration and the generation of energy from the metabolism of carbohydrates, amino acids and fats. Riboflavin is vital for normal reproduction, growth, repair and development of body tissues including the skin, hair, nails, connective tissue and immune system. Riboflavin is mainly converted into FAD and FMN in the small intestine, liver, heart and kidney.

This kit allows the easy sample preparation and safe determination of vitamin B_2, FAD and FMN in whole blood using an isocratic HPLC system with fluorescence detection.

> Safe results by stabilisation of FAD
> Simultaneous determination of FMN and FAD
> Highly stable calibration standards and controls

Riboflavin (Vitamin B_2) wird zu den zwei Coenzymen Flavinadenindinukleotid (FAD) und Flavinmononukleotid (FMN) umgewandelt. FAD und FMN sind essentiell für Prozesse der zellulären Atmung und für den Energiestoffwechsel auf der Basis von Kohlenhydraten, Aminosäuren und Fetten. Riboflavin ist ferner unerlässlich für das Immunsystem und für Wachstum, Entwicklung und Regeneration von Geweben wie Haut, Haare, Nägel, Bindegewebe sowie für die Reproduktion Riboflavin wird vor allem im Dünndarm, in Leber, Herz und in den Nieren zu FAD und FMN umgewandelt.

Dieser Kit ermöglicht die einfache und sichere Bestimmung von Vitamin B_2, FAD und FMN im Vollblut mit einem isokratischen HPLC-System und fluorimetrischer Detektion.

> Sichere Ergebnisse durch Stabilisierung von FAD
> Simultane Bestimmung von FMN und FAD
> Stabile Kalibratoren und Kontrollen

Parameters:
flavin adenine dinucleotide (FAD), flavin mononucleotide (FMN), vitamin B_2 (riboflavin)

Vitamin B_2 in Whole Blood

Order no.	Product
37000	Vitamin B_2 in Whole Blood For 100 tests
	Components available separately
37011	Mobile Phase, 1000 ml
37022	Mobile Phase, 10 x 1000 ml
37005	Extraction Buffer, 20 ml
37007	Precipitation Reagent, 40 ml
37099	Neutralisation Buffer, 10 ml
37008	Whole Blood Calibration Standard Vitamins B_1/B_2 (lyoph.), 5 x 1 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
37110	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
17001	Precolumn Cartridge Holder 4/10, 1 pc.
17037	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0033	Vitamin B_1/B_2 Whole Blood Control Bi-Level (I + II), 2 x 5 x 2 ml
0034	Vitamin B_1/B_2 Whole Blood Control Level I, 5 x 2 ml
0035	Vitamin B_1/B_2 Whole Blood Control Level II, 5 x 2 ml

Specifications

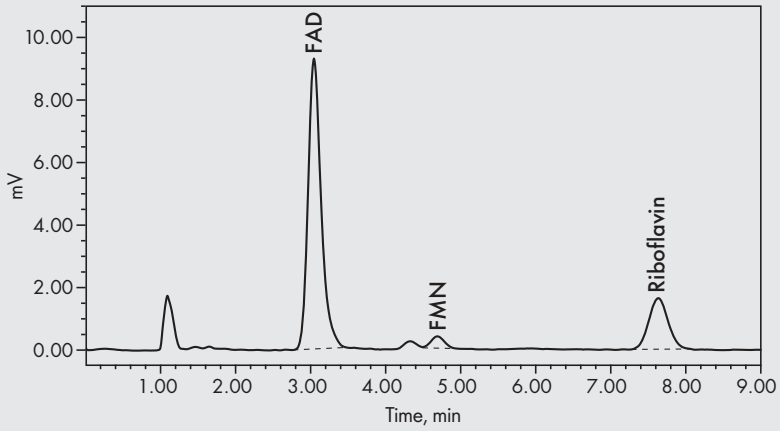
Linearity:	FAD up to 1000 µg/l FMN up to 500 µg/l riboflavin up to 500 µg/l
Limit of quantification:	FAD 3 µg/l whole blood FMN 1 µg/l whole blood riboflavin 2 µg/l
Intraassay:	CV < 3 %
Interassay:	CV < 6 %
Recovery:	FAD 106 % FMN 100 % riboflavin 108 %
Analysis time:	approx. 9 min

Pre-analytic Treatment

Specimens: whole blood.
Stability: up to 1 day at +2 to +8 °C. Samples not analysed immediately must be stored below -18 °C.

Sample Preparation

→ Pipette the following solutions into an light protected reaction vial and mix immediately for 30 s (vortex):
200 µl whole blood
+ 200 µl Extraction Buffer
+ 400 µl Precipitation Reagent.
→ Centrifuge for 10 minutes (> 9000 x g).
→ Pipette 100 µl Neutralisation Buffer into an light protected vial, then add 500 ml supernatant and mix well (vortex).
→ Inject 50 µl of this mixture into the HPLC system.



HPLC Parameters

Isocratic HPLC system with fluorescence detector.

Injection volume: 50 µl
Flow rate: 1.2 ml/min
Wavelengths: EX 465 nm,
EM 525 nm
Column temp.: ambient (~ 20 °C)

Vitamin B_1/B_2 Whole Blood Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Flavin adenine dinucleotide (FAD)	µg/l nmol/l	110 140	368 468
Flavin mononucleotide (FMN)	µg/l nmol/l	4.80 10.5	6.22 13.6
Riboflavin	µg/l nmol/l	7.77 20.6	28.5 75.8
Total riboflavin	µg/l nmol/l	64.4 171	210 558
Thiamine pyrophosphate (TPP)	µg/l nmol/l	26.0 61.3	101 238

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0033	Vitamin B_1/B_2 Whole Blood Control Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0034	Vitamin B_1/B_2 Whole Blood Control Level I (lyoph.), 5 x 2 ml
0035	Vitamin B_1/B_2 Whole Blood Control Level II (lyoph.), 5 x 2 ml

Stability of Whole Blood Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 24 hours at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

4.4 Vitamin B_6 in Plasma/Serum and Whole Blood

CE IVD

Pyridoxine, pyridoxal and pyridoxamine as well as their phosphates are shortly summarised as vitamin B_6. Pyridoxal-5′-phosphate, the active coenzyme form, takes part in nearly 100 enzymatic reactions. These include the synthesis and breakdown of amino acids, the conversion of amino acids into carbohydrates or fat and the conversion of one type of fat into another. It also plays a role in physiological processes such as the production of neurotransmitters and hormones.

This kit is designed for the easy and reliable determination of the active coenzyme form pyridoxal-5′-phosphate (PLP) in whole blood as well as in plasma/serum. The sample cleanup procedure includes an effective protein precipitation step to release the analyte from its proteinous holoenzyme. Subsequent derivatisation produces a fluorescent PLP derivative. The chromatographic determination is run on an isocratic HPLC system with fluorescence detection.

A method for the combined analysis of vitamin B_1 and B_6 is also available (see chapter 4.5).

> Suitable for whole blood as well as plasma/serum
> Fast and easy sample preparation
> Low cost per test

Pyridoxin, Pyridoxal und Pyridoxamin sowie deren Phosphatderivate werden als Vitamin B_6 zusammengefasst. Pyridoxal-5′-Phosphat (PLP) ist die aktive Coenzymform von B_6 und ist an nahezu 100 enzymatischen Reaktionen beteiligt, darunter die Synthese und der Abbau von Aminosäuren, die Verstoffwechselung von Aminosäuren zu Kohlenhydraten und der Fettsäurehaushalt. Vitamin B_6 wird auch für die Katalyse zur Bildung von Neurotransmittern und Hormonen gebraucht.

Mit diesem Reagenzienkit wird PLP aus Vollblut, Plasma oder Serum bestimmt. Die Probenvorbereitung besteht aus einer effektiven Proteinfällung und Abspaltung vom proteinösen Holoenzym. Bei der anschließenden Derivatisierung wird fluoreszierendes PLP-Derivat gebildet. Die chromatographische Messung erfolgt auf einem isokratischen HPLC-System mit Fluoreszenzdetektion.

Eine kombinierte Analyse von Vitamin B_1 und B_6 ist ebenfalls erhältlich (siehe Kapitel 4.5).

> Bestimmung im Vollblut und Plasma/Serum möglich
> Einfache Handhabung
> Geringe Kosten pro Analyse

Parameter:
vitamin B_6 (Pyridoxal-5′-phosphate)

Vitamin B_6 in Plasma/Serum and Whole Blood

Order no.	Product
31000/S	Vitamin B_6 (Pyridoxal-5´-Phosphate) in Plasma/Serum, with Plasma Calibration Standard For 100 tests
31000/WB	Vitamin B_6 (Pyridoxal-5´-Phosphate) in Whole Blood, with Whole Blood Calibration Standard For 100 tests

Components available separately

31001	Mobile Phase, 1000 ml
31002	Mobile Phase, 10 x 1000 ml
31003	Vitamin B_6 Whole Blood Calibration Standard (lyoph.), 5 x 1 ml
36005	Vitamin B_6 Plasma Calibration Standard (lyoph.), 5 x 1 ml
31004	Precipitation Reagent, 30 ml
31005	Neutralisation Reagent, 25 ml
31006	Derivatisation Reagent, 10 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.

Accessories

31100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18031	Precolumn Cartridge 4/10, 1 pc.

Chromsystems Controls (lyoph.)

0031	Vitamin B_6 Plasma Control, Bi-Level (I + II), 2 x 5 x 2 ml
0038	Vitamin B_6 Plasma Control, Level I, 5 x 2 ml
0039	Vitamin B_6 Plasma Control, Level II, 5 x 2 ml
0022	Vitamin B_6 Whole Blood Control, Bi-Level (I + II), 2 x 5 x 2 ml
0023	Vitamin B_6 Whole Blood Control, Level I, 5 x 2 ml
0024	Vitamin B_6 Whole Blood Control, Level II, 5 x 2 ml

Specifications

Linearity:	up to 750 µg/l
Limit of quantification:	plasma 0.5 µg/l
	whole blood 0.6 µg/l
Intraassay:	plasma CV < 0.9 %
	whole Blood CV < 1.3 %
Interassay:	plasma CV < 2 %
	whole Blood CV < 3.7 %
Recovery:	plasma 102 %
	whole Blood 86 %
Analysis time:	< 8 min

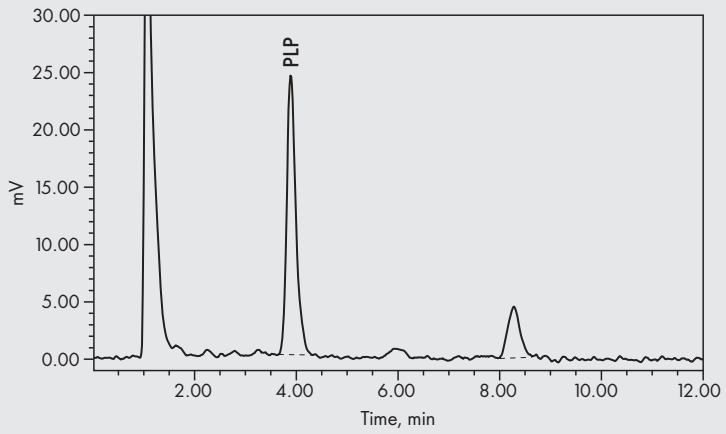
Pre-analytic Treatment

Specimens: plasma, serum or whole blood is used.
Keep samples cool and light protected for transport.
Samples are stable up to 7 days at +4 °C, for longer storage keep frozen below -18 °C.

Sample Preparation

→ To 200 µl of whole blood or plasma/serum add 300 µl Precipitation Reagent in a light protected vial, vortex-mix for at least 30 s.
→ Incubate for 10 min at +4 °C, then centrifuge for 5 min at 16 000 x g.
→ Transfer 250 µl supernatant into a new light protected vial.
→ Add 250 µl Neutralisation Reagent and 100 µl Derivatisation Reagent, mix briefly.
→ Incubate for 20 min at 60 °C (water bath).
→ Cool sample for 10 min at +4 °C, then centrifuge for 2 min at 16 000 x g.
→ Transfer supernatant into a light protected autosampler vial, inject 25–50 µl into the HPLC system.

Vitamin B_6 in Plasma/Serum and Whole Blood



HPLC Parameters

Isocratic HPLC system with fluorescence detector.

Injection volume: 25–50 µl
Flow rate: 1.0–1.2 ml/min
Wavelengths: EX 320 nm,
EM 415 nm
Column temp.: ambient (~ 25 °C)

Vitamin B_6 Plasma Controls

Substance	Method	Unit	Level I Target Value*	Level II Target Value*
Pyridoxal	spiked value	µg/l nmol/l	7.00 41.9	20.0 120
Pyridoxal-5'-phosphate (PLP)	CS HPLC test	µg/l nmol/l	7.72 31.2	21.9 88.6

** Please check packaging leaflet for specific lot concentrations*

Vitamin B_6 Whole Blood Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Pyridoxal-5'-phosphate (PLP)	µg/l nmol/l	12.5 50.4	33.1 134

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0031	Vitamin B_6 Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0038	Vitamin B_6 Plasma Control, Level I (lyoph.), 5 x 2 ml
0039	Vitamin B_6 Plasma Control, Level II (lyoph.), 5 x 2 ml
0022	Vitamin B_6 Whole Blood Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0023	Vitamin B_6 Whole Blood Control, Level I (lyoph.), 5 x 2 ml
0024	Vitamin B_6 Whole Blood Control, Level II (lyoph.), 5 x 2 ml

Stability of Plasma/Whole Blood Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 24 hours at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

4.5 Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma

CE IVD

Vitamin B_1 (thiamine) is ingested with food; it is water-soluble and heat sensitive. As the active form (thiamine pyrophosphate, TPP), concentrations in whole blood are more conclusive than the concentration of total thiamine. Vitamin B_6 is comprised of the pyridoxine-group pyridoxine, pyridoxamine and pyridoxal. It is ingested with food and transferred via several enzymatic conversions into its active form, pyridoxal-5'-phosphate (PLP).

Chromsystems offers solutions for the combined analysis of vitamin B_1 in whole blood and vitamin B_6 in whole blood and plasma either by HPLC or UHPLC. With pre-mixed tubes efficient sample preparation involves only one precipitation step and subsequent derivatisation. The automated solution is ideal for a higher throughput of samples and reduces hands-on time significantly. 96 samples can be processed in less than 2 hours. The separation by UHPLC takes less than 3 minutes, ensuring a high throughput of samples. The sample preparation processes different matrices, thus whole blood samples can easily be measured in the same sequence with plasma samples. Vitamin molecules are derivatised during sample preparation which renders the common post-column derivatisation unnecessary. Analyte separation takes approximately 3 minutes and takes place with a binary gradient. The two specifically developed internal standards for both parameters and matching quality controls ensure precise and accurate results.

> Accurate and fast results for both vitamins
> Each parameter safeguarded by a specific internal standard
> No post-column derivatisation required
> Pre-mixed tubes for simplified sample prep
> Automated methods for HPLC and UHPLC
> UHPLC separation in less than 3 min

Vitamin B_1 (Thiamin) wird über die Nahrung aufgenommen, ist wasserlöslich und hitzeempfindlich. Als aktive Form (Thiamin-pyrophosphat, TPP) ist die Konzentration des TPP im Vollblut aussagekräftiger als die des Gesamtthiamins. Vitamin B6 umfasst die Pyridoxin-Gruppe Pyridoxin, Pyridoxamin und Pyridoxal. Es wird über die Nahrung aufgenommen und über mehrere enzymatische Umwandlungen in die aktive Form Pyridoxal-5'-Phosphat (PLP) überführt.

Chromsystems bietet Lösungen für die Kombi-Analytik von Vitamin B_1 im Vollblut und Vitamin B_6 im Vollblut und Plasma mit HPLC und UHPLC. Die effiziente Probenvorbereitung mit Pre-mixed Tubes erfordert nur einen Fällungsschritt sowie die anschließende Derivatisierung. Die automatisierte Lösung ist ideal für einen höheren Probendurchsatz und sorgt für einen reduzierten Arbeitsaufwand. 96 Proben können in weniger als 2 Stunden verarbeitet werden. Die Trennung mittels UHPLC benötigt weniger als 3 Minuten, was einen hohen Probendurchsatz sicherstellt. Die Probenvorbereitung verarbeitet unterschiedliche Matrices, so dass in einem Durchlauf sowohl Vollblut- als auch Plasmaproben gemessen werden können. Die Derivatisierung der Vitaminmoleküle geschieht bereits bei der Vorbereitung der Probe, so dass die verbreitete Nachsäulen-Derivatisierung hier überflüssig ist. Die Trennung der Analyte erfolgt in ca. 3 Minuten mit einem binären Gradienten. Die internen Standards für jeden der beiden Parameter sowie passende Qualitätskontrollen gewährleisten eine präzise und sichere Quantifizierung.

> Präzise & schnelle Ergebnisse für beide Vitamine
> Spezifischer interner Standard für jeden Parameter
> Keine Nachsäulen-Derivatisierung
> Vereinfachte Probenvorbereitung mit Pre-mixed Tubes
> Automatisierte Methoden für HPLC und UHPLC
> UHPLC-Trennung in weniger als 3 min

Parameters:
vitamin B_1 (TPP), vitamin B_6 (PLP)

4.5.1 Standard Method: Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma

Order no.	Product
52052	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma For 100 tests
	Components available separately
52001	Mobile Phase A, 1000 ml
52022	Mobile Phase B, 1000 ml
52003	Vitamins B_1/B_6 Whole Blood Calibration Standard (lyoph.), 5 x 1 ml
52044	Internal Standard, 10 ml
52005	Precipitation Reagent, 30 ml
52006	Neutralisation Reagent, 25 ml
52007	Derivatisation Reagent 1 (lyoph.), 2 x 0.3 ml
52008	Derivatisation Reagent 2, 15 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
52100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15010	PEEK Prefilter Housing, 1 pc.
15011	PEEK-encased Prefilters, 2 µm, 5 pcs.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18052	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Calibrator and Controls (lyoph.)
36005	Vitamins B_6 Plasma Calibration Standard, 5 x 1 ml
0164	Vitamins B_1/B_6 Whole Blood Control, Bi-Level (I + II), 2 x 5 x 2 ml
0165	Vitamins B_1/B_6 Whole Blood Control, Level I, 5 x 2 ml
0167	Vitamins B_1/B_6 Whole Blood Control Level II, 5 x 2 ml
0031	Vitamin B_6 Plasma Control, Bi-Level (I + II), 2 x 5 x 2 ml
0038	Vitamin B_6 Plasma Control, Level I, 5 x 2 ml
0039	Vitamin B_6 Plasma Control, Level II, 5 x 2 ml

Specifications

Linearity:	TPP up to at least 750 µg/l PLP up to at least 500 µg/l
Limit of quantification:	whole blood TPP 2.0 µg/l plasma PLP 0.5 µg/l whole blood PLP 4.5 µg/l
Intraassay:	CV < 3 %
Interassay:	CV < 6 %
Recovery:	TPP 92 % PLP 88–102 %
Analysis time:	plasma < 7 min whole blood < 9 min

Pre-analytic Treatment

Specimens: whole blood or plasma.
Stability of samples: protect sample from light, at +2 to +8 °C stable for 1 day, for longer storage deep-freeze below -18 °C (maximum 2 weeks).

Sample Preparation

→ In a light protected vial mix 200 µl whole blood or plasma with 100 µl Internal Standard and 300 µl Precipitation Reagent, mix for at least 30 s (vortex).
→ Centrifuge for 5 min with at least 9000 x g.
→ In a new light protected vial mix 250 µl Neutralisation Reagent and 100 µl derivatisation mix (Derivatisation Reagent 1 + Derivatisation Reagent 2) with 250 µl supernatant obtained above, mix briefly.
→ Incubate for 25 min at 60 °C (water bath).
→ Cool sample for 10 min at +2 to +8 °C, then centrifuge for 2 min at 9000 x g.
→ Transfer supernatant into a light protected autosampler vial, inject 25–50 µl into the HPLC system.

4.5.2 Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma with Pre-mixed Tubes

Easy sample preparation with pre-mixed tubes

Order no.	Product
52052/ Premix	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma with Pre-mixed Neutralisation Tubes For 100 tests

Components available separately

52001	Mobile Phase A, 1000 ml
52022	Mobile Phase B, 1000 ml
52003	Vitamins B_1/B_6 Whole Blood Calibration Standard (lyoph.), 5 x 1 ml
52044	Internal Standard, 10 ml
52005	Precipitation Reagent, 30 ml
52906	Pre-mixed Neutralisation Tubes, 100 pcs.
52007	Derivatisation Reagent 1 (lyoph.), 2 x 0.3 ml
52008	Derivatisation Reagent 2, 15 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.

Accessories

52100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15010	PEEK Prefilter Housing, 1 pc.
15011	PEEK-encased Prefilters, 2 µm, 5 pcs.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18052	Precolumn Cartridge 4/10, 1 pc.

Chromsystems Calibrator and Controls (lyoph.)

36005	Vitamin B_6 Plasma Calibration Standard, 5 x 1 ml
0164	Vitamins B_1/B_6 Whole Blood Control, Bi-Level (I + II), 2 x 5 x 2 ml
0165	Vitamins B_1/B_6 Whole Blood Control, Level I, 5 x 2 ml
0167	Vitamins B_1/B_6 Whole Blood Control Level II, 5 x 2 ml
0031	Vitamin B_6 Plasma Control, Bi-Level (I + II), 2 x 5 x 2 ml
0038	Vitamin B_6 Plasma Control, Level I, 5 x 2 ml
0039	Vitamin B6 Plasma Control, Level II, 5 x 2 ml

Specifications

Linearity:	TPP up to at least 750 µg/l PLP up to at least 500 µg/l
Limit of quantification:	whole blood TPP 2.0 µg/l plasma PLP 0.5 µg/l whole blood PLP 4.5 µg/l
Intraassay:	CV < 3 %
Interassay:	CV < 6 %
Recovery:	TPP 92 % PLP 88–102 %
Analysis time:	plasma < 7 min whole blood < 9 min

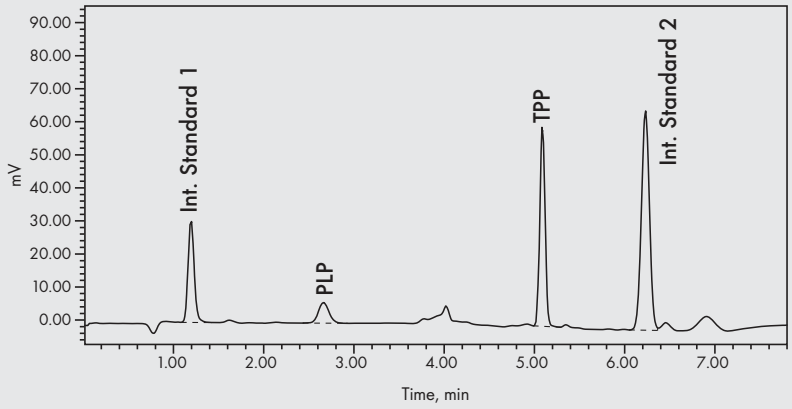
Pre-analytic Treatment

Specimens: whole blood or plasma.
Stability of samples: protect sample from light, at +2 to +8 °C stable for 1 day, for longer storage deep-freeze below -18 °C (maximum 2 weeks).

Sample Preparation

→ In a light protected vial mix 200 µl whole blood or plasma with 100 µl Internal Standard and 300 µl Precipitation Reagent, mix for at least 30 s (vortex).
→ Centrifuge for 5 min with at least 9000 x g.
→ Add 100 µl of derivatisation mix (Derivatisation Reagent 1 + Derivatisation Reagent 2) and 250 µl supernatant to a labeled pre-mixed tube, mix briefly.
→ Incubate for 25 min at 60 °C (water bath).
→ Cool sample for 10 min at +2 to +8 °C, then centrifuge for 2 min at 9000 x g.
→ Transfer supernatant into a light protected autosampler vial, inject 25–50 µl into the HPLC system.

Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma



Chromatogram for standard method and with pre-mixed tubes

HPLC Parameters

Binary HPLC gradient system with programmable fluorescence detector.

Injection volume: 25–50 µl
Flow rate: 1.5–2.3 ml/min
Switch of mobile phases after about 2.5 min
Wavelengths: start EX 320 nm, EM 415 nm, after approx. 3.8 min switch to EX 367 nm, EM 435 nm
Column temp.: ambient (~ 25 °C)

4.5.3 UHPLC: Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma with Pre-mixed Tubes

Fast method with high throughput

Order no.	Product
52952/ UHPLC	**UHPLC:** Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma, column and mobile phases also included For 1000 tests
	Components available separately
52003	Vitamins B_1/B_6 Whole Blood Calibration Standard (lyoph.), 5 x 1 ml
52044	Internal Standard, 10 ml
52005	Precipitation Reagent, 30 ml
52906	Pre-mixed Neutralisation Tubes, 100 pcs.
52007	Derivatisation Reagent 1 (lyoph.), 2 x 0.3 ml
52008	Derivatisation Reagent 2, 15 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
15060	Prefilter Housing, 1 pc.
15061	Prefilter, 0.5 µm, 5 pcs.
	Chromsystems Calibrator and Controls (lyoph.)
36005	Vitamin B_6 Plasma Calibration Standard, 5 x 1 ml
0164	Vitamins B_1/B_6 Whole Blood Control, Bi-Level (I + II), 2 x 5 x 2 ml
0165	Vitamins B_1/B_6 Whole Blood Control, Level I, 5 x 2 ml
0167	Vitamins B_1/B_6 Whole Blood Control Level II, 5 x 2 ml
0031	Vitamin B_6 Plasma Control, Bi-Level (I + II), 2 x 5 x 2 ml
0038	Vitamin B_6 Plasma Control, Level I, 5 x 2 ml
0039	Vitamin B_6 Plasma Control, Level II, 5 x 2 ml

Specifications

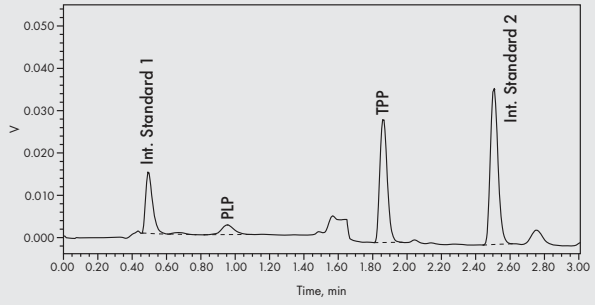
Linearity:	TPP 750 µg/l
	PLP 500 µg/l
Limit of quantification:	whole blood TPP 5 µg/l
	whole blood PLP 5 µg/l
	plasma PLP 1.4 µg/l
Intraassay:	CV < 4 %
Interassay:	CV < 6 %
Recovery:	TPP 101 %
	PLP 86 %
Analysis time:	approx. 3 min

Pre-analytic Treatment

Specimens: whole blood or plasma.
Stability of samples: store samples light protected. Samples are stable at +2 to +8 °C for 1 day, for longer storage deep-freeze below -18 °C (maximum 2 weeks).

Sample Preparation

→ Add in a light protected vial to 200 µl whole blood/ plasma, 100 µl Internal Standard and 300 µl Precipitation Reagent, mix 30 s (vortex).
→ Centrifuge 5 min with at least 9000 x g.
→ Add 100 µl derivatisation mix (Derivatisation Reagent 1 + Derivatisation Reagent 2) in a labelled pre-mixed neutralisation tube and add 250 µl of the supernatant from step 1, mix briefly.
Do not centrifuge the precipitate!
→ Incubate 25 min at 60 °C (water bath).
→ Cool down for 10 min at +2 to +8 °C and centrifuge for 2 min with at least 9000 x g.
→ Transfer the supernatant into a light protected autosampler vial, inject 2.5–10 µl into the UHPLC system.



UHPLC Parameters

UHPLC system with binary pump and programmable fluorescence detector

Pressure: < 600 bar
Injection volume: 2.5–10 µl
Flow rate: 0.7 ml/min
Wavelengths: start EX 320 nm, EM 415 nm, after approx. 1.6 min switch to EX 367 nm, EM 435 nm
Column temperature: ambient (~ 25 °C)

4.5.4 Automated Vitamins B_1/B_6 in Whole Blood for HPLC and UHPLC

Automated with 96 Well Filter Plates

Order no.	Product
52752/F	**HPLC:** Automated Vitamins B_1 and B_6 in Whole Blood using Well Filter Plates For 10 x 96 tests
	Components available separately only for HPLC
52001	Mobile Phase A, 1000 ml
52022	Mobile Phase B, 1000 ml
	Accessories for HPLC
52100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15010	PEEK Prefilter Housing, 1 pc.
15011	PEEK-encased Prefilters, 2 µm, 5 pcs.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18052	Precolumn Cartridge 4/10, 1 pc.
52952/F/ UHPLC	**UHPLC:** Automated Vitamins B_1 and B_6 in Whole Blood using Well Filter Plates, column and mobile phases also included For 10 x 96 tests
	Components available separately for HPLC and UHPLC
52003	Vitamins B_1/B_6 Whole Blood Calibration Standard (lyoph.), 5 x 1 ml
52744	Internal Standard Mix, 50 ml
52705	Extraction Reagent, 75 ml
52706	Prep Solution, 25 ml
52707	Finisher 1 (lyoph.), 5 x 0.25 ml
52708	Finisher 2, 50 ml
52709	Dilution Buffer, 100 ml
52057	96 Well Filter Plates, 5 pcs.
52058	Collection Plates, 10 pcs.
52059	Pierceable Adhesive Seals for 96 Well Plates, 5 pcs.
	Chromsystems Controls (lyoph.)
0164	Vitamins B_1/B_6 Whole Blood Control, Bi-Level (I + II), 2 x 5 x 2 ml
0165	Vitamins B_1/B_6 Whole Blood Control, Level I, 5 x 2 ml
0167	Vitamins B_1/B_6 Whole Blood Control, Level II, 5 x 2 ml

Specifications

Linearity: TPP up to at least 750 µg/l
PLP up to at least 500 µg/l

Limit of quantification
UHPLC: TPP 4.0 µg/l, PLP 2.5 µg/l
HPLC: TPP 7.0 µg/l, PLP 2.0 µg/l

Intraassay: CV < 3–5 %
Interassay: CV < 5–6 %
Analysis time: UHPC 3 min
HPLC 9 min

Pre-analytic Treatment

Specimens: whole blood. Samples are stable up to 1 week at +2 to +8 °C and up to 2 weeks at below -18 °C. Protect from light.

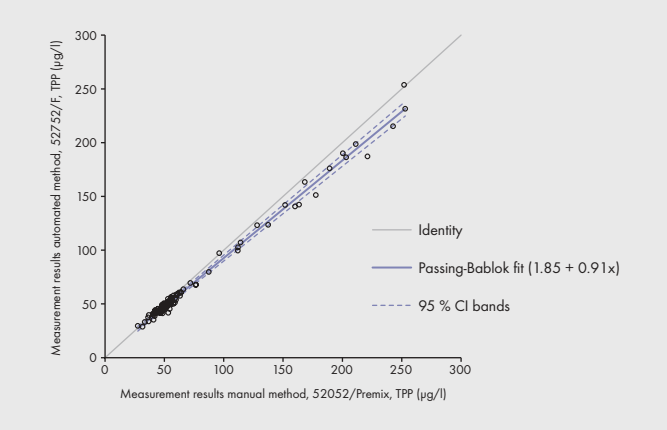
Automated Workflow

→ Load liquid handling device with samples, reagents, 96 well filter plate and collection plate.
→ Start the **automation routine***.
→ After completion remove collection plate from the liquid handling device, seal with an adhesive seal and transfer to autosampler.
→ Inject 25–50 µl eluate into the HPLC system or 2.5–5 µl eluate into the UHPLC system.

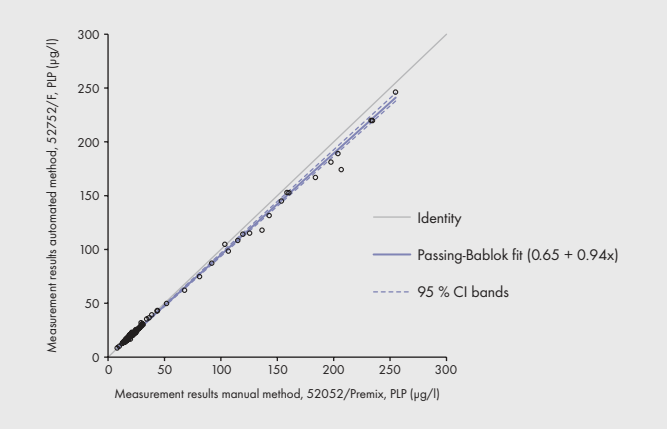
* *Ready to use automation routine provided with the installation by Chromsystems.*

Automated Vitamins B_1/B_6 in Whole Blood for HPLC and UHPLC

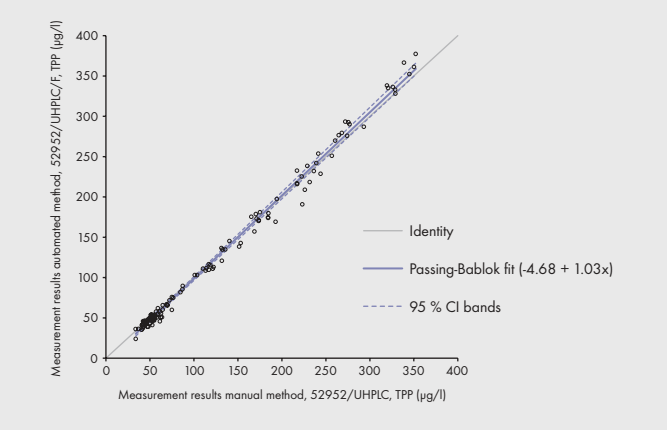
Vitamin B_1, HPLC



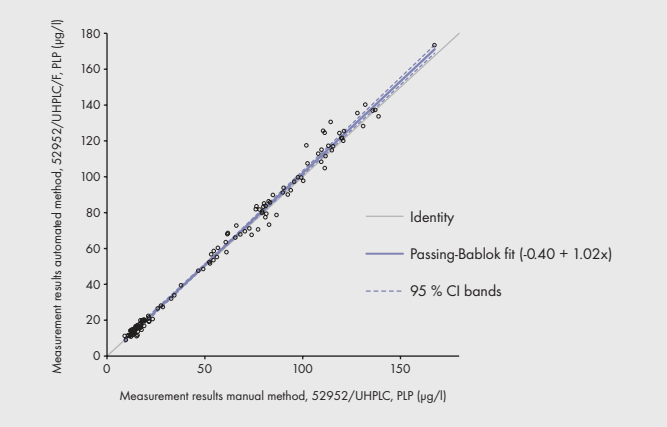
Vitamin B_6, HPLC



Vitamin B_1, UHPLC



Vitamin B_6, UHPLC



Vitamin B_1/B_6 Whole Blood Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Pyridoxal-5'-phosphate (PLP)	µg/l nmol/l	10.6 42.7	32.1 130
Thiamine pyrophosphate (TPP)	µg/l nmol/l	27.3 64.4	105 247

** Please check packaging leaflet for specific lot concentrations*

Vitamin B_6 Plasma Controls

Substance	Method	Unit	Level I Target Value*	Level II Target Value*
Pyridoxal	spiked value	µg/l nmol/l	7.00 41.9	20.0 120
Pyridoxal-5'-phosphate (PLP)	CS HPLC test	µg/l nmol/l	7.72 31.2	21.9 88.6

** Please check packaging leaflet for specific lot concentrations*

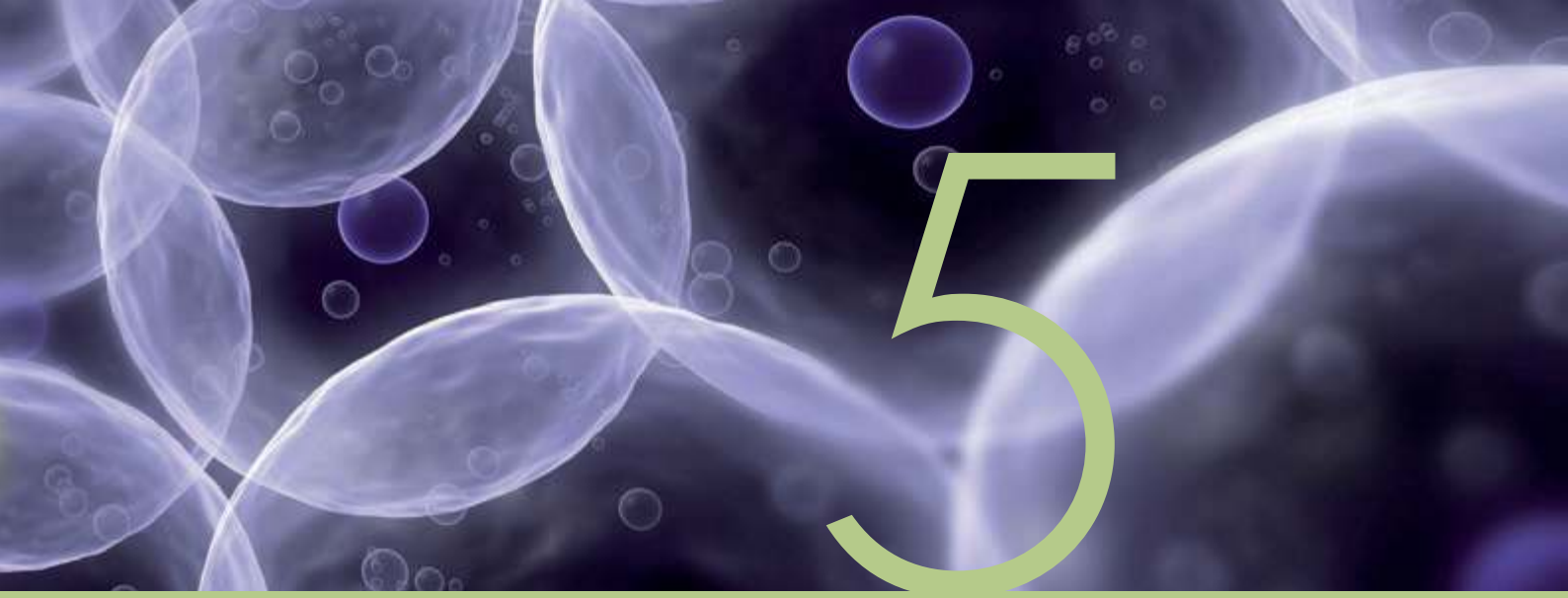
Order no.	Product
0164	Vitamins B_1/B_6 Whole Blood Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0165	Vitamins B_1/B_6 Whole Blood Control, Level I (lyoph.), 5 x 2 ml
0167	Vitamins B_1/B_6 Whole Blood Control, Level II (lyoph.), 5 x 2 ml
0031	Vitamins B_6 Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0038	Vitamins B_6 Plasma Control, Level I (lyoph.), 5 x 2 ml
0039	Vitamins B_6 Plasma Control, Level II (lyoph.), 5 x 2 m

Stability of Whole Blood/Plasma Controls

> Stable to expiry date below -18 °C
> Reconstituted up to 24 hours at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

Monitoring Oxidative Stress

Molecular oxygen is essential for cellular respiration. It is reduced to water as a result of energy production in the mitochondria. A small amount of the oxygen is not metabolised to water but converted to reactive oxygen species. These oxygen species only get dangerous if the balance between antioxidative and oxidative processes shifts to the detriment of the former. If that happens, antioxidative measures may no longer be able to cushion the oxidative pressure, resulting in progressive damage to fatty acids, proteins and DNA. This state is called oxidative stress. An unfavourable interaction of oxidative stress with other factors bears the risk that these damages manifest in tissue ageing and degenerative conditions such as cardiovascular disease, cataracts, Alzheimer's, arteriosclerosis, arthritis, chronic inflammatory disease, allergies and so on. For preventive management of oxidative stress and its effects, it is necessary to determine the oxidative status of an organism and its tissues.



5

Monitoring von oxidativem Stress

Molekularer Sauerstoff ist essentiell für die zelluläre Atmung. In den Mitochondrien wird ein kleiner Teil des Sauerstoffs nicht zu Wasser metabolisiert, sondern in reaktive Sauerstoffspezies umgewandelt. Diese werden erst dann zur Gefahr, wenn die antioxidativen Maßnahmen den oxidativen Druck nicht mehr genügend abfangen können, so dass Fettsäuren, Proteine und DNA in zunehmendem Grade geschädigt werden. Dieser Zustand wird als oxidativer Stress bezeichnet. Durch ungünstiges Zusammenwirken von oxidativem Stress und weiteren Faktoren besteht die Gefahr, dass sich diese Schäden manifestieren als Gewebealterung und degenerative Erkrankungen wie Herz- und Kreislauferkrankungen, Katarakt, Alzheimer-Demenz, Arteriosklerose, Arthritis, Rheuma/Allergien etc. Um den Auswirkungen von oxidativem Stress schon prophylaktisch zu begegnen ist es notwendig, den oxidativen Status eines Organismus festzustellen.

5.1 β-Carotene in Serum/Plasma

CE IVD

This reagent kit is designed for easy and reliable determination of β-carotene in serum/plasma. The sample clean up procedure combines fast precipitation and extraction steps. The resulting extract is ready to inject, no evaporation is necessary. The chromatographic determination runs on an isocratic HPLC system with UV-VIS detection. Specially optimised RP chromatography ensures safe separation of a-, cis-β-, and all-trans-β-carotene as well as some further carotenoids in less than 10 minutes. The analyte is quantified by the inclusion of an internal standard, which is a non-natural occuring carotenoid-derivative, so that a single detection wavelength is required. The high stability of the samples allows the performance of large batches.

> Fast and easy sample preparation
> High sample stability
> Low costs per test

Mit diesem Reagenzienkit wird β-Carotin einfach und zuverlässig im Serum/Plasma bestimmt. Die Probenvorbereitung besteht aus einer schnellen kombinierten Fällung und Extraktion. Der so erhaltene Extrakt ist in der mobilen Phase löslich, ein Eindampfschritt entfällt daher. Die anschließende chromatographische Bestimmung erfolgt auf einem isokratischen HPLC-System mit UV/VIS-Detektion. Eine spezielle RP-Chromatographie gewährleistet die sichere Trennung von a-, cis-β- und all-trans-β-Carotin sowie einer Reihe weiterer Carotinoide in weniger als 10 Minuten. Zur Quantifizierung wird ein interner Standard auf der Basis eines nicht natürlich vorkommenden Carotinoid-Derivats verwendet, wodurch die Detektion bei einer einzigen Wellenlänge erfolgen kann. Die hohe Stabilität der aufgearbeiteten Proben ermöglicht die problemlose Durchführung auch längerer Probensequenzen.

> Einfache und schnelle Probenvorbereitung
> Hohe Probenstabilität
> Geringe Kosten pro Analyse

Parameters:
all-trans-β-carotene

β-Carotene in Serum/Plasma

Order no.	Product
32000	β-Carotene in Serum/Plasma For 100 tests
	Components available separately
32001	Mobile Phase, 1000 ml
32002	Mobile Phase, 10 x 1000 ml
32003	β-Carotene Serum Calibration Standard, (lyoph.), 5 x 0.5 ml
32004	Internal Standard, 5 ml
32005	Precipitation Reagent, 5 ml
32006	Extraction Buffer, 20 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
32100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18032	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0025	β-Carotene Serum Control, Bi-Level (I + II), 2 x 5 x 2 ml
0026	β-Carotene Serum Control, Level I, 5 x 2 ml
0027	β-Carotene Serum Control, Level II, 5 x 2 ml

Specifications

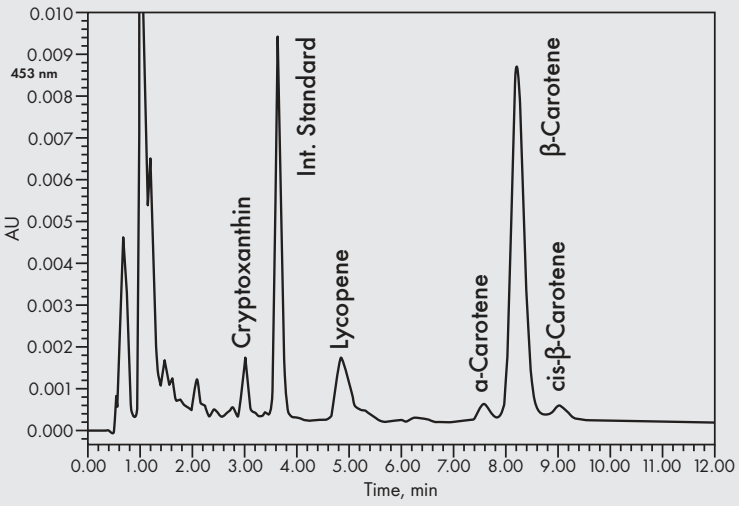
Linearity:	up to 3000 mg/l
Limit of quantification:	5 ng/ml
Intraassay:	CV = 0.8–2.0 %
Interassay:	CV = 2.3–3.1 %
Recovery:	107 %
Analysis time:	< 10 min

Pre-analytic Treatment

Serum or plasma is used for analysis. Specimens should be kept frozen and light protected for transport. Storage life is up to 5 days at +2 to +8 °C. For longer storage, deep-freeze below -18 °C (maximum 2 months).

Sample Preparation

→ To 100 µl serum/plasma add 50 µl Internal Standard in a light protected reaction vial, mix briefly.
→ Add 50 µl Precipitation Reagent, mix briefly (vortex), do not centrifuge!
→ Add 200 µl Extraction Buffer, vortex for 30 s.
→ Centrifuge for 10 min at 16000 x g.
→ Transfer supernatant into a light protected autosampler vial (glass).
→ Inject 50 µl into the HPLC system.



HPLC Parameters

Isocratic HPLC system with UV/VIS detector.

Injection volume: 50 µl
Flow rate: 1.5–1.8 ml/min
Wavelength: 453 nm
Column temp.: ambient (~ 25 °C)

β-Carotene Serum Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
All-trans-β-carotene	ng/ml	361	749
	nmol/l	671	1395

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0025	β-Carotene Serum Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0026	β-Carotene Serum Control, Level I (lyoph.), 5 x 2 ml
0027	β-Carotene Serum Control, Level II (lyoph.), 5 x 2 ml

Stability of Serum Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 5 days at +2 °C to +8 °C
> Reconstituted aliquots up to 2 months below -18 °C

5.2 Coenzyme Q10 in Serum/Plasma/Whole Blood

CE IVD

Coenzyme Q10 or ubiquinone is part of the mitochondrial respiratory chain and thus an important component of cellular energy production. In addition, it is a very effective radical scavenger, functioning as an antioxidant. Deficiency of coenzyme Q10 is, among other reasons, discussed as a possible cause of cardiac disease.

This Chromsystems reagent kit allows the reliable chromatographic determination of coenzyme Q10 in an isocratic HPLC run using UV detection. Coenzyme Q10 is released by precipitating the proteins and then concentrated using solid phase extraction. Using this method extraction with neurotoxic hexane and evaporation of the supernatant is avoided. Inclusion of an internal standard minimises any analytical variation.

> No liquid-liquid extraction
> No evaporation step
> Stable standards and controls

Coenzym Q10 oder Ubichinon ist als Teil der mitochondrialen Atmungskette ein wichtiger Bestandteil der zellulären Energieproduktion. Darüber hinaus ist es ein sehr guter Radikalfänger und wirkt dadurch als Antioxidans. Ein Mangel an Q10 wird unter anderem als Ursache für Herz-Kreislauf Erkrankungen diskutiert.

Dieser Chromsystems-Reagenzienkit erlaubt die sichere chromatographische Bestimmung von Coenzym Q10 in einem isokratischen HPLC-Lauf mit UV-Detektion. Coenzym Q10 wird zuerst durch Proteinfällung freigesetzt und anschließend durch eine Festphasenextraktion aufkonzentriert. Eine Extraktion mit neurotoxischem Hexan und das Eindampfen von Überständen wird so vermieden. Zur sicheren Quantifizierung wird ein stabiler interner Standard verwendet.

> Keine Flüssig-Flüssig-Extraktion
> Kein Eindampfschritt
> Stabile Kalibratoren und Kontrollen

Parameter:
coenzyme Q10

Coenzyme Q10 in Serum/Plasma/Whole Blood

Order no.	Product
68000	Coenzyme Q10 (Ubiquinone) in Serum/Plasma/Whole Blood For 100 tests

Components available separately

68001	Mobile Phase, 1000 ml
68002	Mobile Phase, 10 x 1000 ml
68003	Coenzyme Q10 Plasma Calibration Standard (lyoph.), 5 x 2 ml
68004	Internal Standard, 25 ml
68005	Precipitation Reagent 1, 50 ml
68006	Precipitation Reagent 2, 10 ml
68007	Wash Buffer 1, 50 ml
68009	Wash Buffer 2, 16 ml
68010	Elution Buffer, 25 ml
68008	Sample Clean Up Columns, 50 pcs.
33005	Reaction Vials, amber coloured (light protected), 100 pcs.

Accessories

68100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18068	Precolumn Cartridge 4/10, 1 pc.

Chromsystems Controls (lyoph.)

0091	Coenzyme Q10 Plasma Control, Bi-Level (I + II), 2 x 5 x 2 ml
0092	Coenzyme Q10 Plasma Control, Level I, 5 x 2 ml
0093	Coenzyme Q10 Plasma Control, Level II, 5 x 2 ml

Specifications

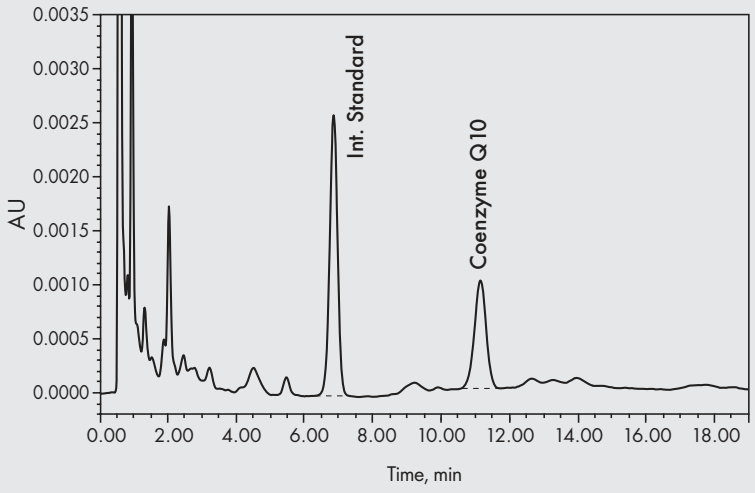
Linearity:	up to 25 000 µg/l
Limit of quantification:	20 µg/l
Intraassay:	CV < 5 %
Interassay:	CV < 6 %
Recovery:	80 %
Analysis time:	< 15 min

Pre-analytic Treatment

Specimens: plasma, serum or whole blood can be used for analysis. Keep cool for transport. Storage life is up to 4 days at +2 to +8 °C. For longer storage, deep-freeze below -18 °C.

Sample Preparation

→ Place 500 µl plasma/serum and 250 µl Internal Standard into a labeled, light protected reaction vial and mix briefly.
→ Add 500 µl Precipitation Reagent 1 and mix 30 s (vortex).
→ Incubate 10 minutes at +2 to +8 °C.
→ Centrifuge 5 minutes at 15 000 x g. It is not necessary to transfer the supernatant into a new reaction vial.
→ Add 100 µl Precipitation Reagent 2 and mix 30 s (vortex).
→ Centrifuge 10 minutes at 15 000 x g.
→ Apply complete supernatant to sample clean up column and draw through completely by centrifugation (2 minutes at 700 x g) or suction, discard effluent.
→ Draw 500 µl Wash Buffer 1 through the sample clean up column (1 minute at 700 x g), followed by 160 µl Wash Buffer 2 (2 minutes at 700 x g), discard effluents.
→ Centrifuge 250 µl Elution Buffer through the sample clean up column in a labeled, light protected reaction vial (2 min at 700 x g).
→ Inject 50 µl of the eluate into the HPLC system.



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 50 µl
Flow rate: 2.5 ml/min
Wavelength: 275 nm
Column temp.: ambient (~ 25 °C)

Coenzyme Q10 Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Coenzyme Q10	µg/l	492	925
	nmol/l	570	1071

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0091	Coenzyme Q10 Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0092	Coenzyme Q10 Plasma Control, Level I (lyoph.), 5 x 2 ml
0093	Coenzyme Q10 Plasma Control, Level II (lyoph.), 5 x 2 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 1 week at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

5.3 Glutathione in Whole Blood

CE IVD

Glutathione is a tripeptide which is mainly located within cells of all organs, and also in red blood cells. It has numerous physiological functions such as its implication in scavenging free radicals and the formation of conjugates for the excretion of e.g. toxic xenobiotics. Glutathione exists in a reduced (GSH) and an oxidised form (GSSG), the ratio of both is a measure for the redox-status of the cell.

GSH as well as GSSG can be reliably quantified with this reagent kit using only 10 µl of whole blood. The sample preparation is based on protein precipitation and derivatisation followed by HPLC with fluorescence detection. After precipitation, the sample is split into two halves. One aliquot is derivatised immediately for the determination of reduced glutathione (GSH); the second aliquot is chemically reduced before derivatisation, which leads to the detection of the sum of both, oxidised and reduced glutathione. Inclusion of an internal standard minimises any analytical variation, being particularly crucial when calculating the GSSG/GSH ratio.

> Detection of reduced and oxidised form
> 10 µl sample volume
> High reliability by inclusion of an internal standard

Glutathion ist ein Tripeptid, das vorwiegend innerhalb von Zellen, im Blut in den Erythrocyten, vorkommt. Es hat zahlreiche biologische Funktionen, unter anderem ist es beteiligt bei der Abwehr der freien Radikale und der Bildung von Konjugaten zur Ausscheidung von toxischen Fremdstoffen. Glutathion liegt in einer reduzierten (GSH) und einer oxidierten Form (GSSG) vor, deren Mengenverhältnis zueinander den Redoxstatus innerhalb der Zelle charakterisiert.

Mit diesem Reagenzienkit kann sowohl GSH als auch GSSG aus nur 10 µl Vollblut zuverlässig quantifiziert werden. Die Probenvorbereitung basiert auf einer Proteinfällung und Derivatisierung für die nachfolgende HPLC-Bestimmung mit Fluoreszenzdetektion. Nach der Fällung wird der Probenansatz geteilt und ein Aliquot zur Messung des reduzierten Glutathions unmittelbar derivatisiert. Das zweite Aliquot wird zunächst einem Reduktionsschritt unterworfen und hieraus die Summe von reduziertem und oxidiertem Glutathion bestimmt. Durch die Verwendung eines internen Standards werden analytische Schwankungen, die besonders das GSSG/GSH-Verhältnis verfälschen, minimiert.

> Reduzierte und oxidierte Form werden erfasst
> Nur 10 µl Probenvolumen
> Hohe Zuverlässigkeit durch Verwendung eines internen Standards

Parameters:
free glutathione (GSH), glutathione disulfide (GSSG)

Glutathione in Whole Blood

Order no.	Product
66000	Glutathione in Whole Blood For 100 tests
	Components available separately
66001	Mobile Phase, 1000 ml
66002	Mobile Phase, 10 x 1000 ml
66003	Glutathione Whole Blood Calibration Standard (lyoph.), 5 x 0.5 ml
66004	Internal Standard, 15 ml
66005	Precipitation Reagent, 40 ml
66006	Derivatisation Reagent 1 (lyoph.), 2 x 5 x 2 ml
66007	Derivatisation Reagent 2, 20 ml
66008	Reduction Reagent (lyoph.), 1 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
66100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18066	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0077	Glutathione Whole Blood Control, Bi-Level (I + II), 2 x 5 x 0.5 ml
0078	Glutathione Whole Blood Control, Level I, 5 x 0.5 ml
0079	Glutathione Whole Blood Control, Level II, 5 x 0.5 ml

Specifications

Linearity:	up to 15000 µmol/l
Limit of quantification:	5 µmol/l
Intraassay:	CV < 5 %
Interassay:	CV ≤ 4 %
Recovery:	99 %
Analysis time:	< 5 min

Pre-analytic Treatment

Specimens: whole blood is used for analysis. The stability of patient samples depends on many factors, e.g. on the conditions during short and long term storage as well as on the use of different anticoagulants. More information can be gathered from the specific literature.

Sample Preparation

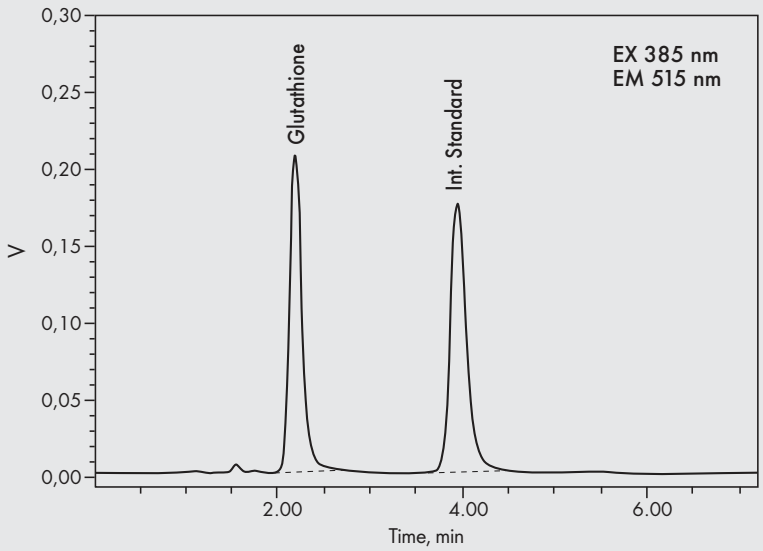
A) Precipitation:
→ Place 150 µl Internal Standard into a light protected reaction vial.
→ Add 10 µl sample (whole blood) and mix by aspirating the pipette tip.
→ Mix briefly (vortex).
→ Add 400 µl Precipitation Reagent and mix 30 s (vortex).
→ Centrifuge 7 min at 9000 x g.

B) Determination of reduced glutathione:
→ Place 50 µl of the supernatant from A) into a new, light protected reaction vial.
→ Add 100 µl of derivatisation mix (Derivatisation Reagent 1 + Derivatisation Reagent 2) and mix well.
→ Incubate 10 min at 50–55 °C in a water bath.
→ Inject 20 µl into the HPLC system.

C) Determination of the sum of oxidised and reduced glutathione:
→ Place 50 µl of the supernatant from A) in a new, light protected reaction vial.
→ Add 10 µl Reduction Reagent and mix well (vortex).
→ Incubate 5 min at room temperature.
→ Add 100 µl of derivatisation mix and mix well.
→ Incubate 10 min at 50–55 °C in a water bath, cool down immediately.
→ Inject 20 µl into the HPLC system.

The concentration of oxidised glutathione is calculated by subtracting the concentration of reduced glutathione from the sum of both (oxidised + reduced).

Glutathione in Whole Blood



HPLC Parameters

Isocratic HPLC system with fluorescence detector.

Injection volume: 20 µl
Flow rate: 1.3 ml/min
Wavelengths: EX 385 nm, EM 515 nm
Column temp.: ambient (~ 25 °C)

Glutathione Whole Blood Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Free glutathione (GSH)	µmol/l mg/l	465 143	1727 531
Glutathione disulfide (GSSG)	µmol/l mg/l	260 160	347 212
Total glutathione (GSH + GSSG)	µmol/l mg/l	986 303	2420 743
GSH/GSSG		1.79	4.98

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0077	Glutathione Whole Blood Control, Bi-Level I + II (lyoph.), 2 x 5 x 0.5 ml
0078	Glutathione Whole Blood Control, Level I (lyoph.), 5 x 0.5 ml
0079	Glutathione Whole Blood Control, Level II (lyoph.), 5 x 0.5 ml

Stability of Whole Blood Controls

> Stable to expiry date below -18 °C
> Reconstituted up to 2 days at +2 °C to +8 °C
> Reconstituted aliquots up to 1 months below -18 °C

5.4 Malondialdehyde in Plasma/Serum

CE IVD

Oxidative stress leads to considerable cellular damage (oxidation of lipids, proteins, and DNA). Malondialdehyde is formed by lipid peroxidation of unsaturated fatty acids and is a marker for oxidative degradation of cellular membranes.

This Chromsystems reagent kit allows the reliable chromatographic determination of malondialdehyde on a simple, isocratic HPLC system with fluorescence detector. Sample preparation is based on an efficient protein precipitation step followed by derivatisation. The resulting fluorophore is specific and detectable at very low levels.

> The marker of lipid peroxidation
> Trouble-free determination
> Reliable results

Oxidativer Stress kann zu degenerativen Schäden im Organismus führen (Oxidation von Lipiden, Proteinen und DNA). Malondialdehyd entsteht als Oxidationsprodukt von mehrfach ungesättigten Fettsäuren der Zellmembranen und ist somit der labordiagnostische Marker für die Lipidperoxidation.

Dieser Chromsystems-Reagenzienkit erlaubt die sichere chromatographische Bestimmung von Malondialdehyd in einem isokratischen HPLC-Lauf mit Fluoreszenz-Detektion. Die Probenvorbereitung basiert auf einer effektiven Proteinfällung mit anschließender Derivatisierung. Das dabei entstehende Fluorophor ist spezifisch und in sehr geringen Konzentrationen nachweisbar.

> Der Marker für Lipidperoxidation
> Störungsfreie Bestimmung
> Verlässliche Ergebnisse

Parameter:
malondialdehyde

Malondialdehyde in Plasma/Serum

Order no.	Product
67000	Malondialdehyde in Plasma/Serum For 100 tests
	Components available separately
67001	Mobile Phase, 1000 ml
67002	Mobile Phase, 10 x 1000 ml
67003	Malondialdehyde Plasma Calibration Standard (lyoph.), 5 x 0.5 ml
67005	Precipitation Reagent, 50 ml
67006	Derivatisation Reagent, 10 ml
67007	Neutralisation Buffer, 50 ml
67009	Derivatisation Vials, 100 pcs. (suitable as autosampler vials)
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
67100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18067	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0094	Malondialdehyde Plasma Control, Bi-Level (I + II), 2 x 5 x 0.5 ml
0095	Malondialdehyde Plasma Control, Level I, 5 x 0.5 ml
0096	Malondialdehyde Plasma Control, Level II, 5 x 0.5 ml

Specifications

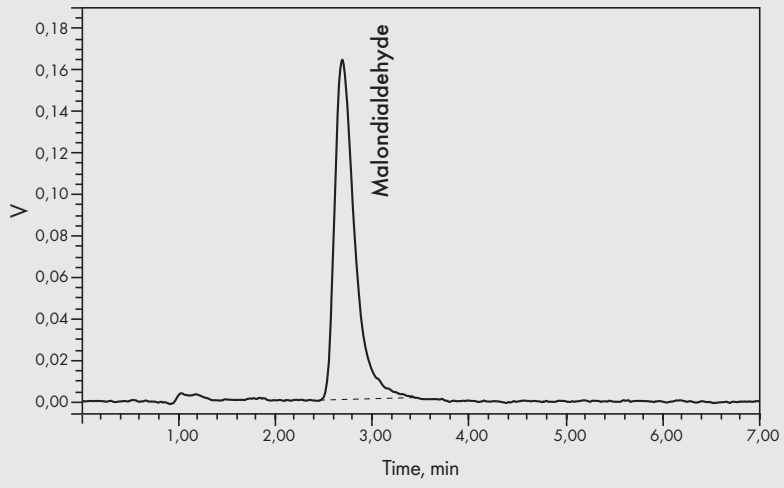
Linearity:	up to 10 µmol/l
Limit of quantification:	0.01 µmol/l
Intraassay:	CV < 3 %
Interassay:	CV < 9 %
Recovery:	99 %
Analysis time:	< 5 min

Pre-analytic Treatment

Specimens: fresh plasma (standards, controls, specimens) is used for analysis. Specimens should be frozen for transport. Storage life is up to 12 hours at +2 to +8 °C. For longer storage, deep-freeze below -18 °C (up to 4 weeks).

Sample Preparation

→ Mix 100 µl plasma + 500 µl Precipitation Reagent, vortex for 10 s, centrifuge.
→ Centrifuge 5 minutes at 16 000 x g.
→ Mix 500 µl supernatant + 100 µl Derivatisation Reagent, mix briefly and incubate 60 min at 95 °C.
→ Cool down immediately.
→ Add 500 µl Neutralisation Buffer, mix briefly.
→ Inject 20 µl into the HPLC system.



HPLC Parameters

Isocratic HPLC system with fluorescence detector.

Injection volume: 20 µl
Flow rate: 1.0 ml/min
Wavelengths: EX 515 nm,
EM 553 nm
Column temp.: ambient (~ 25 °C)

Malondialdehyde Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Malondialdehyde	µg/l	13.8	51.8
	µmol/l	0.19	0.72

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0094	Malondialdehyde Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 0.5 ml
0095	Malondialdehyde Plasma Control, Level I (lyoph.), 5 x 0.5 ml
0096	Malondialdehyde Plasma Control, Level II (lyoph.), 5 x 0.5 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 4 days at +2 °C to +8 °C
> Reconstituted aliquots up to 4 weeks below -18 °C

5.5 Vitamin C in Plasma/Serum

CE IVD

Vitamin C performs multiple functions in human biochemistry. It protects the organism from reactive oxidants and acts as a co-factor in the hydroxylation of collagen.

The kit allows the reliable chromatographic determination of vitamin C on a simple isocratic HPLC system with UV detection. Interfering components are removed by means of efficient protein precipitation, stabilising vitamin C simultaneously. For accurate quantification a stable internal standard is used. Due to the special stabilisation of the prepared samples the method is compatible with large sample batches. We also offer a CE-IVD certified automated solution with 96 well filter plates that requires less than 40 minutes for 96 samples. The assay can be integrated with liquid handler and software in one complete CE-IVD workflow.

> Simplified sample preparation
> Enhanced column stability
> High stability of standards and controls
> Automated assays available

Vitamin C erfüllt viele biochemische Funktionen im Organismus. Es schützt vor reaktiven Oxidantien und ist als Cofaktor an Hydroxylierungen von Collagen beteiligt.

Der Kit erlaubt die sichere chromatographische Bestimmung von Vitamin C in einem isokratischen HPLC-Lauf mit UV-Detektion. Durch eine effektive Proteinfällung werden störende Komponenten abgetrennt und gleichzeitig Vitamin C stabilisiert. Zur sicheren Quantifizierung wird ein stabiler interner Standard verwendet Durch eine spezielle Stabilisierung der aufgearbeiteten Proben können auch lange Probensequenzen zuverlässig abgearbeitet werden. Ebenfalls verfügbar ist eine CE-IVD zertifizierte automatisierte Lösung mit 96 Well-Filterplatten, die weniger weniger als 40 Minuten für 96 Proben benötigt. Darüber hinaus kann der Assay mit Laborroboter und Software zu einem kompletten CE-IVD Workflow kombiniert werden.

> Vereinfachte Probenvorbereitung
> Verbesserte Säulenstabilität
> Lange Haltbarkeit von Standards und Kontrollen
> Automatisierte Methoden verfügbar

Parameter:
vitamin C

5.5.1 Standard Method: Vitamin C in Plasma/Serum

Order no.	Product
65065	Vitamin C in Plasma/Serum For 100 tests
	Components available separately
65001	Mobile Phase, 1000 ml
65002	Mobile Phase, 10 x 1000 ml
65003	Vitamin C Plasma Calibration Standard (lyoph.), 5 x 0.5 ml
65044	Internal Standard, 10 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
65100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18065	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0074	Vitamin C Plasma Control, Bi-Level (I + II), 2 x 5 x 0.5 ml
0075	Vitamin C Plasma Control, Level I, 5 x 0.5 ml
0076	Vitamin C Plasma Control, Level II, 5 x 0.5 ml

Specifications

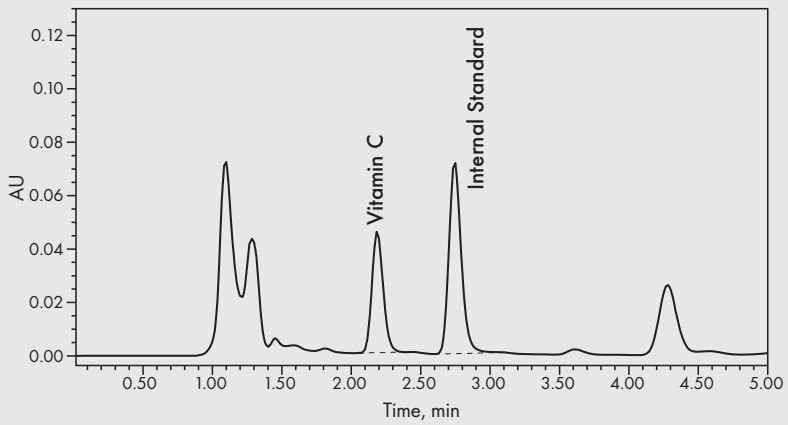
Linearity:	0.4–100 mg/l
Limit of quantification:	0.4 mg/l
Intraassay:	CV < 4 %
Interassay:	CV < 5%
Recovery:	97–102 %
Analysis time:	5 min

Pre-analytic Treatment

Specimens: fresh lithium heparin plasma.
Stability: 5 days at -20 °C, up to 2 hours at room temperature. Detailed information on stability and transportation can be obtained from the instruction manual.

Sample Preparation

→ Pipette 100 µl sample into a labelled light protected reaction vial.
→ Add 100 µl Internal Standard and mix 30 s (vortex).
→ Centrifuge 5 min at 15 000 x g.
→ Inject 20 µl of the supernatant into the HPLC system.



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 20 µl
Flow rate: 1.5 ml/min
Wavelength: 245 nm
Column temp.: ambient (~ 25 °C)

5.5.2 Automated Vitamin C in Plasma/Serum

Automated with 96 Well Filter Plates

Order no.	Product
65765/F	Vitamin C in Plasma/Serum Automated with 96 Well Filter Plates For 480 tests

Components available separately

65001	Mobile Phase, 1000 ml
65002	Mobile Phase, 10 x 1000 ml
65003	Vitamin C Plasma Calibration Standard (lyoph.), 5 x 0.5 ml
65044	Internal Standard, 10 ml
65757	96 Well Filter Plates, 5 pcs.
65758	Collection Plates, 5 pcs.
65759	Pierceable Adhesive Seals for 96 Well Plates, 5 pcs.

Accessories

65100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18065	Precolumn Cartridge 4/10, 1 pc.

Chromsystems Controls (lyoph.)

0074	Vitamin C Plasma Control, Bi-Level (I + II), 2 x 5 x 0.5 ml
0075	Vitamin C Plasma Control, Level I, 5 x 0.5 ml
0076	Vitamin C Plasma Control, Level II, 5 x 0.5 ml

Specifications

Limit of quantification:	0.5 mg/l
Linearity:	up to 100 mg/l
Recovery:	94 %
Intraassay:	CV < 3 %
Interassay:	CV < 3 %
Analysis time:	5 min
Injection volume:	20 µl
Flowrate:	1.5 ml/min
Wavelength:	245 nm
Column temperature:	ambient (~ 25 °C)

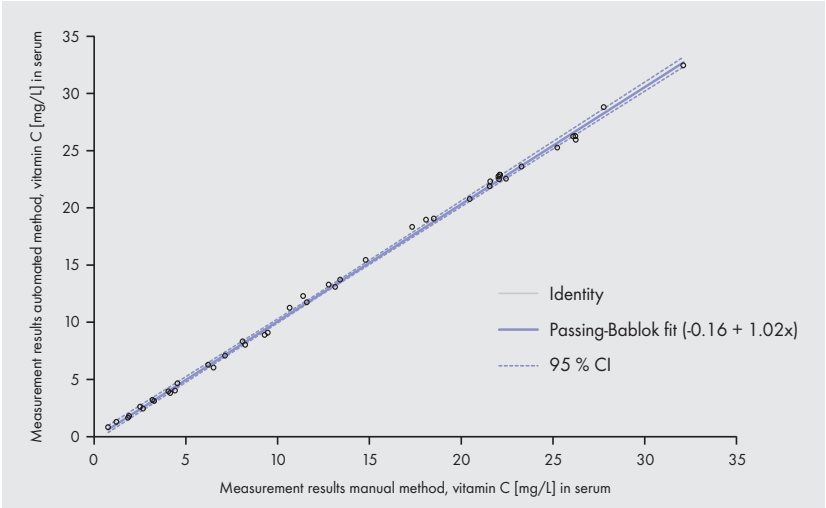
Pre-analytic Treatment

Specimens: fresh lithium heparin plasma.
Stability: 5 days at -20 °C, up to 2 hours at room temperature. Detailed information on stability and transportation can be obtained from the instruction manual.

Automated Workflow

→ Load liquid handling device with samples, reagents, 96 well filter plate and collection plate.
→ Start the **automation routine***.
→ After completion remove collection plate from the liquid handling device, seal with an adhesive seal and transfer to autosampler.
→ Inject 20 µl eluate into the HPLC system.

** Ready to use automation routine provided with the installation by Chromsystems.*



Vitamin C Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Vitamin C	mg/l	5.69	20.2
	µmol/l	32.3	115

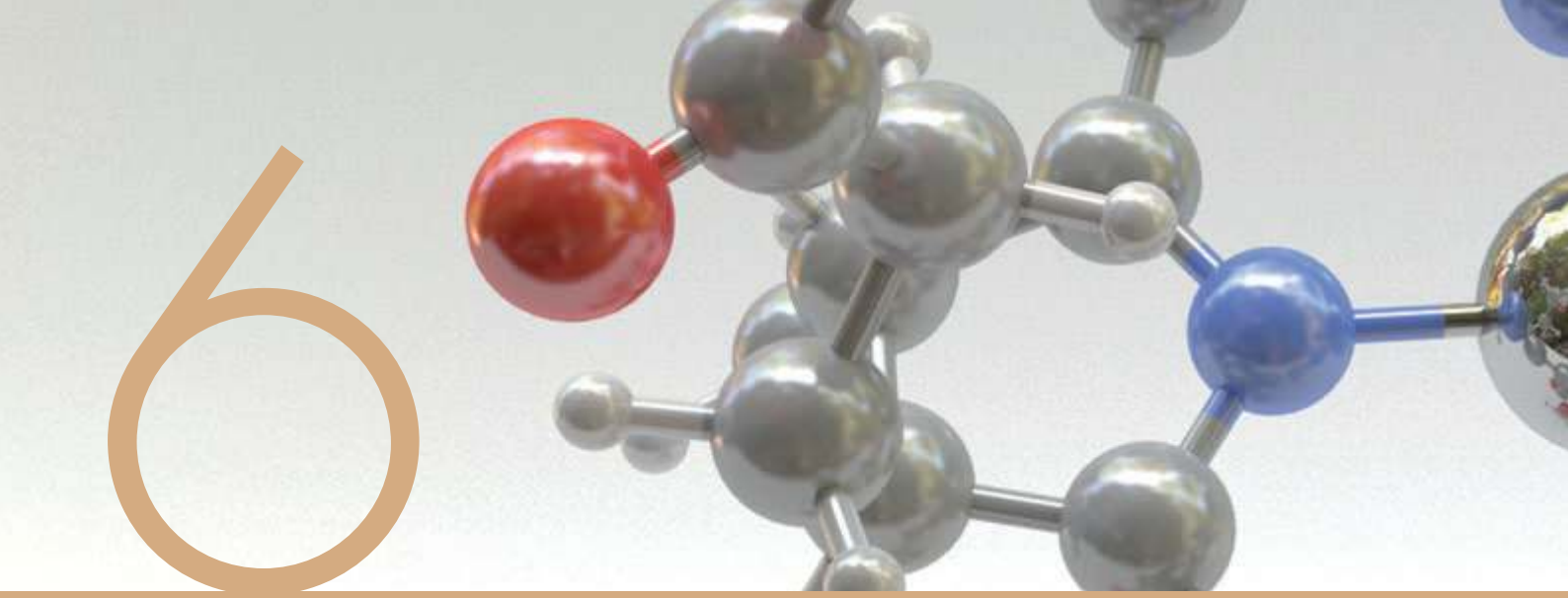
** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0074	Vitamin C Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 0.5 ml
0075	Vitamin C Plasma Control, Level I (lyoph.), 5 x 0.5 ml
0076	Vitamin C Plasma Control, Level II (lyoph.), 5 x 0.5 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

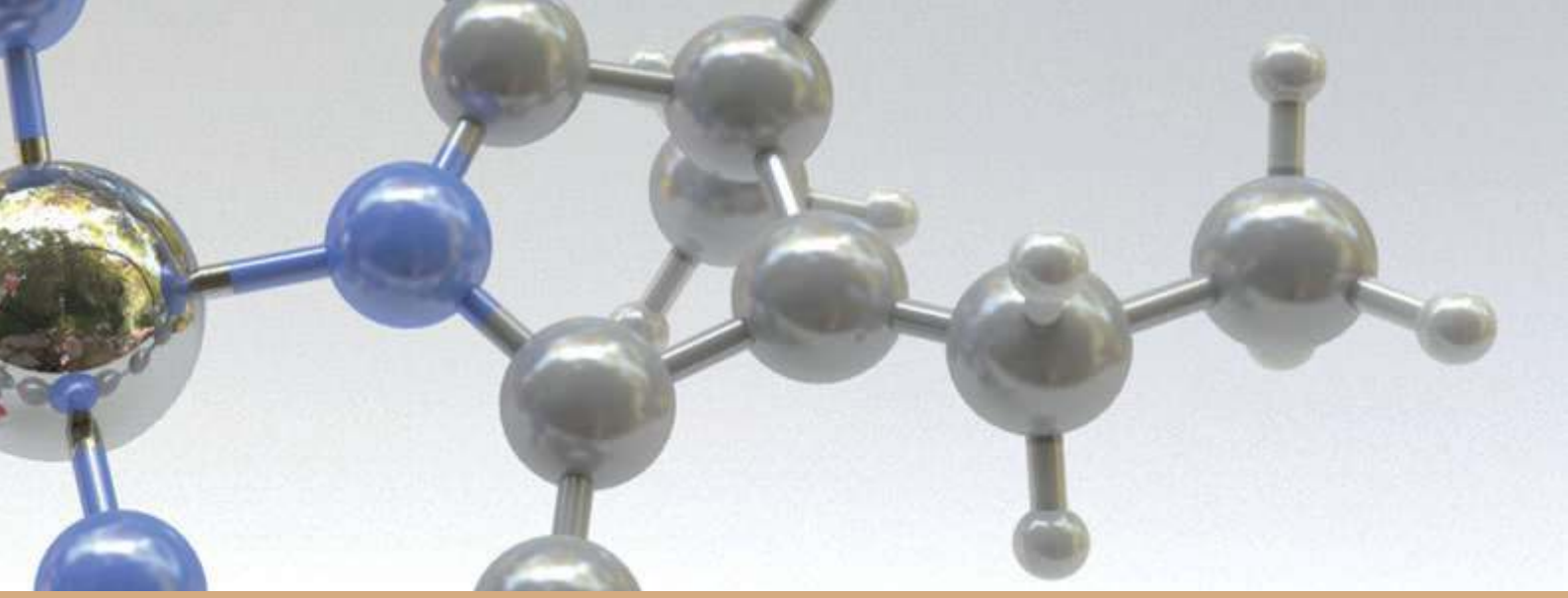
> Stable to expiry date below -18 °C
> Reconstituted up to 4 days at +2 °C to +8 °C
> Reconstituted aliquots up to 4 weeks below -18 °C



Porphyrin Profiling

Porphyrins are precursors of heme which is synthesised in an enzymatic chain by the organism. In a healthy person's urine porphyrins are present in very low concentrations. Metabolic disorders in heme biosynthesis, however, lead to the elevated appearance of some heme precursors in the urine. The resulting diseases are called porphyrias.

In addition to the hereditary porphyrias these diseases can also be acquired by several external factors, such as lead poisoning, alcoholism or pollutants. These porphyrias are called "secondary porphyrias". The two major symptoms of porphyrias are cutaneous photosensitivity of the skin, and neurovisceral symptoms, for example abdominal pain, cardiovascular impairment and neurological symptoms (paralysis, neuropathy).



Porphyrie-Diagnostik

Porphyrine sind Vorläufer des Häms, das im Organismus in einer mehrstufigen enzymatischen Kette gebildet wird. Unter normalen Bedingungen sind die Porphyrine im Urin nicht bzw. in nur sehr geringen Konzentrationen zu finden. Erst wenn die Biosynthese des Häms gestört ist, treten einige Zwischenstufen im Urin in erhöhten Konzentrationen auf. Das dabei auftretende Krankheitsbild bezeichnet man als Porphyrie.

Außer durch Vererbung können Porphyrien auch durch äußere Einflüsse wie zum Beispiel Bleivergiftung, Alkohol oder Umweltgifte verursacht werden. Man spricht in diesem Fall von sekundären Porphyrien. Die Symptome dieser Krankheiten sind zum einen kutane Läsionen, vor allem Photodermatosen der Haut; zum anderen neuroviszerale Symptome wie Bauchkrämpfe, Herz-Kreislaufstörungen und neurologische Symptome (Krämpfe, Neuropathien).

6.1 Porphyrins in Urine

CE IVD

Porphyrins

Several different porphyrias can be distinguished. Since these share some common symptoms, measurement of the porphyrin pattern in urine is necessary for an exact diagnosis.

This Chromsystems reagent kit allows the fast and reliable determination of all porphyrins in urine that are important for differential diagnosis. During sample preparation the internal standard and stabilisation reagent are added and particulates in urine removed by centrifugation. An oxidation step of the urine is unnecessary as the porphyrinogens are oxidised spontaneously by air into the fluorescent porphyrins.

The internal standard is eluted in between the analytes thus analytical variation and inaccuracy is avoided as well as chromatographic run time being shortened.

> Easy sample preparation
> Specially developed internal standard
> Stable standards and controls

Verschiedene Porphyrien können unterschieden werden, abhängig davon welches Enzym des Hämaufbaus gestört ist. Da diese teilweise die gleichen Symptome zeigen, kann eine genaue Diagnose nur anhand des Musters der Porphyrine im Urin gestellt werden.

Dieser Chromsystems Reagenzienkit ermöglicht eine spezifische Bestimmung der Porphyrine im Urin. Alle für eine Differentialdiagnose relevanten Porphyrine werden erfasst. Bei der Probenvorbereitung müssen nur der interne Standard und ein Stabilisierungsreagenz zugegeben und die im Urin enthaltenen Schwebstoffe durch Zentrifugation abgetrennt werden. Eine Oxidation des Urins ist nicht notwendig, da die Porphyrinogene bereits spontan durch Luftsauerstoff in die fluoreszierenden Porphyrine oxidiert werden.

Der interne Standard ist so optimiert, dass er mittig im Chromatogramm eluiert und so eine hohe Präzision und Zuverlässigkeit der Ergebnisse gewährleistet. Außerdem kann die Chromatographie so entscheidend verkürzt werden.

> Einfache Probenvorbereitung
> Maßgeschneiderter interner Standard
> Stabile Kalibratoren und Kontrollen

Parameters:
coproporphyrin I, coproporphyrin III, heptacarboxyporphyrin, hexacarboxyporphyrin
pentacarboxyporphyrin, uroporphyrin

Porphyrins in Urine

Order no.	Product
44000	Porphyrins in Urine For 100 tests
	Components available separately
44001	Mobile Phase A, 1000 ml
44002	Mobile Phase B, 1000 ml
44003	Porphyrins Urine Calibration Standard (lyoph.), 5 x 2 ml
44004	Internal Standard, 5 ml
44005	Stabilisation Reagent, 5 ml
44006	Priming Solution, 5 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
44100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
15011	PEEK-encased Prefilter 2 µm, 5 pcs.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18044	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0144	Porphyrins Urine Control, Bi-Level (I + II), 2 x 5 x 2 ml
0145	Porphyrins Urine Control, Level I, 5 x 2 ml
0146	Porphyrins Urine Control, Level II, 5 x 2 ml

Specifications

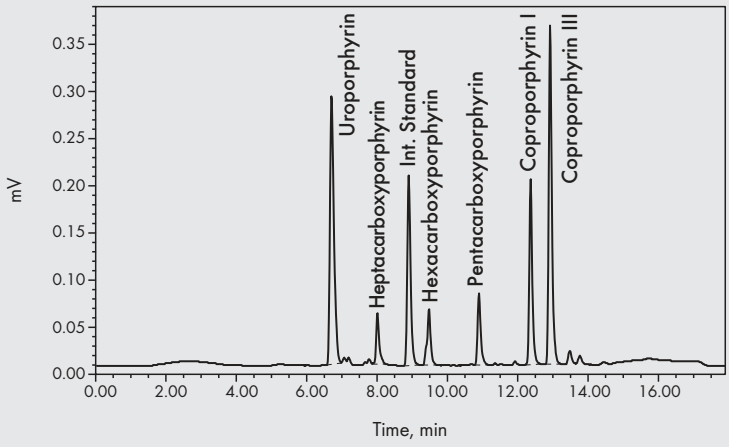
Limit of quantification:	3 µg/l
Linearity:	up to at least 5000 µg/l
Intraassay:	CV < 4 %
Interassay:	CV ≤ 6 %
Recovery:	95–106 %
Analysis time:	15 min + 5 min reequilibration

Pre-analytic Treatment

Specimens: urine is used for analysis. Specimens must be kept cool and light protected for transport. Highest stability at a pH of 6–7 up to 2 days at +2 to +8 °C. For longer storage (up to 1 month) deep-freeze below -18 °C.

Sample Preparation

→ Place 500 µl urine in a labelled, light-protected reaction vial.
→ Add 50 µl Stabilisation Reagent and 50 µl Priming Solution, mix briefly (vortex); incubate for 10 min at ambient temperature.
→ Add 50 µl Internal Standard and mix briefly (vortex).
→ Centrifuge for 10 min at 9000 x g.
→ Inject 25 µl supernatant into the HPLC system.



HPLC Parameters

Binary HPLC gradient system with fluorescence detector.

Injection volume: 25 µl
Flow rate: 1.2 ml/min
Wavelengths: EX 405 nm, EM 620 nm
Column temperature: +18 to +30 °C

Porphyrins Urine Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Coproporphyrin I	µg/l nmol/l	17.9 27.3	362 553
Coproporphyrin III	µg/l nmol/l	49.4 75.4	868 1325
Heptacarboxyporphyrin	µg/l nmol/l	11.2 14.3	100 127
Hexacarboxyporphyrin	µg/l nmol/l	10.8 14.5	60.8 81.9
Pentacarboxyporphyrin	µg/l nmol/l	11 15.8	55.4 79.2
Uroporphyrin	µg/l nmol/l	17.1 20.6	467 563

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0144	Porphyrins Urine Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0145	Porphyrins Urine Control, Level I (lyoph.), 5 x 2 ml
0146	Porphyrins Urine Control, Level II (lyoph.), 5 x 2 ml

Stability of Urine Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 3 days at +2 °C to +8 °C
> Reconstituted aliquots up to 1 month below -18 °C

Notes

7

Occupational Medicine

The aim of biological monitoring within the scope of occupational and environmental toxicology is to assess the exposure to hazardous substances and the resulting health hazards at work. This involves the determination of hazardous substances or their metabolites in body fluids such as blood or urine, in the case of benzene for example trans,trans-muconic acid in urine.

For any hazardous substance or its metabolite, a BTV (Biological Tolerance Value) is defined as a threshold value for maximum exposure, which assures safe working conditions without detriment to the health of the employee. If insufficient toxicological data is available to define a BTV, the so called Biological Guideline Value (BGV) is suggested. For carciogenic substances, there are generally no BTVs defined, and if necessary the BGV should be considered.

Arbeitsmedizin

Ziel des medizinischen Monitorings im Bereich der arbeits- und umweltmedizinischen Toxikologie ist die Abschätzung der Schadstoffbelastung von Personen und der daraus resultierenden Gesundheitsrisiken. Beim Dosismonitoring werden die Schadstoffe oder ihre Metabolite in Körperflüssigkeiten, Blut oder Urin, bestimmt, im Falle des Benzols beispielsweise die trans,trans-Muconsäure im Urin.

Als Höchstwert für die maximal zulässige Belastung mit einem schädlichen Arbeitsstoff oder dessen Metabolit ist der BAT-Wert (Biologischer Arbeitsstoff-Toleranz-Wert) festgelegt, bei dem die Gesundheit des Beschäftigten nicht beeinträchtigt wird. Liegen keine ausreichenden toxikologischen Daten für die Festlegung eines BAT-Wertes vor, so wird der sogenannte „Biologische Leitwert" (BLW) vorgeschlagen. Für kanzerogene Substanzen werden in der Regel keine BAT-Werte definiert, man zieht gegebenenfalls den BLW heran.

7.1 1-Hydroxypyrene in Urine

CE IVD

1-Hydroxypyrene

Polycyclic aromatic hydrocarbons (PAHs) are hydrocarbons composed of multiple aromatic rings with potential carcinogenic properties. Biological monitoring of these substances is therefore essential in occupational health and in particular in industries where workers are potentially exposed to high levels of PAHs, such as in aluminium, iron and steel manufacturing. One of the parent PAHs is pyrene, which undergoes a simple metabolism to 1-hydroxypyrene. 1-Hydroxypyrene and its glucuronide are excreted in urine, making it suitable for monitoring. Pyrene is always present in PAH mixtures and is therefore not only an indicator of pyrene accumulation, but also of an overall exposure to PAHs.

This Chromsystems kit enables the reliable determination of 1-hydroxypyrene from urine using an isocratic HPLC run within 7 minutes. The sample preparation is fast and simple and requires only two steps: 1-hydroxypyrene is de-conjugated by an efficient and fast enzymatic hydrolysis, followed by solid phase extraction using sample clean up columns. The correct pH required for precise analysis is visually verified by a colour changing indicator. The inclusion of an internal standard ensures reproducible and reliable quantitative results. 1-Hydroxypyrene is measured using optimised chromatographic separation with highly sensitive fluorescence detection, ensuring elimination of most potential interferences. The human-matrix based calibration standard and controls ensure precision and accuracy of results.

- **Complete CE-IVD kit, including internal standard and mobile phase**
- **Effective hydrolysis in only 2 hours – with integrated colour indicator for pH adjustment**
- **Analysis time of less than 7 minutes**
- **Equilibrated, tested and ready to use HPLC column**
- **Simple isocratic HPLC system sufficient**

Polyzyklische aromatische Kohlenwasserstoffe (PAKs) sind Kohlenwasserstoffe mit mehreren aromatischen Ringen und karzinogenem Potential. Das Monitoring ist daher in der Arbeitsmedizin essentiell und von besonderer Wichtigkeit in Industrien mit hoher Exposition an PAKs, wie zum Beispiel der Aluminium-, Eisen- und Stahlherstellung. Einer der übergeordneten PAKs ist Pyren, das leicht zu 1-Hydroxypyren metabolisiert wird. 1-Hydroxypyren und sein Glucuronid werden mit dem Urin ausgeschieden und sind daher für das Biomonitoring geeignet. Pyren ist immer in PAK-Gemischen vorhanden und daher nicht nur ein Indikator für die Aufnahme von Pyren, sondern auch von PAKs generell.

Der HPLC-Kit von Chromsystems ermöglicht die zuverlässige Bestimmung von 1-Hydroxypyren im Urin mit einem isokratischen HPLC-Lauf innerhalb von 7 Minuten. Die Probenvorbereitung ist schnell und einfach und erfordert nur zwei Schritte: Dekonjugation des 1-Hydroxypyrens durch eine effiziente und schnelle enzymatische Hydrolyse, gefolgt von einer Festphasenextraktion unter Verwendung von Sample Clean Up Columns. Der korrekte pH-Wert, der für eine genaue Analyse erforderlich ist, kann leicht visuell durch einen Farbwechsel eines Indikators überprüft werden. Die Einbeziehung eines internen Standards gewährleistet reproduzierbare und zuverlässige quantitative Ergebnisse. 1-Hydroxypyren wird mit hochempfindlicher Fluoreszenzdetektion unter Verwendung einer optimierten chromatographischen Trennung gemessen, sodass potentielle Störungen ausgeschlossen werden können. Die auf Human-Matrix basierenden Kalibratoren und Kontrollen sorgen für Präzision und Genauigkeit der Ergebnisse.

- **Kompletter CE-IVD-Kit mit internem Standard und mobiler Phase**
- **Effektive Hydrolyse in nur 2 Stunden – mit integriertem Farbindikator zur pH-Wert-Einstellung**
- **Analysezeit weniger als 7 Minuten**
- **Äquilibrierte, getestete und gebrauchsfertige HPLC-Säule**
- **Einfaches isokratisches HPLC-System ausreichend**

Parameter:
1-hydroxypyrene

1-Hydroxypyrene in Urine

Order no.	Product
53000	1-Hydroxypyrene in Urine For 100 tests
53000/A1	Automated Assay for Gilson® ASPEC™: For 100 tests

Components available separately

53001	Mobile Phase, 1000 ml
53003	1-Hydroxypyrene Urine Calibration Standard, 5 x 5 ml (lyoph.)
53004	Internal Standard, 5 ml
53005	Wash Buffer, 100 ml
53006	Hydrolysis Buffer, 22 ml
53007	Enzyme Solution, 0.5 ml
53008	Sample Clean Up Columns, 100 pcs.
53009	Elution Buffer, 30 ml
33006	Reaction Vials, transparent, 100 pcs.

Accessories

53100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15010	PEEK Prefilter Housing, 1 pc.
15011	PEEK-encased Prefilter, 2 µm, 5 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18053	Precolumn Cartridge 4/10, 1 pc.

Chromsystems Controls (lyoph.)

0177	1-Hydroxypyrene Urine Control, Bi-Level (I + II), 2 x 5 x 5 ml
0178	1-Hydroxypyrene Urine Control, Level I, 5 x 5 ml
0179	1-Hydroxypyrene Urine Control, Level II, 5 x 5 ml

Specifications

Limit of quantification:	0.1 µg/l
Linearity:	up to 20 µg/l
Intraassay:	CV = 0.9–2.7 %
Interassay:	CV = 2.7–5.7 %
Recovery:	92 %
Analysis time:	6.5 min

Pre-analytic Treatment

Specimens: urine is used for analysis.
Sample stability: patient specimens can be kept for up to 2 days at room temperature and at +2 to +8 °C. For longer periods of storage (up to 1 year), deep-freeze below -18 °C.

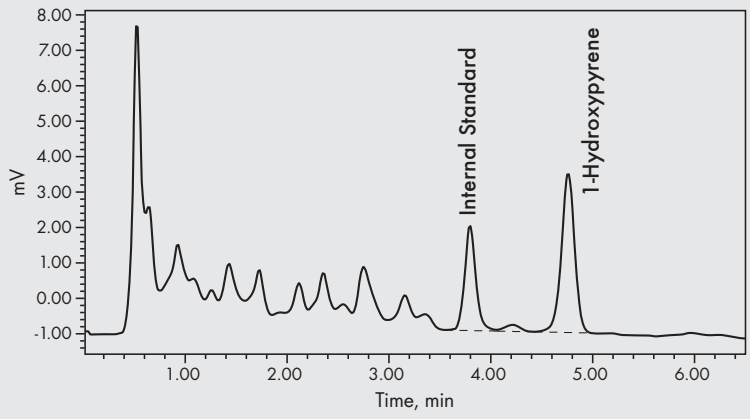
Sample Preparation

ENZYMATIC HYDROLYSIS

→ Mix (vortex for 2 s) 1 ml urine (sample/control/calibrator) with 50 µl Internal Standard and 200 µl of the prepared Enzyme Solution in a reaction vial.
→ Adjust pH if necessary (prepared Enzyme Solution includes colour indicator).
→ Close the vial tightly and incubate for at least 2 hours at 37 °C.

SOLID PHASE EXTRACTION

→ Briefly mix (vortex for 2 s) the hydrolysed urine.
→ Add 1 ml of the hydrolysed urine to a sample clean up column and draw through by centrifugation (2 min at 700 x g) or suction. Discard effluent.
→ Centrifuge (1 min at 700 x g) 1000 µl Wash Buffer through the sample clean up column. Discard effluent.
→ Centrifuge (2 min at 700 x g) 300 µl Elution Buffer through the sample clean up column into a lightprotected collection vessel (e.g. autosampler vial).
→ Briefly mix (vortex for 2 s) the eluate.
→ Inject 10 µl eluate into the HPLC system.



HPLC Parameters

Isocratic HPLC system with column oven and fluorescence detector.

Injection volume: 10 µl
Flow rate: 1.2 ml/min
Wavelengths: EX 242 nm, EM 388 nm
Column temperature: 35 °C

1-Hydroxypyrene in Urine Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
1-Hydroxypyrene	µg/l	0.27	7.99
	µmol/l	1.24	36.6

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0177	1-Hydroxypyrene Urine Control, Bi-Level (I + II), 2 x 5 x 5 ml
0178	1-Hydroxypyrene Urine Control, Level I, 5 x 5 ml
0179	1-Hydroxypyrene Urine Control, Level II, 5 x 5 mll

Stability of Urine Controls

Please check instruction manual for detailed information

> Stable to expiry date at +2 °C to +8 °C
> Reconstituted up to 4 weeks at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

7.2 Hippuric Acid, Methylhippuric Acids, Mandelic Acid and Phenylglyoxylic Acid in Urine

CE IVD

Hippuric acid, o-, m-, p-methylhippuric acids, mandelic acid and phenylglyoxylic acid are the main metabolites of toluene, xylene, and styrene. Despite their high toxicity they are widely used as organic solvents and as a starting compound in the production of plastics. Due to their very fast metabolism the level of these substances in blood is very low. For biological monitoring of people who are exposed to these compounds at work, therefore, measurement of the metabolites in urine gives the most satisfactory data. The Biological Exposure Index (BEI) has been set as the upper limit for concentrations of toxic substances and their metabolites in biological material (e.g. blood, urine) defining the maximum concentrations that do not normally compromise a person´s health.

This Chromsystems reagent kit provides the rapid and easy determination of the parameters mentioned above in an isocratic HPLC run. For sample preparation only one step for stabilisation of the urine is necessary. The inclusion of an internal standard guarantees high precision and reliability of results.

> Only 10 µl sample volume
> Internal standard included
> Simple sample preparation

Hippursäure, o-, m-, p-Methylhippursäure bzw. Mandelsäure und Phenylglyoxylsäure sind die Hauptmetabolite von Toluol, Xylol bzw. Styrol, die trotz ihrer Giftigkeit als Lösungsmittel und Ausgangssubstanz für Kunststoffe weit verbreitet sind. Zur arbeitsmedizinischen Überwachung von beruflich exponierten Personen ist die Messung der Metabolite im Urin aussagekräftiger als die Bestimmung der Schadstoffe im Blut selbst, da diese rasch metabolisiert werden. Die maximal zulässige Schadstoffkonzentration in biologischem Material (z. B. Blut, Urin) ist dabei durch den Biologischen Arbeitsstoff-Toleranz (BAT)-Wert festgelegt.

Dieser Reagenzienkit ermöglicht die rasche und einfache Bestimmung der o. g. arbeitsmedizinischen Parameter in einem isokratischen HPLC-Lauf. Zur Probenvorbereitung ist nur ein Stabilisierungsschritt des Urins notwendig, durch die Verwendung eines internen Standards ist eine hohe Präzision und Zuverlässigkeit der Ergebnisse sicher gestellt.

> Nur 10 µl Probenvolumen
> Interner Standard
> Einfache Probenvorbereitung

Parameters:
hippuric acid, m-methylhippuric acid, o-methylhippuric acid, p-methylhippuric acid, mandelic acid, phenylglyoxylic acid

Hippuric Acid, Methylhippuric Acids, Mandelic Acid and Phenylglyoxylic Acid in Urine

Order no.	Product
43000	Hippuric Acid, Methylhippuric Acids, Mandelic Acid and Phenylglyoxylic Acid in Urine For 100 tests
	Components available separately
43001	Mobile Phase, 1000 ml
43002	Mobile Phase, 10 x 1000 ml
43003	Occupational Medicine Urine Calibration Standard (lyoph.), 5 x 0.5 ml
43004	Internal Standard, 100 ml
3006	Reaction Vials, 100 pcs.
	Accessories
43100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
15011	PEEK-encased Prefilter 2 µm, 5 pcs.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18043	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0141	Occupational Medicine Urine Control, Bi-Level (I + II), 2 x 5 x 0.5 ml
0142	Occupational Medicine Urine Control, Level I, 5 x 0.5 ml
0143	Occupational Medicine Urine Control, Level II, 5 x 0.5 ml

Specifications

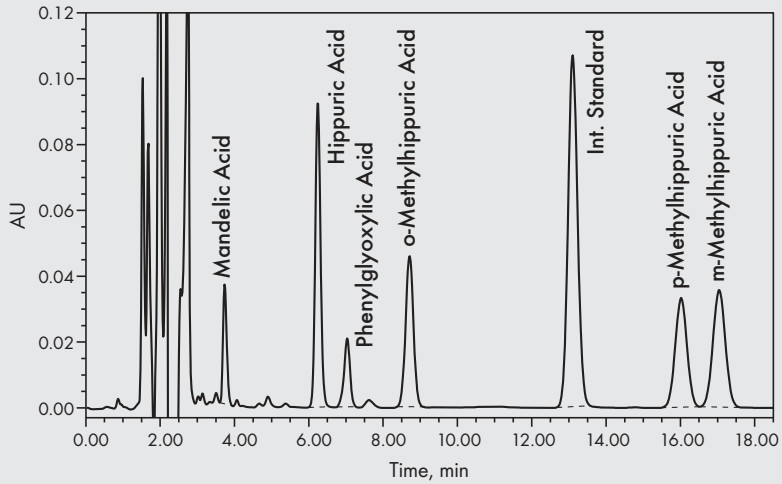
Limit of quantification:	6–11 mg/l
Intraassay:	CV < 2 %
Interassay:	CV < 5%
Recovery:	102–109 %
Analysis time:	20 min
Linearity:	
hippuric acid	11–18000 mg/l
methylhippuric acid	4–7100 mg/l
mandelic acid	10–4000 mg/l
phenylglyoxylic acid	6–1650 mg/l
Biological exposure indices (BEI):	
∑ methylhippuric acids	2000 mg/l
mandelic acid	300 mg/l
phenylglyoxylic acid	300 mg/l

Pre-analytic Treatment

Specimens: urine, collected after end of work shift. Specimens must be kept cool for transport. Stored at +2 to +8 °C samples are stable up to 5 days. For longer storage (up to 3 months) deep-freeze below -18 °C.

Sample Preparation

→ Place 1000 µl Internal Standard into a reaction vial.
→ Add 10 µl urine (calibrator, controls, specimens) and mix briefly (vortex).
→ Centrifuge 5 minutes at 9000 x g.
→ Inject 20 µl supernatant into the HPLC system.



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 20 µl
Flow rate: 1.0 ml/min
Wavelength: 207 nm
Column temperature: ambient (~ 25 °C)

Occupational Medicine Urine Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Hippuric acid	mg/l µmol/l	864 4821	1865 10405
m-Methylhippuric acid	mg/l µmol/l	365 1890	1226 6353
o-Methylhippuric acid	mg/l µmol/l	355 1841	1243 6440
p-Methylhippuric acid	mg/l µmol/l	365 1892	1245 6451
Mandelic acid	mg/l µmol/l	228 1498	616 4048
Phenylglyoxylic acid	mg/l µmol/l	88.4 589	376 2503

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0141	Occupational Medicine Urine Control, Bi-Level I + II (lyoph.), 2 x 5 x 0.5 ml
0142	Occupational Medicine Urine Control, Level I (lyoph.), 5 x 0.5 ml
0143	Occupational Medicine Urine Control, Level II (lyoph.), 5 x 0.5 ml

Stability of Urine Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 4 days at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

7.3 o-Cresol, p-Cresol and Phenol in Urine

CE IVD

o-Cresol, p-Cresol and Phenol

Cresol and phenol are formed as metabolites in the body after exposure to toluene and benzene respectively. Determination of their urinary concentration is an important tool for the biological monitoring of toluene and benzene exposure at work. Toluene and benzene are toxic substances that are produced on an industrial scale for example as solvents and fuel additives.

This Chromsystems reagent kit allows the reliable and fast chromatographic determination of ortho- and para-cresol as well as phenol in an isocratic HPLC run. The sample preparation requires only a hydrolysis step followed by stabilisation of the sample. The phenols in urine are mainly present as conjugates (sulfates, glucuronides), and are converted into the free forms by means of an efficient acid hydrolysis; problems typically occurring with enzymatic release (long reaction time, insufficient reaction yield) are thus avoided. This method employs an optimised chromatographic separation with fluorescence detection for the selective measurement of the analytes, so that most potential interferences are excluded. The inclusion of a tailor-made internal standard in the method assures high precision and safety in quantifying the analytes.

> Efficient acid hydrolysis
> With tailor-made internal standard
> Simultaneous and specific detection of o-cresol, p-cresol and phenol

Cresol und Phenol werden bei einer Belastung mit Toluol bzw. Benzol als Metabolite im Körper gebildet. Die Konzentrationsbestimmung im Urin von beruflich exponierten Personen dient im Rahmen des „Biological Monitoring" der arbeitsmedizinischen Überwachung einer Toluol- bzw. Benzol-Exposition. Toluol und Benzol sind giftige Chemikalien, die im großtechnischen Maßstab zum Beispiel als Lösungsmittel und Kraftstoffzusätze produziert werden.

Dieser Chromsystems Reagenzienkit erlaubt die zuverlässige und schnelle chromatographische Bestimmung von ortho- und para-Cresol sowie Phenol in einem isokratischen HPLC-Lauf. Die Probenvorbereitung ist einfach durchzuführen und erfordert nur einen Hydrolyse- und nachfolgenden Stabilisierungsschritt der Probe. Bei der sauren Hydrolyse werden die im Urin als Konjugate (hauptsächlich Sulfate und Glucuronide) vorliegenden Phenole effizient in die freie Form überführt; typische Probleme, wie sie bei enzymatischer Freisetzung auftreten (lange Reaktionsdauer, unvollständige Freisetzung), werden hier vermieden. Die Erfassung der Analyte erfolgt anschließend mit einer optimierten chromatographischen Trennung über Fluoreszenz-Detektion mit hoher Selektivität, so dass Interferenzen weitgehend ausgeschlossen werden. Die Einbeziehung eines maßgeschneiderten internen Standards in die Methode gewährleistet eine hohe Präzision und Sicherheit bei der Quantifizierung der Analyte.

> Effiziente Säurehydrolyse
> Maßgeschneiderter interner Standard
> Simultane und spezifische Detektion von o-Cresol, p-Cresol und Phenol

Parameters:
o-cresol, p-cresol, phenol

o-Cresol, p-Cresol and Phenol in Urine

Order no.	Product
41000	o-Cresol, p-Cresol and Phenol in Urine For 100 tests
	Components available separately
41001	Mobile Phase, 1000 ml
41002	Mobile Phase, 10 x 1000 ml
41003	o-Cresol, p-Cresol and Phenol Urine Calibration Standard (lyoph.), 5 x 0.5 ml
41004	Internal Standard, 5 ml
41055	Hydrolysis Reagent, 15 ml
41006	Stabilisation Buffer, 60 ml
41007	Hydrolysis Vials with screw caps, 100 pcs.
	Accessories
41100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15010	PEEK Prefilter Housing, 1 pc.
15011	PEEK-encased Prefilter 2 µm, 5 pcs.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18041	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0138	o-Cresol, p-Cresol, Phenol Urine Control, Bi-Level (I + II), 2 x 5 x 1 ml
0139	o-Cresol, p-Cresol, Phenol Urine Control, Level I, 5 x 1 ml
0140	o-Cresol, p-Cresol, Phenol Urine Control, Level II, 5 x 1 ml

Specifications

Linearity:	o-cresol at least to 20 mg/l p-cresol at least to 200 mg/l phenol at least to 50 mg/l
Limit of quantification:	0.04 mg/l
Intraassay:	CV < 3 %
Interassay:	CV < 4 %
Recovery:	97–100 %
Analysis time:	14 min

Reference ranges:
occupational tolerance limits in urine (mg/l)

total phenol:	200 (BGV)
total cresol:	200 (BGV)
o-Cresol:	1.5 (BTV)

reference range in urine (mg/g creatinine)

total phenol:	4.5–20.7
p-Cresol:	5.5–65
o-Cresol:	n. d.

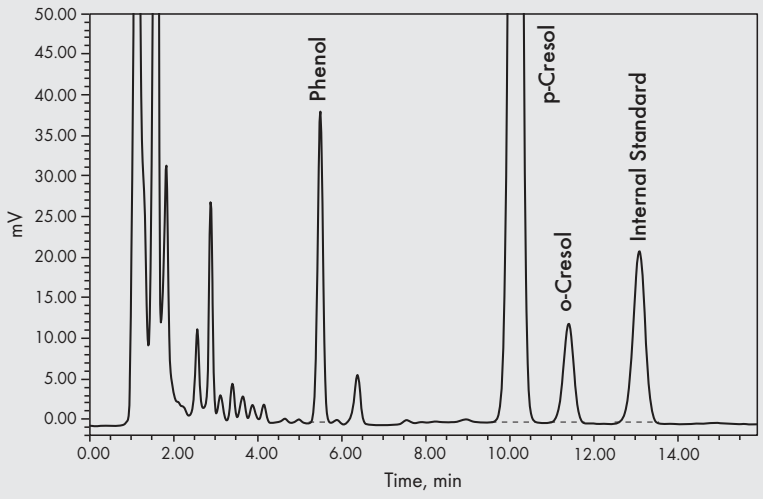
Pre-analytic Treatment

Urine is used for analysis. Storage life is up to 3 days at ambient temperature, at +2 to +8 °C up to 4 weeks. For longer storage deep-freeze below -18 °C (up to 2 months).

Sample Preparation

→ To 100 µl urine (sample, control, calibrator) add 150 µl Hydrolysis Reagent and 50 µl Internal Standard in a hydrolysis vial*, seal carefully, mix briefly.
→ Incubate 30 min at 95 °C.
→ Cool down sample (approx. 5 min, ambient temp.).
→ Add 600 µl Stabilisation Buffer, mix briefly.
→ Inject 10 µl into the HPLC system.

* The hydrolysis vials are suitable as sample vials for a number of commonly used autosamplers.



HPLC Parameters

Isocratic HPLC system with column oven and fluorescence detector.

Injection volume: 10 µl
Flow rate: 1.1–1.5 ml/min
Wavelengths: EX 270 nm, EM 300 nm
Column temperature: 25–35 °C

o-Cresol, p-Cresol and Phenol Urine Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
o-Cresol	mg/l µmol/l	0.48 4.46	3.22 29.8
p-Cresol	mg/l µmol/l	4.73 43.7	16.4 152
Phenol	mg/l µmol/l	4.09 43.4	15.8 168

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0138	o-Cresol, p-Cresol, Phenol Urine Control, Bi-Level I + II (lyoph.), 2 x 5 x 1 ml
0139	o-Cresol, p-Cresol, Phenol Urine Control, Level I (lyoph.), 5 x 1 ml
0140	o-Cresol, p-Cresol, Phenol Urine Control, Level II (lyoph.), 5 x 1 ml

Stability of Urine Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 4 weeks at +2 °C to +8 °C
> Reconstituted aliquots up to 2 months below -18 °C

7.4 t,t-Muconic Acid in Urine

CE IVD

t,t-Muconic acid is formed as metabolite in the body after exposure to benzene. Determination of the urinary t,t-muconic acid concentration is an important tool for the biological monitoring of benzene exposure at work. Benzene is produced on an industrial scale e.g. as solvent and as chemical for synthetic purposes. It is a toxic and carcinogenic compound that may cause damage to the stem cells of the bone marrow, thus inducing leukaemia and lymphoid cancer. To assess the exposition so called "exposition equivalents for carcinogenic substances" are defined, which are correlated with the concentration of the hazardous substance in the air and can be compared with an appropriate threshold limit value.

This Chromsystems reagent kit is designed for the easy and reliable chromatographic determination of t,t-muconic acid as marker of a benzene exposure. The sample preparation is based on an efficient and selective solid phase extraction. The chromatographic determination is run on an isocratic HPLC system with UV detector.

> Low limit of quantification
> Internal standard included
> Easy, fast, reliable

t,t-Muconsäure ist ein Stoffwechselendprodukt im Metabolismus des Benzols und wird als Marker für das arbeitsmedizinische Monitoring einer Benzolexposition herangezogen. Benzol wird vielfältig in der Synthesechemie als Grundchemikalie sowie als Lösungsmittel eingesetzt. Benzol ist giftig und besitzt kanzerogene Eigenschaften. Es schädigt Stammzellen im Knochenmark, was Leukämien und Lymphome induzieren kann. Zur Expositionsbeurteilung dienen sog. „Expositionsäquivalente für krebserzeugende Arbeitsstoffe" (EKA), die mit der Gefahrstoffkonzentration in der Luft in Beziehung gesetzt und mit dem TRK-Wert verglichen werden.

Dieser Chromsystems Reagenzienkit erlaubt die einfache und zuverlässige chromatographische Bestimmung von t,t-Muconsäure als Belastungsparameter einer Benzolexposition. Die Probenvorbereitung basiert auf einer effizienten und selektiven Festphasenextraktion. Die chromatographische Messung erfolgt auf einem isokratischen HPLC-System mit UV-Detektion.

> Niedrige Bestimmungsgrenze
> Mit internem Standard
> Einfach, schnell, zuverlässig

Parameter:
t,t-muconic acid

t,t-Muconic Acid in Urine

Order no.	Product
47000	t,t-Muconic Acid in Urine For 100 tests
	Automated Assay for Gilson® ASPEC™:
47000/A1	For 100 tests
47000/A5	For 500 tests
47000/A9	For 1000 tests

Components available separately

47001	Mobile Phase, 1000 ml
47002	Mobile Phase, 10 x 1000 ml
47003	t,t-Muconic Acid Urine Calibration Standard (lyoph.), 5 x 1 ml
47004	Internal Standard, 75 ml
47005	Wash Buffer 1, 100 ml
47006	Wash Buffer 2, 100 ml
47007	Wash Buffer 3, 100 ml
47009	Elution Buffer, 100 ml
47008	Sample Clean Up Columns, 50 pcs.
33005	Reaction Vials, amber coloured (light protected), 100 pcs.

Accessories

47100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18047	Precolumn Cartridge 4/10, 1 pc.

Chromsystems Controls (lyoph.)

0161	t,t-Muconic Acid Urine Control, Bi-Level (I + II), 2 x 5 x 2 ml
0162	t,t-Muconic Acid Urine Control, Level I, 5 x 2 ml
0163	t,t-Muconic Acid Urine Control, Level II, 5 x 2 ml

Specifications

Linearity:	0.02–10 mg/l
Limit of quantification:	0.02 mg/l
Intraassay:	CV = 1.5–1.7 %
Interassay:	CV = 2.9–3.4 %
Recovery:	93–98 %
Analysis time:	< 17 min

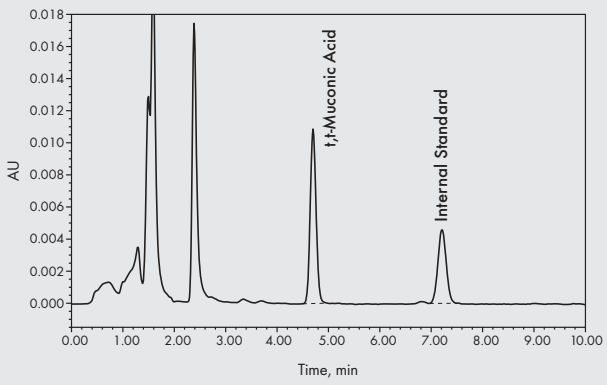
Exposition equivalents for carcinogenic substances:
t,t-Muconic acid: 2 mg/l urine (correlates to an exposition of 1 ppm benzene in the air)

Pre-analytic Treatment

Specimens: native urine (not acidified) is used for analysis. Storage life is up to 3 days at ambient temperature, at +2 to +8 °C up to 2 weeks.
For longer storage deep-freeze below -18 °C (maximum 3 months).

Sample Preparation

→ Pipette 250 µl urine + 750 µl Internal Standard into a reaction vial, mix briefly.
→ Apply to the sample clean up column, centrifuge (1 min, ca. 250 x g), draw through entirely! Discard the effluent.
→ Apply 1 ml of Wash Buffer 1 to the sample clean up column, centrifuge (1 min, ca. 250 x g). Repeat the wash step using Wash Buffer 2 and Wash Buffer 3. Discard the effluents.
→ Change the collection vial and apply 1 ml Elution Buffer to the sample clean up column, centrifuge (1 min, ca. 250 x g).
→ Mix eluate briefly, inject 20 µl into the HPLC system.



HPLC Parameters

Isocratic HPLC system with column oven and UV detector.

Injection volume: 20 µl
Flow rate: 1.1–1.3 ml/min
Wavelength: 264 nm
Column temperature: 33–37 °C

t,t-Muconic Acid Urine Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
t,t-Muconic acid	mg/l µmol/l	0.78 5.49	2.48 17.5

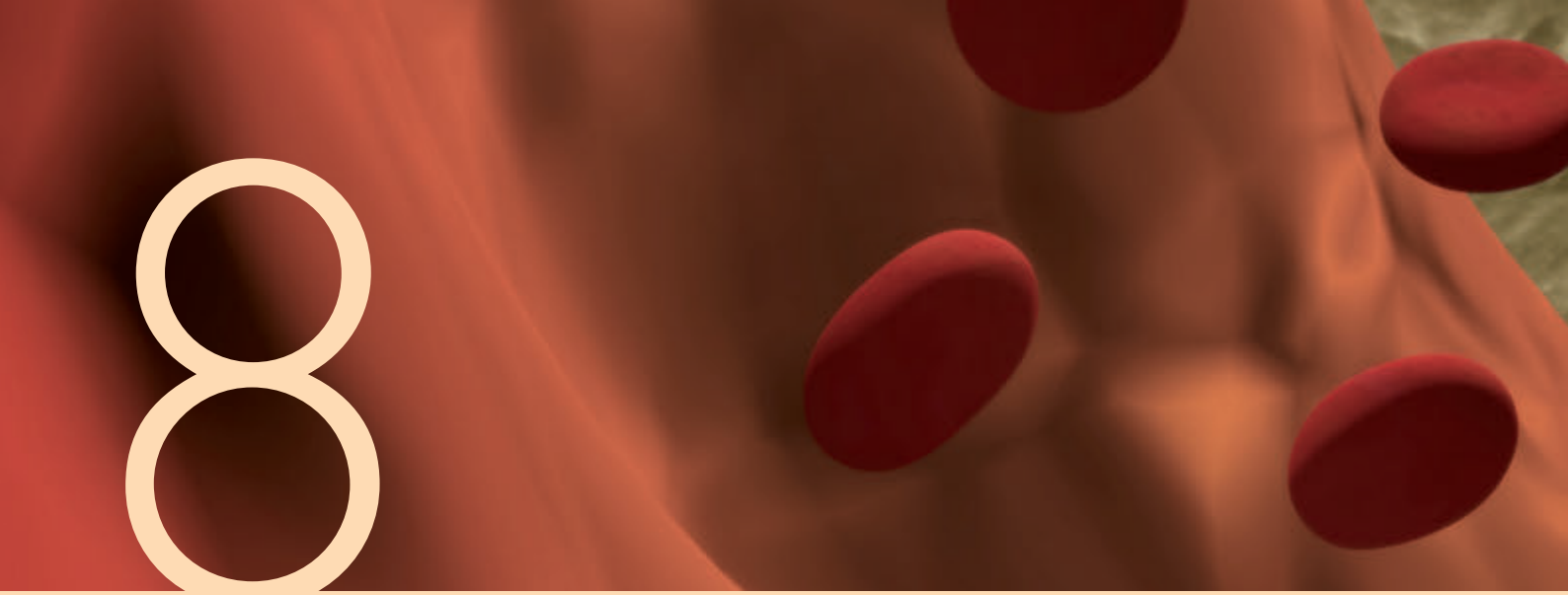
** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0161	t,t-Muconic Acid Urine Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0162	t,t-Muconic Acid Urine Control, Level I (lyoph.), 5 x 2 ml
0163	t,t-Muconic Acid Urine Control, Level II (lyoph.), 5 x 2 ml

Stability of Urine Controls

Please check instruction manual for detailed information

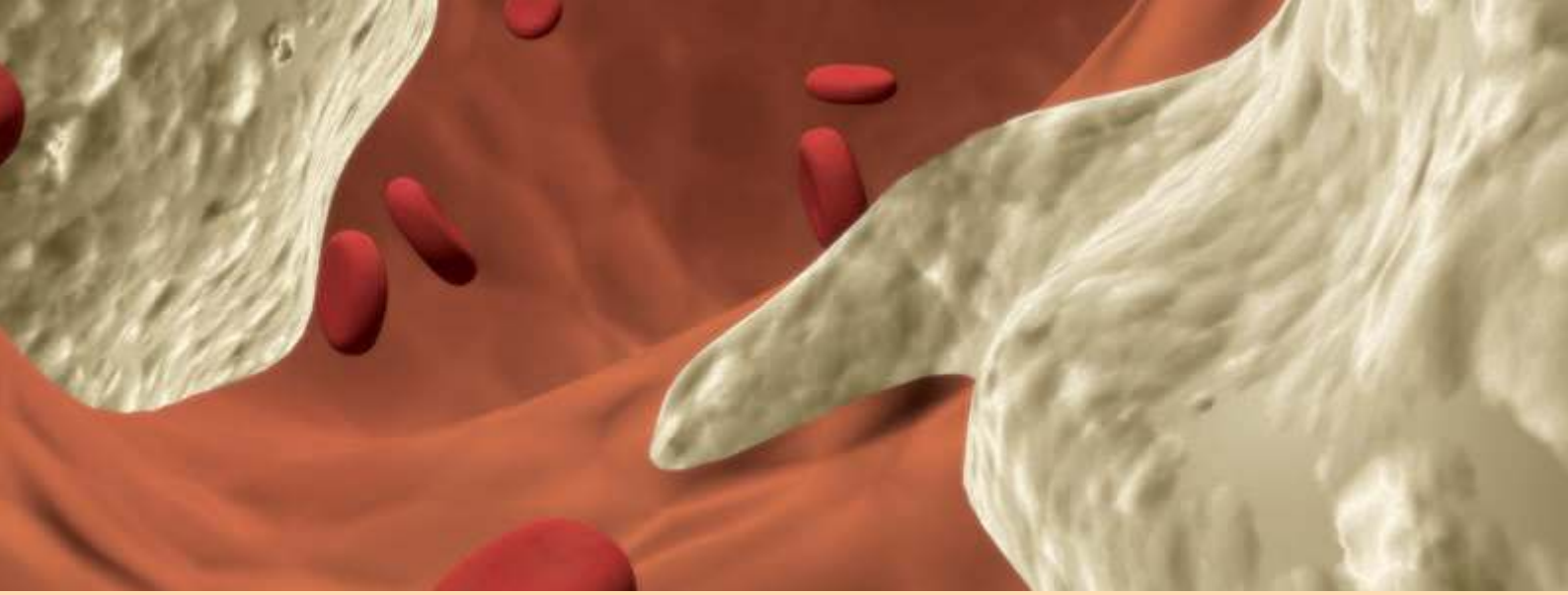
> Stable to expiry date below -18 °C
> Reconstituted up to 2 weeks at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C



8 Risk Factor for Arteriosclerosis

Cerebral vascular accidents (stroke) and coronary artery disease, both occurring as a consequence of arteriosclerotic changes in the circulatory system, are a major cause of death in western industrial countries. About half of all cases can be attributed to risk factors such as hypertension, increased cholesterol levels, smoking or obesity.

A further major risk factor for coronary heart disease was suggested initially by the clinical progression of disease in patients with homocystinuria. In these patients the plasma homocysteine levels are greatly increased because of a genetic disturbance of homocysteine metabolism. Many independent studies have been carried out worldwide and in most of them a clear relationship between increased homocysteine levels (hyperhomocysteinaemia) and arteriosclerosis was documented.



Risikofaktor für Arteriosklerose

Schlaganfall und koronare Herzkrankheiten als Folge arteriosklerotischer Veränderungen des Blutkreislaufsystems gelten als eine der Haupttodesursachen in den westlichen Industrienationen. Etwa die Hälfte aller auftretenden Fälle sind durch Risikofaktoren wie Bluthochdruck, erhöhter Cholesterinspiegel, Rauchen oder Fettleibigkeit bedingt.

Erste Hinweise auf einen weiteren Hauptrisikofaktor für koronare Herzkrankheiten gab der Krankheitsverlauf von Homocystinuriepatienten, bei denen der Homocysteinspiegel aufgrund einer genetischen Störung des Stoffwechsels stark erhöht ist. Weltweit wurden zahlreiche unabhängige Studien durchgeführt, von denen die meisten eindeutig den Zusammenhang zwischen erhöhtem Homocysteinspiegel (Hyperhomocysteinämie) und Arteriosklerose belegen.

8.1 Homocysteine in Plasma/Serum

CE IVD

Homocysteine is recognised worldwide as an independent risk factor for arteriosclerosis and coronary heart disease.

This reagent kit allows the simple and specific determination of total homocysteine in plasma/serum. Sample preparation is simply a reduction step for releasing homocysteine from its protein binding, followed by precipitation and subsequent precolumn derivatisation. An optimised chromatographic separation system and dedicated reagents ensure safe and reliable determination in all homocysteine blood collection systems.

> Fast sample preparation
> Short analysis time
> Column life-time more than 2000 runs
> For all blood collection systems

Homocystein gilt weltweit als anerkannter unabhängiger Risikofaktor für Arteriosklerose und koronare Herzkrankheiten.

Mit diesem Reagenzienkit wird Gesamthomocystein einfach und zuverlässig im Plasma/Serum bestimmt. Dabei beschränkt sich die Probenvorbereitung auf einen Reduktionsschritt, zur Freisetzung von Homocystein aus seiner Proteinbindung und einen Fällungsschritt mit anschließender Derivatisierung. Ein auf kurze Analysenzeiten optimiertes Trennsystem und sorgfältig aufeinander abgestimmte Reagenzien erlauben eine sichere und verlässliche Quantifizierung aus allen Blutentnahmesystemen für Homocystein.

> Schnelle Probenvorbereitung
> Kurze Analysenzeit
> Standzeit der HPLC-Säule mehr als 2000 Trennungen
> Für alle Blutabnahmesysteme geeignet

Parameter:
homocysteine

Homocysteine in Plasma/Serum

Order no.	Product
45000	Homocysteine in Plasma/Serum For 200 tests
	Components available separately
39001	Mobile Phase, 1000 ml
39002	Mobile Phase, 10 x 1000 ml
45003	Precipitation Reagent, 20 ml
39004	Homocysteine Plasma Calibration Standard (lyoph.), 5 x 1 ml
45099	Internal Standard, 5 ml
45006	Derivatisation Reagent 1 (lyoph.), 2 x 5 x 2 ml
45007	Derivatisation Reagent 2, 20 ml
45088	Reduction Reagent, 5 x 3 ml
33005	Reaction Vials, amber coloured (light protected), 100 pcs.
	Accessories
39100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
	Chromsystems Controls (lyoph.)
0071	Homocysteine Plasma Control, Bi-Level (I + II), 2 x 5 x 2 ml
0072	Homocysteine Plasma Control, Level I, 5 x 2 ml
0073	Homocysteine Plasma Control, Level II, 5 x 2 ml

Specifications

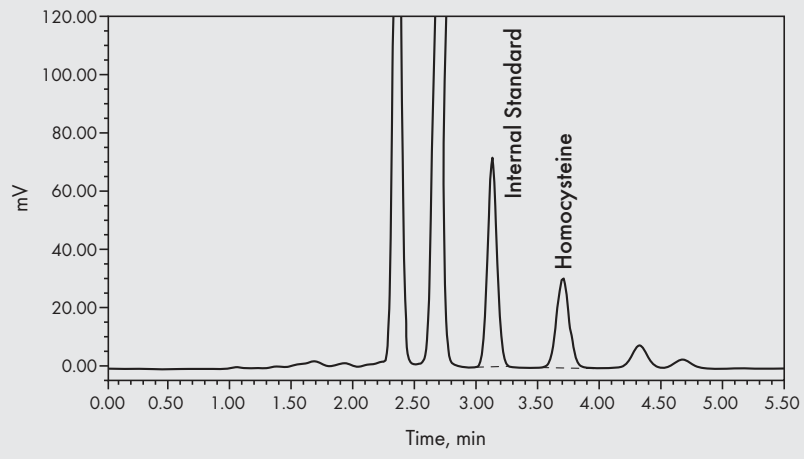
Linearity:	up to 400 µmol/l
Limit of quantification:	0.4 µmol/l
Intraassay:	CV = 0.9–1.5 %
Interassay:	CV = 2.9–3.1 %
Recovery:	96–99 %
Analysis time:	< 6 min

Pre-analytic Treatment

Specimens: plasma/serum taken from the fasting patient. If no special homocysteine blood collection systems are used, plasma/serum should be prepared within 45 min after drawing the sample. Stable at room temperature for 24 h, at +4° C up to 7 days. For longer storage samples should be frozen below -18° C (in case special homocysteine blood collection systems are used, please refer to the manufacturer for stability information).

Sample Preparation

→ To 100 µl plasma/serum add 25 µl Internal Standard and 75 µl Reduction Reagent.
→ Mix 2 s (vortex).
→ Incubate 10 minutes at room temperature (~ 25 °C).
→ Add 100 µl Precipitation Reagent.
→ Mix 30 s (vortex).
→ Centrifuge 5–7 minutes at 9000 x g.
→ In a separate reaction vial prepare 100 µl derivatisation mix (Derivatisation Reagent 1 + Derivatisation Reagent 2) and add 50 µl supernatant from the centrifugation, mix well.
→ Incubate 10 minutes at +50 to +55 °C in a water bath.
→ Cool down immediately.
→ Inject 20–50 µl into the HPLC system.



HPLC Parameters

Isocratic HPLC system with fluorescence detector.

Injection volume: 20–50 µl
Flow rate: 1.3–1.7 ml/min
Wavelengths: EX 385 nm, EM 515 nm
Column temp.: ambient (~ 25 °C)

Homocysteine Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Homocysteine	µmol/l	9.64	19.4

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0071	Homocysteine Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0072	Homocysteine Plasma Control, Level I (lyoph.), 5 x 2 ml
0073	Homocysteine Plasma Control, Level II (lyoph.), 5 x 2 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 3 days at +2 °C to +8 °C
> Reconstituted aliquots up to 4 weeks below -18 °C

Notes

9

Chronic Alcohol Abuse

Alcohol is the most frequently consumed drug and is also the most underestimated. The number of alcoholics in Germany alone is assessed to be 3.4 million, i.e. about 5–9.5 % of all adults. Every year approximately 74,000 people die as a result of excessive alcohol consumption. The damage due to alcoholism is estimated at about 26 billion Euro. Therefore, a marker for the reliable diagnosis of alcoholism is essential.

Chronischer Alkoholmissbrauch

Alkohol ist die in unserer Gesellschaft am meisten konsumierte aber auch die am stärksten unterschätzte Droge. Die Zahl der Suchtkranken allein in Deutschland wird auf 3,4 Millionen geschätzt, das entspricht etwa 5–9.5 % der Erwachsenen. Jährlich sterben ca. 74 000 Menschen an den Folgen von übermäßigem Alkoholkonsum, die davon verursachten Kosten werden auf 26 Milliarden Euro geschätzt. Umso wichtiger ist eine zuverlässige Kenngröße, mit deren Hilfe ein Alkoholmissbrauch sicher diagnostiziert werden kann.

9.1 CDT in Serum

CE IVD

CDT (carbohydrate-deficient transferrin) is a lab marker showing the highest specificity for chronic alcohol abuse. Unlike other biochemical parameters such as γ-GT or MCV, false-positive results caused by non-alcoholic liver diseases can be excluded. A daily intake of more than 60 g ethanol (about 0.75 l wine) over a period of one or two weeks elevates CDT values significantly. After approximately 2 weeks of alcohol abstention the levels normalise again. This makes CDT an excellent parameter for controlling withdrawal treatment, forensic judgements or in occupational medicine.

The Chromsystems reagent kits are designed for the fast and reliable determination of CDT in serum using HPLC with UV detection. The results are calculated as area percent of total transferrin, and therefore, are not affected by variations of the total transferrin concentration. The optimised chromatographic separation of the transferrin isoforms also ensures the detection of genetic variants of transferrin.
The one step method uses pre-mixed tubes that reduce the sample preparation to only one pipetting step. An automated version is also available that can be carried out fully automated with a liquid handling device as well as semi-automated with a multichannel pipette.

> Reference method for safe CDT determination
> Low cost per test
> Detects genetic variants
> With ready-to-use pre-mixed tubes for only one pipetting step
> Automated assay available

Das CDT (engl. Carbohydrate-Deficient-Transferrin) ist ein Labormarker mit der höchsten Spezifität für chronischen Alkoholmissbrauch. Im Gegensatz zu anderen biochemischen Parametern wie γ-GT oder MCV sind keine falsch positiven Ergebnisse durch Lebererkrankungen zu erwarten. Der CDT Wert steigt ab einem täglichen Konsum von mehr als 60 g Ethanol (entspricht ca. 0,75 l Wein) innerhalb von etwa 1–2 Wochen signifikant an und normalisiert sich bei Alkoholabstinenz innerhalb von ca. 2 Wochen wieder. Damit eignet sich das CDT hervorragend zur Verlaufskontrolle bei Alkoholentzugstherapien oder zu forensischen und arbeitsmedizinischen Beurteilungen.

Diese Chromsystems Reagenzienkits erlauben die schnelle und zuverlässige Bestimmung von CDT im Serum mittels HPLC mit UV-Detektion. Die Ergebnisse werden als Flächenprozent des Gesamttransferrins angegeben und sind damit unabhängig von Schwankungen der Transferrinkonzentration. Durch die optimierte chromatographische Trennung der Transferrinisoformen werden auch genetische Varianten des Transferrins sicher erkannt.
Die One Step Methode verwendet Pre-mixed Tubes, die die Probenvorbereitung auf einen einzigen Pipettierschritt reduzieren. Eine automatisierte Methode steht ebenfalls zur Verfügung, die entweder mit einem Pipettierroboter vollautomatisiert oder mit einer Mehrkanalpipette semi-automatisiert durchgeführt werden kann.

> Referenzmethode zur sicheren CDT-Bestimmung
> Geringe Kosten pro Analyse
> Erfassung genetischer Varianten
> Mit Pre-mixed Tubes nur ein Pipettierschritt
> Automatisierte Methode verfügbar

Parameters:
asialotransferrin, disialotransferrin, pentasialotransferrin, tetrasialotransferrin, trisialotransferrin

9.1.1 Standard Method: CDT in Serum

Order no.	Product
	For binary gradient systems:
54020	CDT in Serum For 100 tests
54020/500	For 500 tests

	Components available separately
	For binary gradient systems:
54021	Mobile Phase A, 3000 ml
54022	Mobile Phase B, 1500 ml
54025	Neutralisation Buffer, 2.5 ml
54026	Stabilisation Buffer, 2.5 ml
54027	Precipitation Reagent 1 (lyoph.), 3 ml
54028	Precipitation Reagent 2, 2.5 ml
3006	Reaction Vials, 100 pcs.

	For ternary gradient systems:
54030	CDT in Serum For 100 tests
54030/500	For 500 tests

	Components available separately
	For ternary gradient systems:
54031	Mobile Phase A, 2500 ml
54032	Mobile Phase B, 700 ml
54033	Mobile Phase C, 800 ml
54025	Neutralisation Buffer, 2.5 ml
54026	Stabilisation Buffer, 2.5 ml
54027	Precipitation Reagent 1 (lyoph.), 3 ml
54028	Precipitation Reagent 2, 2.5 ml
3006	Reaction Vials, 100 pcs.

	Accessories
54100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
54029	Column Wash Buffer, 500 ml
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.

	Chromsystems Controls (lyoph.)
0168	CDT Serum Control, Level I, 5 x 1 ml
0169	CDT Serum Control, Level II, 5 x 1 ml

Specifications

Linearity:	disialotransferrin < 12 %
Limit of quantification:	disialotransferrin 0.5 %
Intraassay:	CV ≤ 7.7 % (binary gradient)
	CV ≤ 6.2 % (ternary gradient)
Interassay:	CV = 4.6 % (binary gradient)
	CV = 3.5 % (ternary gradient)
Recovery:	101 % (binary gradient)
	99 % (ternary gradient)
Analysis time:	with binary gradient 22 min
	with ternary gradient 20 min

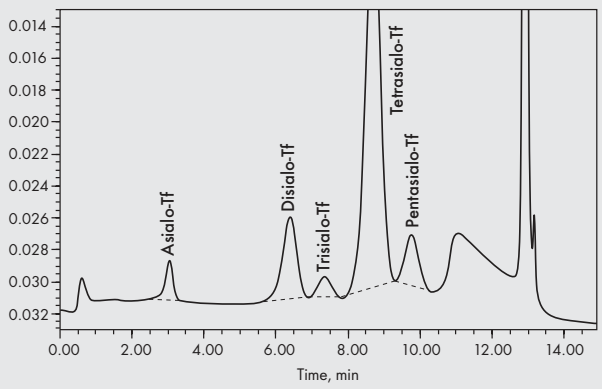
Pre-analytic Treatment

Specimens: serum is used for analysis. Specimens should be kept cool for transport.
Storage life is up to 1 week at +2 to +8 °C.
For longer storage, deep-freeze below -18 °C.

Sample Preparation

→ Place 200 µl serum in a reaction vial.
→ Add 100 µl reagent mix*.
→ Vortex for 60 s.
→ Incubate 30 min at +2 to +8 °C.
→ Centrifuge 10 min at 9000 x g.
→ Dilute 200 µl supernatant with 400 µl ultrapure water (HPLC grade).
→ Inject 200 µl into the HPLC system.

* Preparation of reagent mix:
mix 25 µl each of Neutralisation Buffer, Stabilisation Buffer, Precipitation Reagent 1 and 2.



HPLC Parameters

Binary or ternary HPLC gradient system with UV/VIS detector.

Injection volume: 200 µl
Flow rate: 1.5 ml/min
Wavelength: 460 nm
Column temp.: ambient (~ 25 °C)

9.1.2 One Step CDT in Serum, Fast Elution with Pre-mixed Tubes

Sample preparation with one single step

Order no.	Product
54930/500	One Step CDT in Serum, Fast Elution For 500 tests
	Components available separately
54931	Mobile Phase A, 2500 ml
54932	Mobile Phase B, 1300 ml
54933	Mobile Phase C, 2500 ml
54934	Pre-mixed Tubes, 100 pcs.
	Accessories
54100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
	Chromsystems Controls (lyoph.)
0168	CDT Serum Control, Level I, 5 x 1 ml
0169	CDT Serum Control, Level II, 5 x 1 ml

Specifications

Limit of quantification:	0.5 % disialotransferrin
Intraassay:	CV = 2.4 %
Interassay:	CV = 3.2 %
Analysis time:	10 min

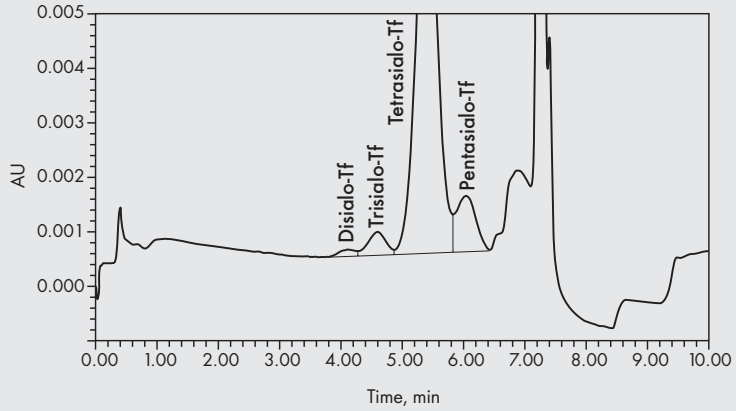
Pre-analytic Treatment

Specimens: serum is used for analysis. Specimens should be kept cool for transport.
Storage life is up to 1 week at +2 to +8 °C.
For longer storage, deep-freeze below -18 °C.

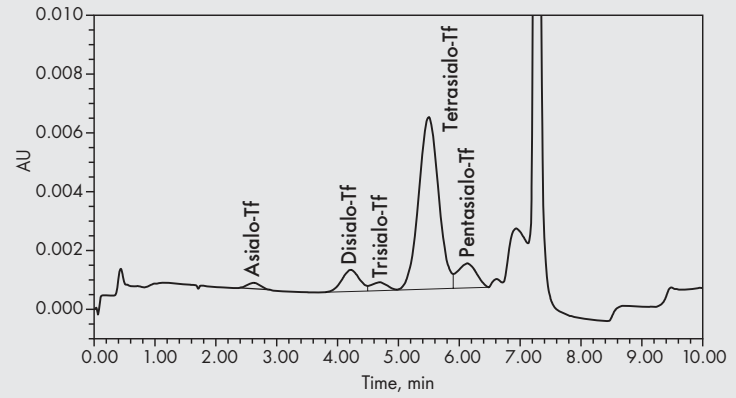
Sample Preparation

→ Add 100 µl serum to a pre-mixed tube.
→ Vortex for 30–60 s.
→ Incubate 30 min at +2 to +8 °C.
→ Centrifuge 10 min at 9000 x g.
→ Inject 150–200 µl of the supernatant into the HPLC system.

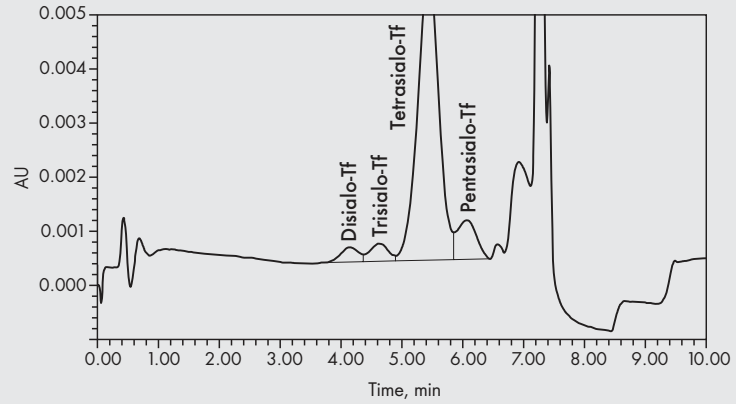
One Step CDT in Serum, Fast Elution with Pre-mixed Tubes



Chromatogram of a normal patient sample



Chromatograms of patho-logical patient samples



HPLC Parameters

Ternary HPLC gradient system with UV/VIS detector.

Injection volume: 150–200 µl
Flow rate: detection 1.5 ml/min
Wavelength: 460 nm
Column temp.: ambient (~ 25 °C)

9.1.3 Automated CDT in Serum using 96 Well Filter Plates

Automated with 96 Well Filter Plates

Order no.	Product
54730/F	Automated CDT in Serum using 96 Well Filter Plates with Fast Elution For 6 x 96 tests

Components available separately

54931	Mobile Phase A, 2500 ml
54932	Mobile Phase B, 1300 ml
54933	Mobile Phase C, 2500 ml
54025	Neutralisation Buffer, 2.5 ml
54026	Stabilisation Buffer, 2.5 ml
54027	Precipitation Reagent 1 (lyoph.), 3 ml
54028	Precipitation Reagent 2, 2.5 ml
54757	96 Well Filter Plates, 6 pcs.
54758	Collection Plates, 6 pcs.
54759	Pierceable Adhesive Seals for 96 Well Filter Plates, 3 pcs.

Accessories

54100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.

Chromsystems Controls (lyoph.)

0168	CDT Serum Control, Level I, 5 x 1 ml
0169	CDT Serum Control, Level II, 5 x 1 ml

Specifications

Limit of quantification:	0.5 % disialotransferrin
Intraassay:	CV = 2.7 %
Interassay:	CV = 5.7 %
Analysis time:	10 min

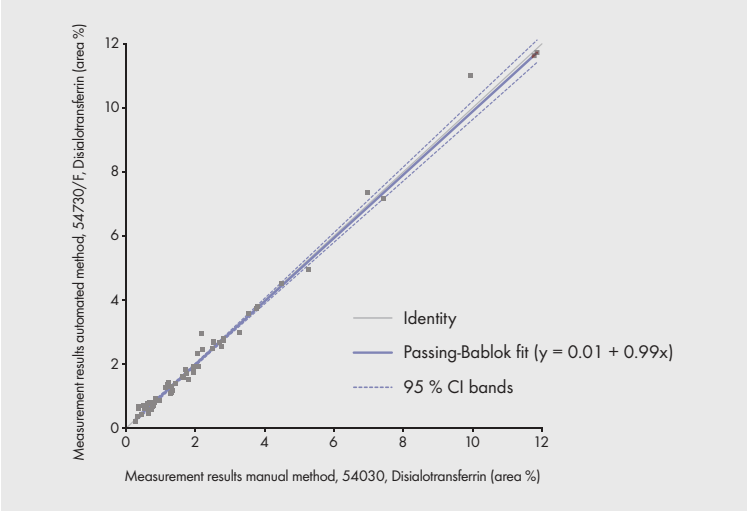
Pre-analytic Treatment

Specimens: serum is used for analysis. Specimens should be kept cool for transport.
Storage life is up to 1 week at +2 to +8 °C.
For longer storage, deep-freeze below -18 °C.

Automated Workflow

→ Load liquid handling device with samples, reagents, 96 well filter plate and collection plate.
→ Start the **automation routine***.
→ After completion remove collection plate from the liquid handling device, seal with an adhesive seal and transfer to autosampler.
→ Inject 150–200 µl eluate into the HPLC system.

** Ready to use automation routine provided with the installation by Chromsystems.*



CDT Serum Controls

Integration valley to valley		
Substance	Level I Target Value* in %	Level II Target Value* in %
Asialotransferrin	< 0.3	< 0.5
Disialotransferrin	1.47	3.31
Monosialotransferrin	0	0
Pentasialotransferrin	9.04	7.32
Tetrasialotransferrin	83.7	84.2
Trisialotransferrin	4.86	4.2
Total CDT	1.47	3.31

Integration baseline		
Substance	Level I Target Value* in %	Level II Target Value* in %
Asialotransferrin	0	< 0.5
Disialotransferrin	1.56	3.2
Monosialotransferrin	0	0
Pentasialotransferrin	14.6	12.2
Tetrasialotransferrin	77.1	79.4
Trisialotransferrin	5.16	4.49
Total CDT	1.56	3.2

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0168	CDT Serum Control Level I (lyoph.), 5 x 1 ml
0169	CDT Serum Control Level II (lyoph.), 5 x 1 ml

Stability of Serum Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 5 days at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

Therapeutic Drug Monitoring

Therapeutic drug monitoring (TDM) provides valuable information on the actual blood concentration of a specific drug. This ensures sufficient levels of the drug, while at the same time avoiding overdoses with potentially harmful side effects. TDM is also employed to assess patient compliance to a certain therapy regimen.

10 Therapeutisches Drug Monitoring

Das Therapeutische Drug Monitoring (TDM) liefert wertvolle Informationen über den aktuellen Blutspiegel eines bestimmten Arzneistoffes. Damit ist sichergestellt, dass das Therapeutikum in ausreichenden Mengen im Körper vorhanden ist, während gleichzeitig Überdosierungen mit potentiell gefährlichen Nebenwirkungen ausgeschlossen werden. TDM ermöglicht auch die Überprüfung der Einnahmetreue des Patienten.

10.1 Antibiotics in Serum/Plasma

CE IVD

The assay antibiotics in serum/plasma is an in vitro diagnostic product for the use in clinical laboratories. It is used for the quantitative determination of ampicillin, cefepime, ceftazidime, linezolid, meropenem and piperacillin in human serum and plasma samples for monitoring patients' blood levels of these antibiotics. The calibrators and controls also include sulbactam* and tazobactam* for obtaining qualitative data (customer validation required).

The HPLC determination with subsequent UV detection is done in two groups, the first run via a mobile phase gradient, the second run isocratically. Two internal standards and stable matrix products ensure precise quantification. The additionally included Priming Solution increases sample stability notably.

> Simple to perform
> Covers important and clinically relevant antibiotics
> Stable calibrators and controls
> First commercial CE-IVD assay for HPLC

Der Kit Antibiotika im Serum/Plasma ist ein in-vitro-diagnostisches Produkt zur Verwendung in klinischen Laboratorien. Er dient der quantitativen Bestimmung von Ampicillin, Cefepim, Ceftazidim, Linezolid, Meropenem und Piperacillin in humanen Serum- und Plasmaproben zur Überwachung der entsprechenden Blutspiegel bei Patienten. Die Kalibratoren und Kontrollen enthalten außerdem Sulbactam* und Tazobactam* zur Gewinnung von qualitativen Daten (Validierung erforderlich).

Die HPLC-Messung mit anschließender UV-Detektion erfolgt in zwei Gruppen, der erste Lauf über einen Lösungsmittelgradienten, der zweite Lauf isokratisch. Zwei interne Standards sowie stabile Matrixprodukte garantieren eine zuverlässige Quantifizierung. Zusätzlich enthält der Kit eine Priming Solution, mit der die Stabilität der Proben deutlich erhöht wird.

> Einfach durchzuführen
> Umfasst wichtige und klinisch relevante Antibiotika
> Stabile Kalibratoren und Kontrollen
> Erster kommerzieller CE-IVD-Kit mit HPLC

Parameters:
ampicillin, cefepime, ceftazidime, linezolid, meropenem, piperacillin, sulbactam*, tazobactam*

* Qualitative information on these analytes can be obtained, but data are not CE-IVD compliant

Antibiotics in Serum/Plasma

Order no.	Product
61000	Antibiotics in Serum/Plasma For 100 tests

Components available separately

61001	Mobile Phase A, 750 ml
61002	Mobile Phase B, 950 ml
61004	Internal Standard Mix, 20 ml
61005	Dilution Buffer, 10 ml
61012	Priming Solution, 2 ml
33006	Reaction Vials, transparent, 100 pcs.

Accessories

61100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15070	Stainless Steel Prefilter Housing, 1 pc.
15071	Stainless Steel Prefilter, 0.5 µm, 5 pcs.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18061	Precolumn Cartridge 4/10, 1 pc.
J0404	Autosampler Vials, amber glass, 1.5 ml, 100 pcs.
J0406	Crimp Caps, rubber/PTFE septa, 11 mm, 100 pcs.
J0505	Micro-inserts for autosampler vials, clear glass, 100 pcs.

Calibrators and Controls (lyoph.)

61028	3PLUS1® Multilevel Plasma Calibrator Set Antibiotics, 4 x 1 ml
61003	Antibiotics Plasma Calibration Standard, 5 x 1 ml
0183	Antibiotics Plasma Control, Level I, 5 x 1 ml
0184	Antibiotics Plasma Control, Level II, 5 x 1 ml

Specifications

Linearity:	up to 60–400 mg/l
Limit of quantification:	0.5–2.2 mg/l
Intraassay:	CV = 0.5–1.6 %
Interassay:	CV = 2.5–5.5 %
Recovery:	91–104 %
Analysis time:	group 1 = 13 min, group 2 = 5 min

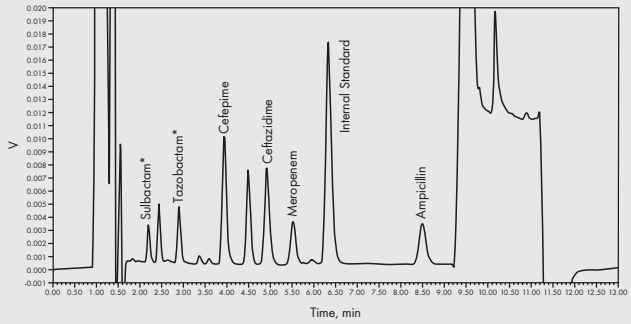
Pre-analytic Treatment

Specimens: serum or plasma.
Stability: detailed information can be obtained from the instruction manual.

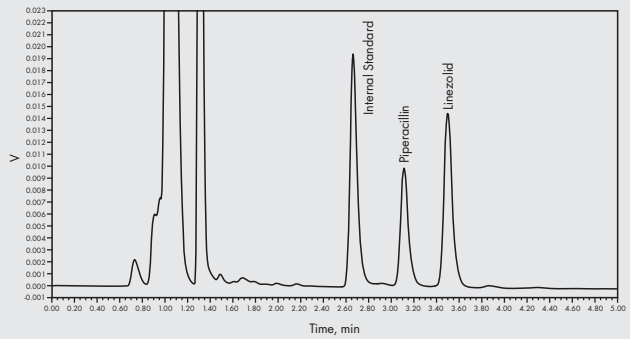
Sample Preparation

→ Pipette 100 µl sample into a 1.5 ml reaction vial.
→ Add 20 µl Priming Solution, mix briefly (vortex).
→ Add 200 µl Internal Standard, mix 1 min (vortex), centrifuge 5 min.
→ Transfer 100 µl supernatant into autosampler vial equipped with 400 µl microinsert.
→ Add 100 µl Dilution Buffer, mix briefly (vortex).
→ Inject 5 µl (group 1) or 10 µl (group 2) into the HPLC system.

Group 1



Group 2



HPLC Parameters

Binary HPLC gradient system with coolable injector, coolable column oven and UV detector.

Injection volume:
group 1 = 5 µl
group 2 = 10 µl

Gradient:
group 1 binary
group 2 isocratic

Wavelengths:
group 1 = 0–5.9 min 290 nm, then 210 nm
group 2 = 252 nm

Flow rate: 1 ml/min
Column temperature: 22 °C
Autosampler temperature: ≤ 10 °C

3PLUS1® Multilevel Plasma Calibrator Set Antibiotics

Substance	Unit	Calibrator 1*	Calibrator 2*	Calibrator 3*	Blank Calibrator*
Ampicillin	mg/l µmol/l	3.39 9.70	17.2 49.2	51.7 148	< LOQ
Cefepime	mg/l µmol/l	3.19 6.64	43.9 91.3	176 366	< LOQ
Ceftazidime	mg/l µmol/l	7.29 13.3	35.9 65.7	134 245	< LOQ
Linezolid	mg/l µmol/l	3.93 11.7	14.6 43.3	29.3 86.8	< LOQ
Meropenem	mg/l µmol/l	3.28 8.55	24.1 62.8	79.9 208	< LOQ
Piperacillin	mg/l µmol/l	7.33 14.2	45.4 87.8	182 352	< LOQ
Sulbactam**	mg/l µmol/l	4.53 19.4	19.1 81.9	45.9 197	< LOQ
Tazobactam**	mg/l µmol/l	4.77 15.9	19.3 64.3	32.8 109	< LOQ

** Please check packaging leaflet for specific lot concentrations*

*** For performance evaluation only*

LOQ = Limit of Quantification

Antibiotics Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Ampicillin	mg/l µmol/l	8.31 23.8	25.6 73.3
Cefepime	mg/l µmol/l	17.2 35.8	84.3 175
Ceftazidime	mg/l µmol/l	20.0 36.6	74.0 135
Linezolid	mg/l µmol/l	8.20 24.3	22.8 67.6
Meropenem	mg/l µmol/l	15.7 40.9	50.9 133
Piperacillin	mg/l µmol/l	18.6 35.9	91.5 177
Sulbactam**	mg/l µmol/l	10.7 45.9	28.5 122
Tazobactam**	mg/l µmol/l	9.90 33.0	24.7 82.3

** Please check packaging leaflet for specific lot concentrations*

*** For performance evaluation only*

Order no.	Product
61028	3PLUS1® Multilevel Plasma Calibrator Set Antibiotics (lyoph.), 4 x 1 ml
0183	Antibiotics Plasma Control, Level I (lyoph.), 5 x 1 ml
0184	Antibiotics Plasma Control, Level II (lyoph.), 5 x 1 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Meropenem at +2 to +8 °C 3 days, at -18 °C 1 week
> Sulbactam and Tazobactam at +2 to +8 °C 1 week, at -18 °C 3 months
> Ampicillin, Cefepime, Ceftazidime, Linezolid, Piperacillin at +2 to +8 °C 3 weeks, at -18 °C 3 months

10.2 Amiodarone and Desethylamiodarone in Serum/Plasma

CE IVD

Amiodarone is a typical representative of the class III antiarrhythmic agents that induce prolongation of the action potentials and refractory periods in the heart. Although amiodarone itself rarely causes cardiac arrhythmias, adverse effects may occur in other organs, e.g. reversible sensitivity to light in the eyes and the skin with risk of sunburn, increased liver-related values, as well as very rarely lung damages and hyperthyroidism/hypothyroidism. Regular monitoring of the amiodarone levels is therefore essential. Its bioactive metabolite desethylamiodarone can also be used for measurements.

This assay allows for the simple and reliable HPLC analysis of amiodarone and desethylamiodarone in serum/plasma. Sample preparation is based on a simple and very efficient method of precipitation of all of the interfering components of the sample matrix. The separation is then performed on an isocratic HPLC system with UV detector.

> Analysis of active metabolite included
> Quick and easy sample preparation
> Stable calibration standards and controls

Amiodaron ist ein typischer Vertreter der Klasse III-Antiarrhythmika, das im Herzen eine Verlängerung der Aktionspotentiale und Refraktärzeiten induziert. In Deutschland ist es für die Therapie von verschiedenen tachykarder Herzrhythmusstörungen zugelassen und wird vor allem dann verschrieben, wenn andere Medikamente nicht oder nicht mehr wirken. Auch wenn Amiodaron selbst selten Herzrhythmusstörungen hervorruft, so können dennoch unerwünschte Nebenwirkungen in anderen Organen vorkommen, wie z. B. eine reversible Lichtempfindlichkeit der Augen und der Haut mit Sonnenbrandgefahr, erhöhte Leberwerte, sowie sehr selten auch Lungenschäden und eine Schilddrüsenüber-/unterfunktion. Regelmäßiges Monitoring des Amiodaronspiegels ist daher unerlässlich. Hierzu kann auch sein bioaktiver Metabolit Desethylamiodaron herangezogen werden.

Dieser Kit erlaubt die einfache und sichere HPLC-Analytik von Amiodaron und Desethylamiodaron im Serum/Plasma. Die Probenvorbereitung basiert auf einer einfachen, jedoch sehr effizienten Ausfällung aller störenden Bestandteile der Probenmatrix. Die HPLC-Trennung erfolgt auf einem isokratischen HPLC-System mit UV-Detektor.

> Metabolitenanalyse inbegriffen
> Einfache und schnelle Probenvorbereitung
> Stabile Kalibrierungsstandards und Kontrollen

Parameters:
amiodarone, desethylamiodarone

Amiodarone and Desethylamiodarone in Serum/Plasma

Order no.	Product
25000	Amiodarone and Desethylamiodarone in Serum/Plasma For 100 tests
	Components available separately
25011	Mobile Phase, 1000 ml
25022	Mobile Phase, 10 x 1000 ml
25033	Precipitation Reagent, 10 ml
25044	Internal Standard, 15 ml
25005	Amiodarone/Desethylamiodarone Plasma Calibration Standard (lyoph.), 5 x 1 ml
33005	Reaction Vials, amber colour (light protected), 100 pcs.
	Accessories
25100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18025	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0067	Amiodarone, Desethylamiodarone Plasma Control Level I, 10 x 2 ml
0068	Amiodarone, Desethylamiodarone Plasma Control Level II, 10 x 2 ml

Specifications

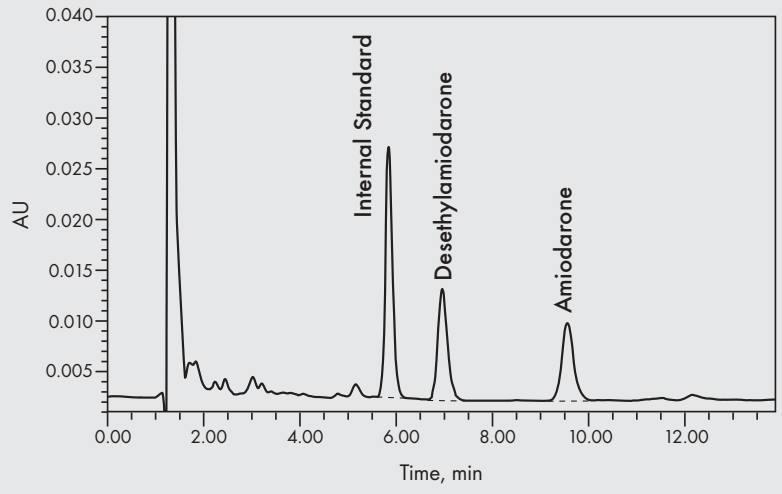
Linearity:	up to at least 20 mg/l
Limit of quantification:	amiodarone 0.15 mg/l desethylamiodarone 0.10 mg/l
Intraassay:	CV = 0.5–1.1 %
Interassay:	CV = 3.4–5.5 %
Recovery:	102 %
Analysis time:	approx. 11 min

Pre-analytic Treatment

Specimens: serum or plasma is used.
Stability: stored in the dark and cooled (4 °C) samples are stable for at least 24 hours. For longer storage samples should be frozen at approx. -20 °C.

Sample Preparation

→ Pipette 100 µl serum/plasma
+ 150 µl Internal Standard
+ 100 µl Precipitation Reagent
into an amber reaction vial.
→ Mix 20 s (vortex).
→ Centrifuge 10 min at a minimum of 9000 x g.
→ Inject 25 µl of the supernatant into the HPLC system.



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 25 µl
Flow rate: 1 ml/min
Wavelength: 242 nm
Column temp.: ambient (~ 25 °C)

Amiodarone, Desethylamiodarone Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Amiodarone	mg/l	1.04	2.49
	µmol/l	1.61	3.86
Desethylamiodarone	mg/l	0.98	2.39
	µmol/l	1.59	3.87

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0067	Amiodarone, Desethylamiodarone Plasma Control Level I (lyoph.), 10 x 2 ml
0068	Amiodarone, Desethylamiodarone Plasma Control Level II (lyoph.), 10 x 2 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 2 days at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

10.3 Antiepileptic Drugs in Serum/Plasma

CE IVD

This reagent kit is designed for the specific monitoring of the antiepileptic drugs ethosuximide, primidone, phenobarbital, phenytoin, carbamazepine, lamotrigine, Trileptal®, sultiame and zonisamide in serum or plasma. In addition, the metabolites carbamazepine-10,11-epoxide and 10-OH-carbamazepine are assayed.

The sample preparation is based on a simple but efficient precipitation step. To quantify the analytes a high-speed chromatography ("Fast Elution" in less than 5 minutes) and alternatively a "High Resolution" setup are available.

> All relevant antiepileptic drugs in one run
> Fast sample preparation
> Inclusive determination of metabolites

Dieser Reagenzienkit ermöglicht ein spezifisches Monitoring der Antiepileptika Ethosuximid, Primidon, Phenobarbital, Phenytoin, Carbamazepin, Lamotrigin, Trileptal®, Sultiam und Zonisamid im Serum bzw. Plasma. Zusätzlich werden die Metabolite Carbamazepin-10,11-epoxid und 10-OH-Carbamazepin erfasst.

Die Probenvorbereitung basiert auf einer einfachen, jedoch sehr effizienten Ausfällung der Plasmaproteine. Für die Quantifizierung der Analyten stehen wahlweise eine sehr schnelle Chromatographie „Fast Elution" (< 5 Minuten) oder eine hochauflösende „High Resolution" Chromatographie zur Verfügung.

> Alle wichtigen Antiepileptika in einem Lauf
> Nur ein Fällungsschritt
> Messung von Metaboliten inbegriffen

Parameters:
carbamazepine, 10-OH-carbamazepine, carbamazepine-10,11-epoxide, ethosuximide, lamotrigine, phenobarbital, phenytoin, primidone, sultiame, Trileptal® (oxcarbazepine [syn. oxcarbamazepine]), zonisamide

Antiepileptic Drugs in Serum/Plasma

Order no.	Product
22000/F	Antiepileptic Drugs in Serum/Plasma, Fast Elution For 100 tests
22000/HR	Antiepileptic Drugs in Serum/Plasma, High Resolution For 100 tests
23000/F	Automated Antiepileptic Drugs in Serum/Plasma, Fast Elution Assay for Gilson® ASPEC™ For 100 tests
23000/HR	Automated Antiepileptic Drugs in Serum/Plasma, High Resolution Assay for Gilson® ASPEC™ For 100 tests

Components available separately

22001/F	Mobile Phase, Fast Elution, 1000 ml
22001/HR	Mobile Phase, High Resolution, 1000 ml
22005	AED Serum Calibration Standard (lyoph.), 5 x 1 ml
22005/HR	AED, Trileptal®, Sultiame Serum Calibration Standard (lyoph.), 5 x 1 ml
28005	Trileptal®, Zonisamide Serum Calibration Standard (lyoph.), 5 x 1 ml
29004	Sultiame, Lamotrigine Serum Calibration Standard (lyoph.), 5 x 1ml
22004	Internal Standard, 15 ml
22003	Precipitation Reagent, 5 ml
22006	Stabilisation Buffer, 10 ml
3006	Reaction Vials, 100 pcs.

Accessories

22100/F	HPLC Column, Fast Elution, equilibrated, with test chromatogram, 1 pc.
22100/HR	HPLC Column, High Resolution, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18022/F/HR	Precolumn Cartridge 4/10, 1 pc.

Chromsystems Controls (lyoph.)

0060	AED Serum Control, Level I, 10 x 2 ml
0160	AED Serum Control, Level I, 10 x 5 ml
0070	AED Serum Control, Level II, 10 x 2 ml
0170	AED Serum Control, Level II, 10 x 5 ml
0080	AED Serum Control, Level III, 10 x 2 ml
0180	AED Serum Control, Level III, 10 x 5 ml
0166	AED Serum Control, Bi-Level (I + II), 2 x 5 x 5 ml
0188	AED Serum Control, Tri-Level (I + II + III), 2 x 3 x 5 ml and 1 x 4 x 5 ml
0063	Trileptal®, Zonisamide Serum Control, Bi-Level (I + II) (Oxcarbazepine [syn. Oxcarbamazepine], 10-Hydoxy-carbamazepine, Zonisamide), 2 x 5 x 2 ml
0064	Sultiame, Lamotrigine Serum Control, Bi-Level (I + II) (Sultiame, Lamotrigine, Carbamazepine-10,11-epoxide, Desmethyl-mesuximide), 2 x 5 x 2 ml

Specifications

Linearity:	up to 250 mg/l
Limit of quantification:	0.2–4.5 mg/l
Intraassay:	CV < 4 %
Interassay:	CV < 6 %
Analysis time:	
Fast Elution:	< 5 min
High Resolution:	< 22 min

Pre-analytic Treatment

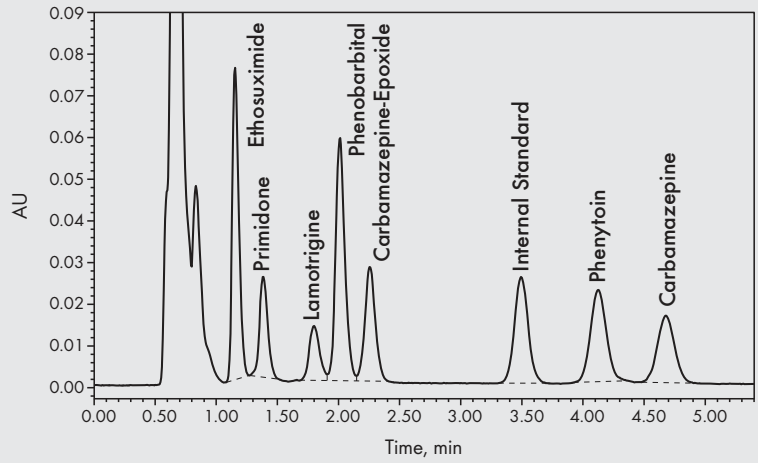
Serum or plasma is used for analysis.
Samples should be cooled for transport.

Sample Preparation

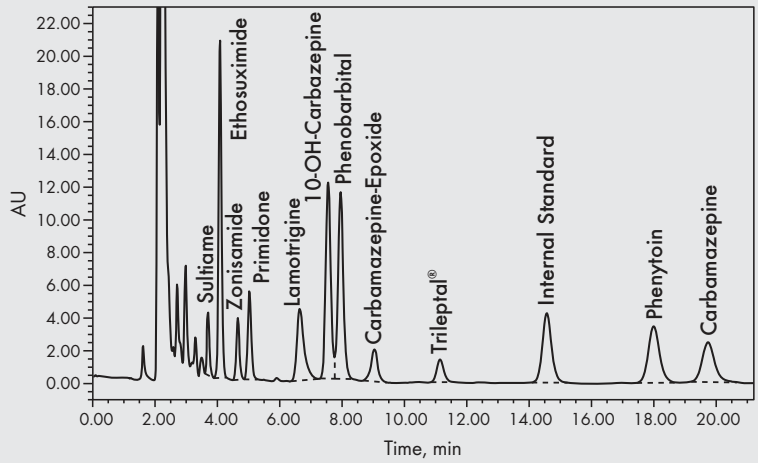
→ To 100 µl serum/plasma add 150 µl Internal Standard in a reaction vial.
→ Mix briefly (vortex).
→ Add 50 µl Precipitation Reagent.
→ Mix 1 min (vortex).
→ Centrifuge 10–15 min at 9000 x g.
→ Mix 100 µl of the supernatant with 100 µl Stabilisation Buffer.
→ Inject 20 µl into the HPLC system.

Antiepileptic Drugs in Serum/Plasma

FAST ELUTION



HIGH RESOLUTION



HPLC Parameters

Isocratic HPLC system with
UV detectord.

Injection volume: 20 µl
Flow rate: 1.2 (HR) or 2.0 (F) ml/min
Wavelength: 204 nm
Column temp.: ambient (~ 25 °C)

Antiepileptic Drugs Serum Controls

Substance	Unit	Level I Target Value*	Level II Target Value*	Level III Target Value*
Carbamazepine	mg/l µmol/l	4.89 20.7	14.1 59.5	18.6 78.6
Carbamazepine -10,11-epoxide	mg/l µmol/l	1.98 7.82	5.3 21.0	7.69 30.5
Ethosuximide	mg/l µmol/l	43.1 305	92.0 652	119 845
Lamotrigine	mg/l µmol/l	2.96 11.5	10.4 40.5	14.8 57.6
Phenobarbital	mg/l µmol/l	9.93 42.8	39.5 170	49.1 212
Phenytoin	mg/l µmol/l	4.76 18.9	18.9 75.0	27.9 111
Primidone	mg/l µmol/l	4.38 20.0	19.2 87.9	28.1 129

** Please check packaging leaflet for specific lot concentrations*

Trileptal®, Zonisamide Serum Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Oxcarbamazepine (Trileptal®)	mg/l µmol/l	1.71 6.76	8.07 32.0
10-Hydroxycarbamazepine	mg/l µmol/l	7.25 28.5	24.4 95.9
Zonisamide	mg/l µmol/l	12.0 56.5	40.0 189

** Please check packaging leaflet for specific lot concentrations*

Sultiame, Lamotrigine Serum Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Carbamazepine -10,11-epoxide	mg/l µmol/l	2.37 12.5	6.63 35.1
Desmethylmesuximide	mg/l µmol/l	9.82 38.3	36.2 141
Lamotrigine	mg/l µmol/l	2.79 11.0	12.2 48.2
Sultiame	mg/l µmol/l	4.65 16.0	10.2 35.2

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0060	AED Serum Control, Level I (lyoph.), 10 x 2 ml
0160	AED Serum Control, Level I (lyoph.), 10 x 5 ml
0070	AED Serum Control, Level II (lyoph.), 10 x 2 ml
0170	AED Serum Control, Level II (lyoph.), 10 x 5 ml
0080	AED Serum Control, Level III (lyoph.), 10 x 2 ml
0180	AED Serum Control, Level III (lyoph.), 10 x 5 ml
0166	AED Serum Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml
0188	AED Serum Control, Tri-Level I + II + III (lyoph.), 2 x 3 x 5 ml and 1 x 4 x 5 ml
0063	Trileptal®, Zonisamide Serum Control, Bi-Level I + II (lyoph.) (Oxcarbazepine [syn. Oxcarbamazepine], 10-Hydoxycarbamazepine, Zonisamide), 2 x 5 x 2 ml
0064	Sultiame, Lamotrigine Serum Control, Bi-Level I + II (lyoph.) (Sultiame, Lamotrigine, Carbamazepine-10,11-epoxide, Desmethylmesuximide), 2 x 5 x 2 ml

Stability of Serum Controls

Please check instruction manual for detailed information

> Stable to expiry date at +2 to +8 °C
> Reconstituted up to 2 weeks at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

10.4 Benzodiazepines and Tricyclic Antidepressants in Serum/Plasma

CE IVD

This reagent kit is designed for the determination of the therapeutically most important benzodiazepines and tricyclic antidepressants (incl. clozapine) and their relevant metabolites with a single sample preparation. The two substance groups are assayed in two chromatographic runs on an isocratic HPLC system with UV detection. The analytes are quantified by the inclusion of two specifically synthesised internal standards which themselves are not used as medication. By means of selective solid phase extraction, the sample preparation eliminates interfering co-eluants and ensures reproducible and reliable results.

Mit diesem Reagenzienkit werden die therapeutisch wichtigen Benzodiazepine und tricyclischen Antidepressiva (inkl. Clozapin) einschließlich der relevanten Metabolite mit einer Probenaufarbeitung bestimmt. Die beiden Substanzgruppen werden in zwei chromatographischen Läufen auf einem isokratischen HPLC-System mit UV-Detektor gemessen. Die Quantifizierung erfolgt über zwei speziell synthetisierte interne Standards, die selbst nicht als Medikamente Verwendung finden. Die Probenvorbereitung eliminiert durch eine selektive Festphasenextraktion störende Coelutionen und gewährleistet reproduzierbare und zuverlässige Ergebnisse.

- **All important benzodiazepines, TCA & metabolites**
- **One sample preparation for both substance groups**
- **Identical HPLC conditions, one HPLC column and mobile phase**

- **Alle wichtigen Benzodiazepine und TCA mit Metaboliten**
- **Simultane Probenvorbereitung**
- **Identische HPLC-Säule/Mobile Phase**

Parameters:
alprazolam, amitriptyline, bromazepam, chlordiazepoxide, clobazam, clomipramine, norclomipramine, clonazepam, clozapine, norclozapine, desipramine, diazepam, nordiazepam, doxepin, nordoxepin, flunitrazepam, imipramine, maprotiline, nitrazepam, nortriptyline, oxazepam, trimipramine

Benzodiazepines and Tricyclic Antidepressants in Serum/Plasma

Order no.	Product
49000	Benzodiazepines and TCA incl. Clozapine in Serum/Plasma For 100 tests
	Automated Assay for Gilson® ASPEC™:
49000/A1	For 100 tests
49000/A5	For 500 tests
49000/A9	For 1000 tests

	Components available separately
49001	Mobile Phase, 1000 ml
49002	Mobile Phase, 10 x 1000 ml
49004	Internal Standard, 10 ml
49005	Equilibration Buffer 1, 100 ml
49006	Equilibration Buffer 2, 100 ml
49007	Wash Buffer, 200 ml
49009	Elution Buffer 1, 40 ml
49010	Elution Buffer 2, 40 ml
49008	Sample Clean Up Columns, 50 pcs.

	Accessories
49100	HPLC Column, equilibrated, with test chromatogram
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
17001	Precolumn Cartridge Holder 4/10, 1 pc.
17049	Precolumn Cartridge 4/10, 1 pc.
49003	Plasma Calibration Standard Benzodiazepines + TCA (lyoph.), 5 x 2.5 ml
49031	Plasma Calibration Standard Benzodiazepines (lyoph.), 5 x 2.5 ml
49032	Plasma Calibration Standard Tricyclic Antidepressants (lyoph.), 5 x 2.5 ml
49033	Plasma Calibration Standard Clozapine/ Norclozapine (lyoph.), 5 x 2.5 ml
49034	Plasma Calibration Standard Clobazam/ Norclobazam (lyoph.), 5 x 2.5 ml
49035	Plasma Calibration Standard Alprazolam/ Trazodone (lyoph.), 5 x 2.5 ml
49041	Internal Standard for Clozapine/ Norclozapine, 10 ml

	Chromsystems Controls (lyoph.)
0051	Benzodiazepines Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml
0052	Benzodiazepines Plasma Control, Level I, 10 x 5 ml
0053	Benzodiazepines Plasma Control, Level II, 10 x 5 ml
0054	Tricyclic Antidepressants Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml
0055	Tricyclic Antidepressants Plasma Control, Level I, 10 x 5 ml
0056	Tricyclic Antidepressants Plasma Control, Level II, 10 x 5 ml
0057	Clozapine/Norclozapine Plasma Control (lyoph.), Bi-Level (I + II), 2 x 5 x 5 ml
0061	Clobazam/Norclobazam Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml
0062	Alprazolam/Trazodone Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml

Benzodiazepines and Tricyclic Antidepressants in Serum/Plasma

Specifications

Linearity:	entire therapeutic range
Limit of quantification:	1.5–122 ng/ml
Intraassay:	CV = 1–4 %
Interassay:	CV = 3–6 %
Recovery:	86–122 %
Analysis time:	28 min (BZD)
	25 min (TCA)

Pre-analytic Treatment

Specimens: serum or plasma, samples should be transported with cooling. Storage at +2 to +8 °C for 7 days. For longer storage keep samples frozen below -18 °C, use polypropylene vials, no glass!

Sample Preparation

EXTRACTION

→ Precondition sample clean up columns with 1 ml of Extraction Buffer 1 and centrifuge. Repeat with 1 ml Extraction Buffer 2.
→ Add 1 ml serum/plasma sample and 100 µl Internal Standard to the sample clean up column, mix briefly.
→ Draw complete sample through sample clean up column by centrifugation or suction, discard effluent.

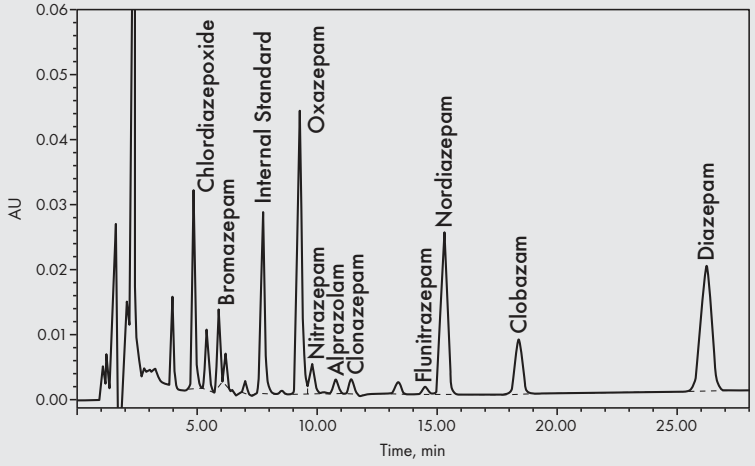
WASHING

→ Draw 2 x 1 ml Wash Buffer through sample clean up column by centrifugation or suction, discard effluent.

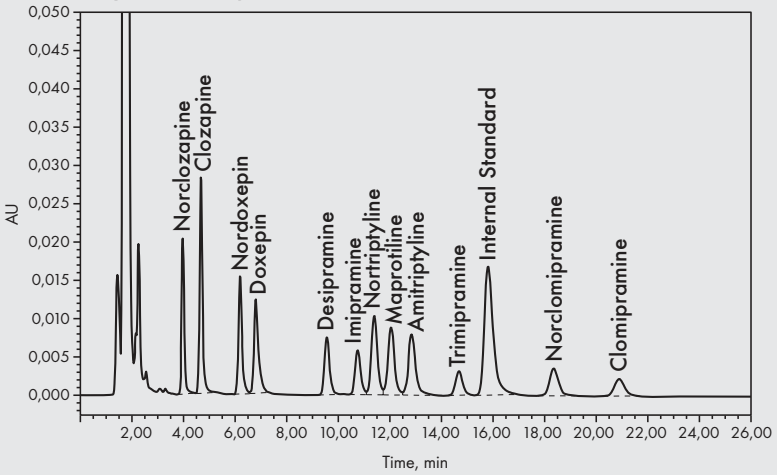
ELUTION

→ Elute first the benzodiazepines and then the tricyclic antidepressants with 400 µl of the appropriate Elution Buffer.
→ Add 200 µl ultrapure water (HPLC grade) to each eluate.
→ Inject 50 µl of each diluted eluate into the HPLC system.

Benzodiazepines



Tricyclic antidepressants



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 50 µl
Flow rate: 0.6 ml/min
Wavelength: 210 nm
Column temp.: ambient (~ 25 °C)

Benzodiazepines Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Bromazepam	ng/ml	65.0	229
Chlordiazepoxide	ng/ml	294	1750
Clobazam	ng/ml	149	585
Clonazepam	ng/ml	24.6	77.5
Diazepam	ng/ml	132	1449
Nordiazepam	ng/ml	83.1	890
Flunitrazepam	ng/ml	18.2	61
Nitrazepam	ng/ml	44.8	146
Oxazepam	ng/ml	134	1391

** Please check packaging leaflet for specific lot concentrations*

Tricyclic Antidepressants Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Amitriptyline	ng/ml	56.5	287
Clomipramine	ng/ml	48.2	248
Norclomipramine	ng/ml	61.2	298
Clozapine	ng/ml	101	760
Norclozapine	ng/ml	98.6	484
Desipramine	ng/ml	59.7	300
Doxepin	ng/ml	47.2	238
Nordoxepin	ng/ml	59.3	288
Imipramine	ng/ml	58.6	299
Maprotiline	ng/ml	59.2	295
Nortriptyline	ng/ml	57.8	302
Trimipramine	ng/ml	47.7	243

** Please check packaging leaflet for specific lot concentrations*

Clozapine/Norclozapine Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Clozapine	µg/l nmol/l	153 468	748 2289
Norclozapine	µg/l nmol/l	146 467	490 1565

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0051	Benzodiazepines Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml
0052	Benzodiazepines Plasma Control, Level I (lyoph.), 10 x 5 ml
0053	Benzodiazepines Plasma Control, Level II (lyoph.), 10 x 5 ml
0054	Tricyclic Antidepressants Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml
0055	Tricyclic Antidepressants Plasma Control, Level I (lyoph.), 10 x 5 ml
0056	Tricyclic Antidepressants Plasma Control, Level II (lyoph.), 10 x 5 ml
0057	Clozapine/Norclozapine Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date at +2 to +8 °C
> Reconstituted up to 1 week at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

Clobazam/Norclobazam Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Clobazam	µg/l nmol/l	159 528	591 1965
Norclobazam	µg/l nmol/l	1077 3755	4336 15124

** Please check packaging leaflet for specific lot concentrations*

Alpralozam/Trazodone Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Alpralozam	µg/l nmol/l	13.8 44.6	77.9 252
Trazodone	µg/l nmol/l	473 1272	2640 7098

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0061	Clobazam/Norclobazam Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml
0062	Alprazolam/Trazodone Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 1 week at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

10.5 Extended Benzodiazepines in Serum/Plasma

CE IVD

The drug class of benzodiazepines offers a broad spectrum of possible medical applications. They set the most important representatives of tranquillizers and soporifics. In addition they are commonly used as antiepileptics, muscle relaxants or anaesthetics (sometimes in combination with opioides). In the case of alcohol withdrawal treatments they facilitate the weaning, however, there is also a risk for addiction. The metabolism of the various benzodiazepines occurs at different rates, whereas some metabolites (for example desmethyl derivates) are still therapeutically effective.

This Chromsystems reagent kit permits the simple and reliable chromatographic determination of 15 benzodiazepines and metabolites. The sample preparation is based on an efficient and selective solid phase extraction, which allows automation of the method on the Gilson® ASPEC™. The chromatographic determination is run on an isocratic HPLC system with UV detector.

> All common benzodiazepines in one analytical run
> 6 additional analytes
> Reduced analysis time
> Tailor-made internal standard

Die Medikamentengruppe der Benzodiazepine weist ein breites Anwendungsspektrum auf. So stellen sie die wichtigsten Vertreter unter den Tranquillantien und Schlafmitteln. Weitere Verwendung finden sie als Antiepileptika, als Muskelrelaxanzien und Anästhetika zur Narkoseeinleitung (manchmal in Kombination mit Opioiden). Bei Alkoholentziehungskuren erleichtern sie die Entwöhnung, allerdings besteht die Gefahr einer Abhängigkeit. Die Metabolisierung der verschiedenen Benzodiazepine erfolgt unterschiedlich schnell, wobei manche Metabolite (z. B. Desmethyl-Derivate) noch therapeutisch wirksam sind.

Dieser Chromsystems Reagenzienkit erlaubt die einfache und zuverlässige chromatographische Bestimmung von insgesamt 15 Benzodiazepinen und Metaboliten. Die Probenvorbereitung basiert auf einer effizienten und selektiven Festphasenextraktion, die auch eine Automatisierung der Methode auf dem Gilson® ASPEC™ ermöglicht. Die chromatographische Messung erfolgt auf einem isokratischen HPLC-System mit UV-Detektion.

> Alle gängigen Benzodiazepine in einem Lauf
> 6 zusätzliche Analyte
> Verkürzte Analysendauer
> Maßgeschneiderter interner Standard

Parameters:
bromazepam, chlordiazepoxide, clobazam, clonazepam, desalkylflurazepam, diazepam, nordiazepam, flunitrazepam, lorazepam, medazepam, midazolam, nitrazepam, oxazepam, temazepam, tetrazepam

Extended Benzodiazepines in Serum/Plasma

Order no.	Product
59000	Extended Benzodiazepines in Serum/ Plasma For 100 tests
	Automated Assay for Gilson® ASPEC™:
59000/A1	For 100 tests
59000/A5	For 500 tests
59000/A9	For 1000 tests

Components available separately

59001	Mobile Phase, 1000 ml
59002	Mobile Phase, 10 x 1000 ml
59003	Plasma Calibration Standard (lyoph.), 5 x 2.5 ml
59004	Internal Standard, 10 ml
59005	Equilibration Buffer 1, 100 ml
59006	Equilibration Buffer 2, 100 ml
59007	Wash Buffer, 200 ml
59008	Elution Buffer, 40 ml
49008	Sample Clean Up Columns, 50 pcs.

Accessories

59100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
17001	Precolumn Cartridge Holder 4/10, 1 pc.
17059	Precolumn Cartridge 4/10, 1 pc.
49034	Plasma Calibration Standard Clobazam/ Norclobazam (lyoph.), 5 x 2.5 ml
49035	Plasma Calibration Standard Alprazolam/ Trazodone (lyoph.), 5 x 2.5 ml

Chromsystems Controls (lyoph.)

0174	Extended Benzodiazepines Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml
0175	Extended Benzodiazepines Plasma Control, Level I, 10 x 5 ml
0176	Extended Benzodiazepines Plasma Control, Level II, 10 x 5 ml
0061	Clobazam/Norclobazam Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml
0062	Alprazolam/Trazodone Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml
0051	Benzodiazepines Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml
0052	Benzodiazepines Plasma Control, Level I, 10 x 5 ml
0053	Benzodiazepines Plasma Control, Level II, 10 x 5 ml

Specifications

Linearity:	from limit of quantification up to at least the stated upper limit
Limit of quantification:	6–11 µg/l
Intraassay:	CV = 0.9–4.8 %
Interassay:	CV = 1.9–5.5 %
Recovery:	94–103 %
Analysis time:	< 26 min

Pre-analytic Treatment

Specimens: plasma/serum is used for analysis.
Stability of specimens: up to 1 week, stored at +2 to +8 °C.
For longer storage deep-freeze the samples below -18 °C.

Sample Preparation

EXTRACTION

→ Apply 1 ml Equilibration Buffer 1 to the sample clean up column and centrifuge 30–60 s at 170 x g or use suction. Repeat with 1 ml Equilibration Buffer 2.
→ Add 1 ml plasma/serum sample and 100 µl Internal Standard to the sample clean up column mix several times and centrifuge 1 min at 340 x g or use suction, discard effluent.

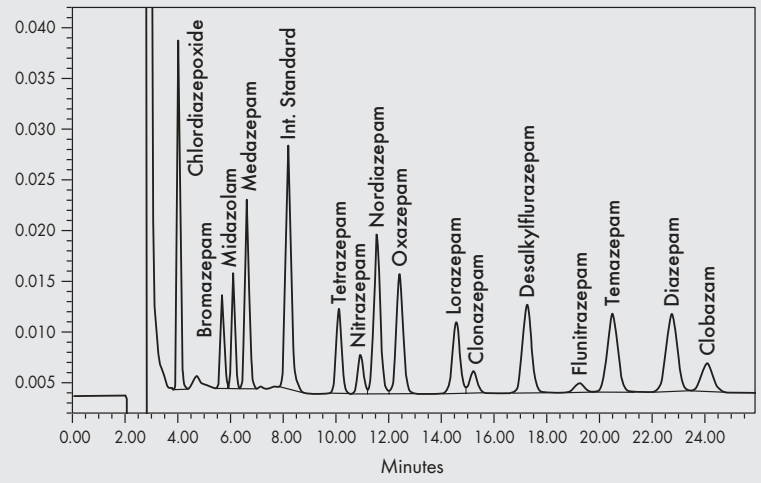
WASHING

→ Apply 2 x 1 ml Wash Buffer to the sample clean up column and draw through by centrifugation (1 min at 340 x g) or suction, discard effluent. Then centrifuge 2 min at 1090 x g to dryness or use suction.

ELUTION

→ Change collection vial (glass!), apply 400 µl Elution Buffer to the sample clean up column, draw through by centrifugation (1 min at 170 x g, then 1 min at 1090 x g) or suction.
→ Add 300 µl distilled water, mix briefly. Inject 50 µl of the diluted eluate into the HPLC system.

Extended Benzodiazepines in Serum/Plasma



HPLC Parameters

Isocratic HPLC system with column oven and UV detector.

Injection volume: 50 µl
Flow rate: 0.6 ml/min
Wavelength: 210 nm
Column temperature: 28–32 °C

Extended Benzodiazepines Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Bromazepam	µg/l	64.5	247
Chlordiazepoxide	µg/l	275	1655
Clobazam	µg/l	150	608
Clonazepam	µg/l	25.9	76.7
Diazepam	µg/l	142	1502
Nordiazepam	µg/l	86.8	959
Desalkylflurazepam	µg/l	37.2	111
Flunitrazepam	µg/l	20.7	64.9
Lorazepam	µg/l	49.2	280
Medazepam	µg/l	96.9	475
Midazolam	µg/l	46.7	388
Nitrazepam	µg/l	56.3	168
Oxazepam	µg/l	142	1494
Temazepam	µg/l	73.1	767
Tetrazepam	µg/l	57.1	662

** Please check packaging leaflet for specific lot concentrations*

Clobazam, Norclobazam Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Clobazam	µg/l nmol/l	159 528	591 1965
Norclobazam	µg/l nmol/l	1077 3755	4336 15124

** Please check packaging leaflet for specific lot concentrations*

Alpralozam, Trazodone Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Alpralozam	µg/l nmol/l	13.8 44.6	77.9 252
Trazodone	µg/l nmol/l	473 1272	2640 7098

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0174	Extended Benzodiazepines Plasma Control/HR, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml
0175	Extended Benzodiazepines Plasma Control/HR, Level I (lyoph.), 10 x 5 ml
0176	Extended Benzodiazepines Plasma Control/HR, Level II (lyoph.), 10 x 5 ml
0061	Clobazam, Norclobazam Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml
0062	Alprazolam, Trazodone Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 5 days at +2 °C to +8 °C (0061, 0062 up to 1 week)
> Reconstituted aliquots up to 3 months below -18 °C

Benzodiazepines Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Bromazepam	ng/ml	65.9	235
Chlordiazepoxide	ng/ml	304	1807
Clobazam	ng/ml	150	590
Clonazepam	ng/ml	26.4	80.5
Diazepam	ng/ml	136	1520
Nordiazepam	ng/ml	86.4	922
Flunitrazepam	ng/ml	20.6	63.2
Nitrazepam	ng/ml	46.2	150
Oxazepam	ng/ml	138	1529

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0051	Benzodiazepines Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml
0052	Benzodiazepines Plasma Control, Level I (lyoph.), 10 x 5 ml
0053	Benzodiazepines Plasma Control, Level II (lyoph.), 10 x 5 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date 2 °C to +8 °C
> Reconstituted up to 1 week at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

10.6 Levetiracetam (Keppra®) in Serum/Plasma

CE IVD

Levetiracetam (Keppra®) is an antiepileptic drug and is chemically unrelated to other antiepileptic drugs. Since there is inter-individual drug concentration variability in patients, the determination of serum levels (therapeutic drug monitoring) can be useful in patients depending on the clinical setting.

This Chromsystems reagent kit is designed for the fast and reliable determination of levetiracetam levels in serum/plasma. The sample preparation is based on solid phase extraction (SPE) which can be carried out very quickly and easily. Using the selectivity of SPE, all other antiepileptic drugs and their metabolites are removed. An internal standard is used to guarantee the exact quantification of levetiracetam. The chromatographic separation is carried out on an RP column followed by UV detection.

> Completes the determination of antiepileptic drugs
> Efficient removal of interferences
> High sample throughput

Levetiracetam (Keppra®) ist ein Antiepileptikum, das strukturell keinerlei Ähnlichkeit zu anderen Wirkstoffen aufweist. Die Serum-Konzentration von Levetiracetam stellt sich für jeden Patienten individuell ein und ist daher Schwankungen unterworfen. Daher kann die Überwachung des Serumspiegels (Therapeutisches Drug Monitoring) abhängig vom klinischen Hintergrund der Patienten sinnvoll sein.

Dieser Chromsystems Reagenzienkit ermöglicht die rasche und zuverlässige Bestimmung des Levetiracetam-Spiegels im Serum/Plasma. Die Probenvorbereitung basiert auf einer effizienten und schnellen Festphasenextraktion, so dass Störungen durch weitere Antiepileptika sowie deren Metabolite ausgeschlossen sind. Um eine exakte Quantifizierung zu gewährleisten wird ein geeigneter interner Standard verwendet. Die chromatographische Trennung erfolgt isokratisch an einer RP-Säule mit nachfolgender UV-Detektion.

> Komplettierung der Antiepileptika-Bestimmung
> Effektive Abtrennung von Interferenzen
> Hoher Probendurchsatz

Parameter:
levetiracetam (Keppra®)

Levetiracetam (Keppra®) in Serum/Plasma

Order no.	Product
24000	Levetiracetam (Keppra®) in Serum/Plasma For 100 tests
	Components available separately
24001	Mobile Phase, 1000 ml
24002	Mobile Phase, 10 x 1000 ml
24003	Levetiracetam Serum Calibration Standard (lyoph.), 5 x 1 ml
24004	Internal Standard, 10 ml
24005	Equilibration Buffer 1, 100 ml
24006	Equilibration Buffer 2, 100 ml
24007	Wash Buffer 1, 100 ml
24009	Wash Buffer 2, 100 ml
24010	Elution Buffer, 50 ml
24008	Sample Clean Up Columns, 50 pcs.
	Accessories
24100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
24100/HR	HPLC Column High Resolution, equilibrated, with test chromatogram, 1 pc.
24001/HR	Mobile Phase High Resolution, 1000 ml
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18024	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0086	Levetiracetam Serum Control, Bi-Level (I + II), 2 x 5 x 2 ml
0087	Levetiracetam Serum Control, Level I, 10 x 2 ml
0088	Levetiracetam Serum Control, Level II, 10 x 2 ml

Specifications

Linearity:	up to 1000 mg/l
Limit of quantification:	0.5 mg/l
Intraassay:	CV ≤ 3.4 % (High Resolution ≤ 1.3 %)
Interassay:	CV ≤ 3.8 %
Recovery:	80 % (High Resolution 90 %)
Analysis time:	4 min (High Resolution 7 min)

Pre-analytic Treatment

Serum or plasma is used for analysis. Samples should be cooled for transport; they are stable up to 1 week at + 2 to +8 °C. For longer storage keep samples frozen below -18 °C.

Sample Preparation

EXTRACTION

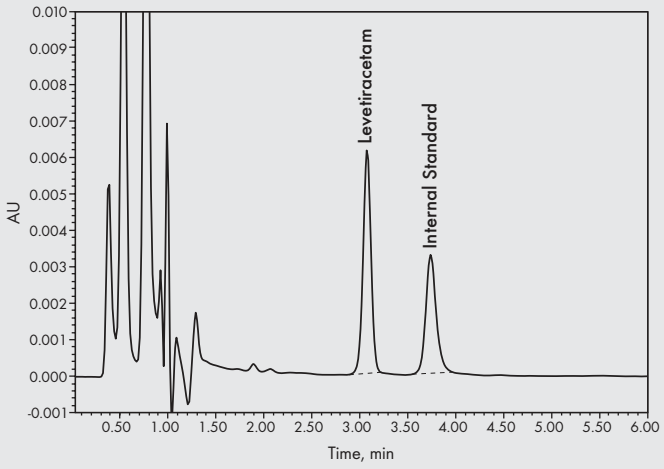
→ Precondition the sample clean up columns with 1 ml Equilibration Buffer 1 and 1 ml Equilibration Buffer 2.
→ Apply 100 µl serum/plasma sample and 100 µl Internal Standard to the sample clean up column and mix briefly.
→ Draw complete sample through sample clean up column by centrifugation or suction, discard effluent.

WASHING

→ Draw 1 ml Wash Buffer 1 and subsequently 1 ml Wash Buffer 2 through sample clean up column by centrifugation or suction, discard effluent.

ELUTION

→ Elute levetiracetam using 500 µl Elution Buffer.
→ Inject 10 µl eluate into the HPLC system.



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 10 µl
Flow rate: 1.5 ml/min
(High Resolution 1.2 ml/min)
Wavelength: 210 nm
Column temp.: ambient (~ 25 °C)

Levetiracetam (Keppra®) Serum Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Levetiracetam	mg/l µmol/l	15.0 88.0	59.6 350

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0086	Levetiracetam Serum Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0087	Levetiracetam Serum Control, Level I (lyoph.), 10 x 2 ml
0088	Levetiracetam Serum Control, Level II (lyoph.), 10 x 2 ml

Stability of Serum Controls

Please check instruction manual for detailed information

> Stable to expiry date 2 °C to +8 °C
> Reconstituted up to 1 week at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

10.7 Mycophenolic Acid in Plasma/Serum

CE IVD

Mycophenolic acid (MPA) is used as an immunosuppressant agent to prevent organ transplant rejection. MPA is also used to treat autoimmune diseases such as psoriasis, systemic lupus erythematosus and scleroderma. Currently available drugs contain either mycophenolate mofetil or mycophenolate sodium. Both are completely hydrolysed into MPA. MPA is partially metabolised into mycophenolate glucuronide (MPAG) which is inactive. However this step is reversible. In the enterohepatic circulation MPAG can be deglucuronidated and is then available as an active metabolite.

Solid phase extraction separates the inactive MPAG from the physiologically active form and thus only the mycophenolic acid is detected. Precise quantification is assured by the use of an internal standard. The HPLC column removes further interfering substances, such as daptomycin, and ensures a reliable and reproducible determination.

> Fast and easy sample preparation
> Detection of physiologically active MPA
> Removes interfering substances for a precise result

Mycophenolsäure (MPA) dient als immunsuppressives Präparat insbesondere zur Unterdrückung von Abstoßungsreaktionen nach Organtransplantationen. Darüber hinaus wird MPA auch bei Behandlung von Autoimmunerkrankungen wie beispielsweise Psoriasis, systemischem Lupus erythematosus oder Sklerodermie eingesetzt. Die aktuell verfügbaren Medikamente enthalten Mycophenolatmofetil oder Natriummycophenolat. Beide werden zur aktiven Substanz MPA hydrolysiert. MPA wird teilweise weiter zum inaktiven Glucoronid (MPAG) umgesetzt. MPAG kann im enterohepatischen Kreislauf wieder deglucuronidiert werden und steht dann erneut als aktiver Metabolit zur Verfügung.

Durch eine Festphasenextraktion wird das inaktive MPAG von der physiologisch wirksamen Form separiert und so nur die Mycophenolsäure selektiv erfasst. Die exakte Quantifizierung wird durch Verwendung eines internen Standards gewährleistet. Die HPLC-Säule ermöglicht die Abtrennung weiterer störender Substanzen, wie beispielsweise Daptomycin und erlaubt somit eine zuverlässige und reproduzierbare Bestimmung.

> Einfache und schnelle Probenvorbereitung
> Erfassung der physiologisch wirksamen Form (MPA)
> Entfernt störende Substanzen für ein präzises Ergebnis

Parameter:
mycophenolic acid

Mycophenolic Acid in Plasma/Serum

Order no.	Product
46000	Mycophenolic Acid in Plasma/Serum For 100 tests
	Components available separately
46012/HR	Mobile Phase, High Resolution, 1000 ml
46003	Plasma Calibration Standard Mycophenolic Acid (lyoph.), 5 x 1 ml
46004	Internal Standard, 25 ml
46005	Equilibration Buffer 1, 100 ml
46006	Equilibration Buffer 2, 100 ml
46007	Wash Buffer, 200 ml
46009	Elution Buffer, 40 ml
46008	Sample Clean Up Columns, 50 pcs.
	Accessories
46110/HR	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
17001	Precolumn Cartridge Holder 4/10, 1 pc.
17046	Precolumn Cartridge 4/10, 1 pc.
	Multilevel Calibrator and Controls (lyoph.)
46029	3PLUS1® Multilevel Plasma Calibrator Set Mycophenolic Acid/Glucuronide (lyoph.), 4 x 1 ml
0041	Mycophenolic Acid Plasma Control, Bi-Level (I + II), 2 x 5 x 2 ml
0042	Mycophenolic Acid Plasma Control, Level I, 10 x 2 ml
0043	Mycophenolic Acid Plasma Control, Level II, 10 x 2 ml

Specifications

Linearity:	up to 30 mg/l
Limit of quantification:	0.1 mg/l
Intraassay:	CV = 2 %
Interassay:	CV < 3 %
Recovery:	> 97 %
Analysis time:	8 min

Pre-analytic Treatment

Plasma or serum is used for analysis. Specimens should be kept cool for transport, they are stable up to 5 days at +2 to +8 °C. For longer storage, deep-freeze below -18 °C.

Sample Preparation

→ Centrifuge specimens before sample preparation (10 min at 2800 x g).

EXTRACTION

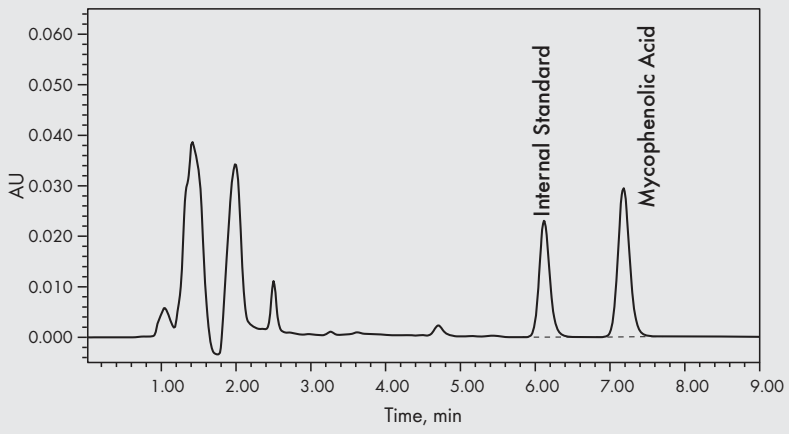
→ Precondition the sample clean up columns with 1 ml of each of Equlilibration Buffers 1 and 2.
→ Mix 250 µl plasma/serum sample with 250 µl Internal Standard.
→ Apply complete sample to the sample clean up column and draw through by centrifugation or suction; discard effluent.

WASHING

→ Draw 2 x 1 ml Wash Buffer through sample clean up column by centrifugation or suction; discard effluent.

ELUTION

→ Elute the mycophenolic acid with 400 µl of the Elution Buffer, mix briefly.
→ Inject 20–40 µl eluate into the HPLC system.



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 20–40 µl
Flow rate: 1 ml/min
Wavelength: 215 nm
Column temp.: ambient (~ 25 °C)

3PLUS1® Multilevel Plasma Calibrator Set Mycophenolic Acid

Substance	Unit	Calibrator 1*	Calibrator 2*	Calibrator 3*	Blank Calibrator*
Mycophenolic acid	mg/l	0.96	3.86	9.40	< LOQ
Mycophenolic acid glucuronide	mg/l	16.6	84.5	215	< LOQ

** Please check packaging leaflet for specific lot concentrations*

LOQ = Limit of Quantification

Order no.	Product
46029	3PLUS1® Multilevel Plasma Calibrator Set Mycophenolic Acid/Glucuronide (lyoph.), 4 x 1 ml

Stability of Plasma Calibrators

Please check instruction manual for detailed information

> Stable to expiry date at -18 °C
> Reconstituted up to 4 weeks at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

Mycophenolic Acid Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Mycophenolic acid	mg/l µmol/l	1.91 5.96	5.67 17.7

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0041	Mycophenolic Acid Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 2 ml
0042	Mycophenolic Acid Plasma Control, Level I (lyoph.), 10 x 2 ml
0043	Mycophenolic Acid Plasma Control, Level II (lyoph.), 10 x 2 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date at +2 °C to +8 °C
> Reconstituted up to 1 week at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

10.8 Olanzapine and Desmethylolanzapine in Serum/Plasma

CE IVD

Olanzapine and Quetiapine are potent antipsychotic drugs for the treatment of both positive and negative symptoms of schizophrenia. Like clozapine, they belong to the group of atypical neuroleptics, which cause only slight extra-pyramidal motor side effects (dyskinesia, akathisia, Parkinsonian syndrome). Quetiapine, also a recently developed neuroleptic, is structurally related to olanzapine, but exhibits a different receptor profile. Under therapy with atypical neuroleptics moderate increases of prolactin levels have been reported as well as substantial weight gain in a number of cases. Other complications may occur as disorders in glucose metabolism, hence regular control of blood glucose level is recommended.

This Chromsystems reagent kit is designed for the reliable determination of olanzapine and quetiapine as well as the metabolite desmethylolanzapine in serum/plasma. The sample preparation is based on an efficient and selective solid phase extraction including an internal standard. The chromatographic separation is run on an isocratic HPLC system with UV-VIS detector.

> Low limit of quantification
> Robust UV-VIS detection
> Metabolites included

Olanzapin und Quetiapin sind hochwirksame Antipsychotika zur Behandlung der Positiv- und Negativsymptomatik schizophrener Psychosen. Sie zählen wie Clozapin zu den atypischen Neuroleptika, die sich durch geringere Nebenwirkungen im extrapyramidal-motorischen System (Dyskinesien, Akathisie, Parkinson-Syndrom) auszeichnen. Im Gegensatz zu Clozapin weist Olanzapin ein nur geringes Agranulozytoserisiko auf. Unter Therapie mit atypischen Neuroleptika kann es zu mäßigem Anstieg des Prolaktinspiegels und einer deutlichen Zunahme des Gewichts kommen. Als weitere Nebenwirkungen können Störungen des Glukosestoffwechsels auftreten, so dass eine regelmäßige Kontrolle des Blutzuckerspiegels empfohlen wird.

Dieser Chromsystems-Reagenzienkit ermöglicht die zuverlässige Bestimmung von Olanzapin und Quetiapin sowie des Metaboliten Desmethylolanzapin im Serum/Plasma. Die Probenvorbereitung basiert auf einer effizienten und selektiven Festphasenextraktion mit internem Standard. Die chromatographische Trennung erfolgt an einem isokratischen HPLC-System mit UV-VIS-Detektor.

> Niedrige Bestimmungsgrenze
> Robuste UV-VIS-Bestimmung
> Metabolitenanalyse inklusive

Parameters:
olanzapine, desmethylolanzapine, quetiapine

Olanzapine and Desmethylolanzapine in Serum/Plasma

Order no.	Product
26000	Olanzapine and Desmethylolanzapine in Serum/Plasma For 100 tests

Components available separately

26001	Mobile Phase, 1000 ml
26002	Mobile Phase, 10 x 1000 ml
26003	Olanzapine/Desmethylolanzapine Plasma Calibration Standard (lyoph.), 5 x 2.5 ml
26004	Internal Standard, 10 ml
26005	Equilibration Buffer 1, 100 ml
26006	Equilibration Buffer 2, 100 ml
26009	Wash Buffer, 200 ml
26010	Elution Buffer, 40 ml
26008	Sample Clean Up Columns, 50 pcs.

Accessories

26100	HPLC Column, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18026	Precolumn Cartridge 4/10, 1 pc.
28007	Perazine, Quetiapine, Citalopram Plasma Calibration Standard, 5 x 2.5 ml

Chromsystems Controls (lyoph.)

0147	Olanzapine, Desmethylolanzapine Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml
0148	Olanzapine, Desmethylolanzapine Plasma Control, Level I, 10 x 5 ml
0149	Olanzapine, Desmethylolanzapine Plasma Control, Level II, 10 x 5 ml
0131	Perazine, Quetiapine, Citalopram Plasma Control, Bi-Level (I + II), 2 x 5 x 5 ml
0132	Perazine, Quetiapine, Citalopram Plasma Control, Level I, 10 x 5 ml
0133	Perazine, Quetiapine, Citalopram Plasma Control, Level II, 10 x 5 ml

Specifications

Olanzapine and desmethylolanzapine

Limit of quantification:	3.5 ng/ml
Linearity:	up to 1000 ng/ml
Intraassay:	CV < 4.8 %
Interassay:	CV < 9.6 %
Recovery:	98 %

Quetiapine

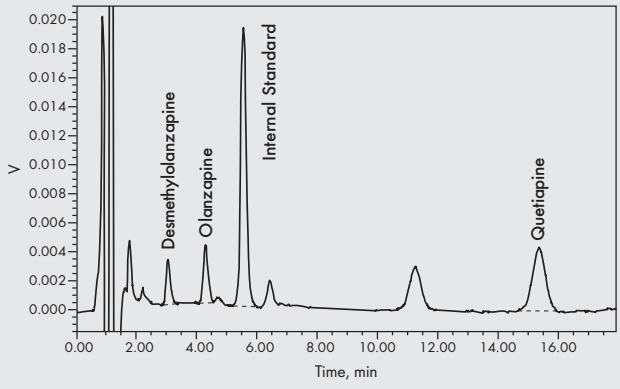
Limit of quantification:	11 ng/ml
Linearity:	up to 5000 ng/ml
Intraassay:	CV < 4.1 %
Interassay:	CV < 7.2 %
Recovery:	96 %
Analysis time:	< 18 min

Pre-analytic Treatment

Serum or plasma is used for analysis. Specimens should be kept cool for transport. Stored in the dark at +4 °C samples are stable up to 24 h. For longer storage samples should be frozen at approx. -20 °C.

Sample Preparation

→ Precondition the sample clean up columns with 1 ml Equilibration Buffer 1 followed by 1 ml Equilibration Buffer 2.
→ Apply 1 ml serum/plasma and 100 µl Internal Standard to the sample clean up column. Draw complete sample through sample clean up column by centrifugation or suction, discard effluent.
→ Draw 1 ml Wash Buffer through the sample clean up column by centrifugation or suction, discard effluent.
→ Elute with 400 µl Elution Buffer into a glass vial.
→ Inject 50 µl of the eluate into the HPLC system.



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 50 µl
Flow rate: 0.6 ml/min
Wavelength: 254 nm
Column temp.: ambient (~ 25 °C)

Olanzapine, Desmethylolanzapine Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Olanzapine	µg/l nmol/l	29.7 95.0	94.1 301
Desmethylolanzapine	µg/l nmol/l	16.8 56.2	52.8 177

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0147	Olanzapine, Desmethylolanzapine Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml
0148	Olanzapine, Desmethylolanzapine Plasma Control, Level I (lyoph.), 10 x 5 ml
0149	Olanzapine, Desmethylolanzapine Plasma Control, Level II (lyoph.), 10 x 5 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date below -18 °C
> Reconstituted up to 1 week at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

Perazine, Quetiapine, Citalopram Plasma Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Perazine	µg/l nmol/l	77.6 229	273 805
Quetiapine	µg/l nmol/l	102 266	414 1080
Citalopram	µg/l nmol/l	30.0 92.6	190 586

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0131	Perazine, Quetiapine, Citalopram Plasma Control, Bi-Level I + II (lyoph.), 2 x 5 x 5 ml
0132	Perazine, Quetiapine, Citalopram Plasma Control, Level I (lyoph.), 10 x 5 ml
0133	Perazine, Quetiapine, Citalopram Plasma Control, Level II (lyoph.), 10 x 5 ml

Stability of Plasma Controls

Please check instruction manual for detailed information

> Stable to expiry date at +2 °C to +8 °C
> Reconstituted up to 1 week at +2 °C to +8 °C
> Reconstituted aliquots up to 3 months below -18 °C

10.9 Rufinamide, Felbamate and Lacosamide in Serum/Plasma

CE IVD

Rufinamide, Felbamate, Lacosamide

Rufinamide, felbamate and mesuximide are approved in the EU for concomitant therapy in combination with other antiepileptic drugs (AEDs). They are primarily used to treat therapy-resistant epilepsies and Lennox–Gastaut syndrome, and are also suitable for difficult to treat epilepsies in children. Rufinamide and felbamate influence the effectiveness of other AEDs and contraceptive products. Eslicarbazepine acetate and lacosamide are also used in combination with other AEDs to treat partial epileptic seizures. The blood levels of these medications must be determined to maintain the therapeutic range due to their pharmacodynamics and toxicities. That also includes measuring the levels of the metabolites N-desmethylmesuximide and eslicarbazepine.

Enhanced HPLC analysis of the antiepileptics enables the reliable determination of the AEDs rufinamide, felbamate, lacosamide, eslicarbazepine and N-desmethylmesuximide. Sample preparation requires only one precipitation step and is identical to that of the Chromsystems kit no. 22000. It has been tested for interference from other AEDs and can therefore guarantee undisturbed analysis even in the case of concomitant therapy with other AEDs.

> **No interference with concomitant drug therapy**
> **Option of combined analysis with 22000/F** (see chapter 10.3)

Rufinamid, Felbamat und Mesuximid sind in der EU für die Begleittherapie in Kombination mit anderen Antiepileptika (AEDs) zugelassen. Sie kommen vor allem bei therapieresistenten Epilepsien und dem Lennox-Gastaut-Syndrom zum Einsatz und eignen sich unter anderem für schwer zu behandelnde Epilepsien im Kindesalter. Rufinamid und Felbamat beeinflussen die Wirksamkeit anderer AEDs sowie empfängnisverhütender Präparate. Eslicarbazepinacetat und Lacosamid werden ebenfalls in Kombination mit anderen AEDs bei der Behandlung von partiellen epileptischen Anfällen eingesetzt. Aufgrund der Pharmakodynamik und Toxizität ist die Bestimmung des Blutspiegels dieser Medikamente zur Einhaltung des therapeutischen Bereichs erforderlich. Dazu gehört außerdem die Messung der Metabolite N-Desmethylmesuximid und Eslicarbazepin.

Die erweiterte HPLC-Analytik der Antiepileptika ermöglicht die zuverlässige Bestimmung der AEDs Rufinamid, Felbamat, Lacosamid, Eslicarbazepin und N-Desmethylmesuximid. Die Probenvorbereitung erfordert nur einen Fällungsschritt und ist identisch mit der des Chromsystems-Kits Nr. 22000. Er ist auf Interferenzen mit anderen AEDs geprüft und gewährt daher eine störungsfreie Analytik auch bei Komedikationen mit anderen AEDs.

> **Keine Interferenzen bei Komedikation mit anderen Antiepileptika**
> **Kombinierte Analytik mit 22000/F möglich** (siehe Kapitel 10.3)

Parameters:
desmethylmesuximide, eslicarbazepine, felbamate, lacosamide, rufinamide

Rufinamide, Felbamate and Lacosamide in Serum/Plasma

Order no.	Product
21000	Rufinamide, Felbamate and Lacosamide in Serum/Plasma For 100 tests
	Components available separately
21001	Mobile Phase, 1000 ml
21002	Mobile Phase, 10 x 1000 ml
22003	Precipitation Reagent, 5 ml
22004	Internal Standard, 15 ml
21003	Rufinamide, Felbamate, Lacosamide Serum Calibration Standard (lyoph.), 5 x 1 ml
22006	Stabilisation Buffer, 10 ml
3006	Reaction Vials, 100 pcs.
	Accessories
22100/F	HPLC Column, Fast Elution, equilibrated, with test chromatogram, 1 pc.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
18001	Precolumn Cartridge Holder 4/10, 1 pc.
18022/F/HR	Precolumn Cartridge 4/10, 1 pc.
	Chromsystems Controls (lyoph.)
0065	Rufinamide, Felbamate, Lacosamide Serum Control, Bi-Level (I + II), 2 x 5 x 2 ml

Specifications

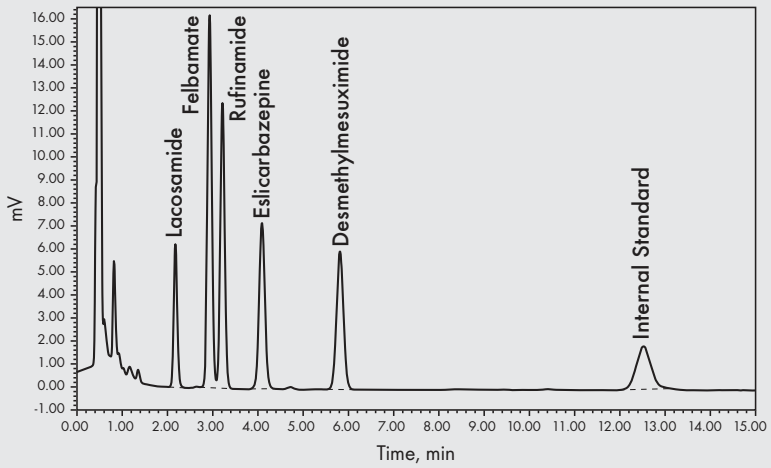
Linearity:	up to 200 mg/l
Limit of quantification:	0.5–1.0 mg/l
Intraassay:	CV < 2 %
Interassay:	CV < 2 %
Recovery:	100 %
Analysis time:	< 15 min

Pre-analytic Treatment

Specimens: serum or plasma.
Stability: up to 4 weeks at +2 to +8 °C. For longer storage (up to 12 weeks) deep-freeze samples below -18 °C.

Sample Preparation

→ To 100 µl serum/plasma (calibrators/controls/samples) add 150 µl Internal Standard in a reaction vial.
→ Mix 2 s (vortex).
→ Add 50 µl Precipitation Reagent.
→ Mix 1 min (vortex).
→ Centrifuge 10 min at 15000 x g.
→ Mix 100 µl supernatant with 100 µl Stabilisation Buffer.
→ Inject 20 µl into the HPLC system.



HPLC Parameters

Isocratic HPLC system with UV detector.

Injection volume: 20 µl
Flow rate: 2.5 ml/min
Wavelength: 204 nm
Column temp.: ambient (~ 25 °C)

Rufinamide, Felbamate, Lacosamide Serum Controls

Substance	Unit	Level I Target Value*	Level II Target Value*
Eslicarbazepine	mg/l µmol/l	7.61 29.9	17.4 68.3
Felbamate	mg/l µmol/l	36.4 153	90.8 381
Lacosamide	mg/l µmol/l	7.73 30.9	17.6 70.3
N-Desmethylmesuximide	mg/l µmol/l	18.6 98.5	36.6 193
Rufinamide	mg/l µmol/l	16.4 69.0	40.1 168

** Please check packaging leaflet for specific lot concentrations*

Order no.	Product
0065	Rufinamide, Felbamate, Lacosamide Serum Control, Bi-Level I + II (lyoph.) (Rufinamide, Felbamate, Lacosamide, Eslicarbazepine, N-Desmethylmesuximide), 2 x 5 x 2 ml

Stability of Serum Controls

Please check instruction manual for detailed information

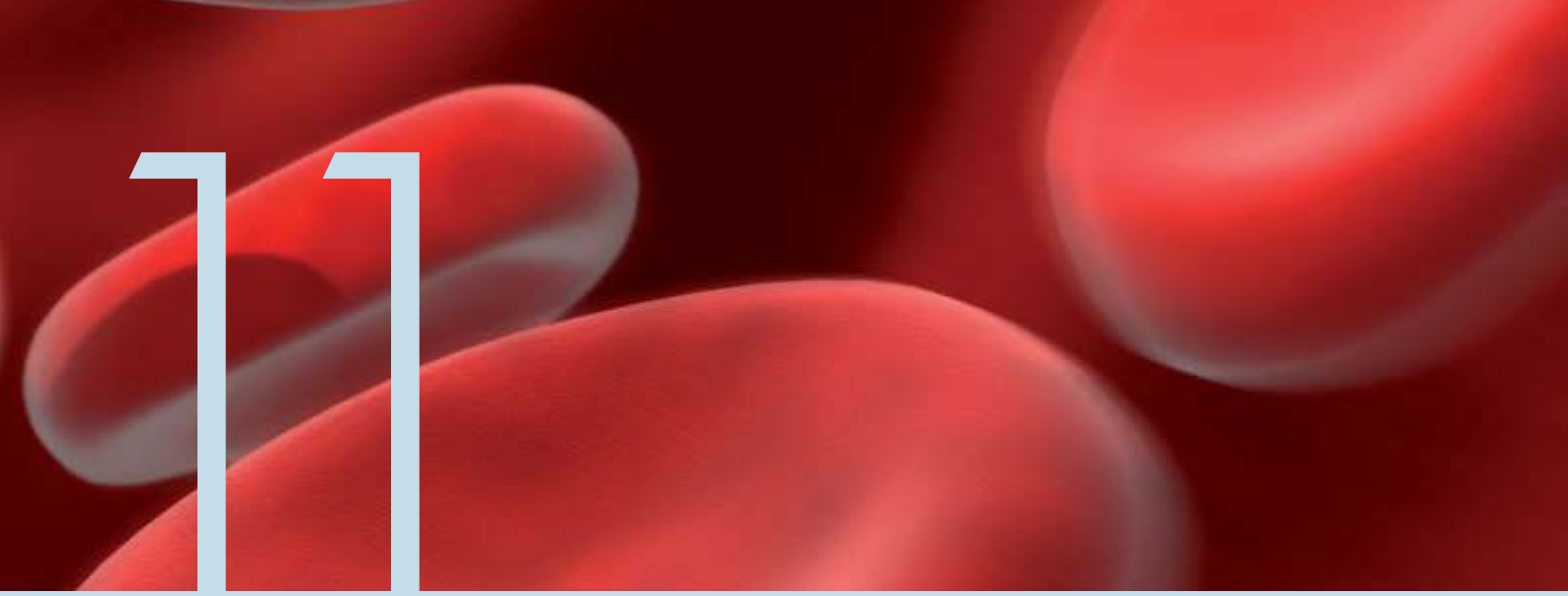
> Stable to expiry date below -18 °C
> Reconstituted up to 3 days at +2 °C to +8 °C
> Reconstituted aliquots up to 12 weeks below -18 °C

Notes

Hemoglobin Testing

Hemoglobin is the iron containing red colouring of blood which can be found in erythrocytes and which is responsible for oxygen transport in the organism. It is a tetramer globin complex which consists of four polypeptide chains, two of each always identical. All four subunits contain a colour-giving iron-porphyrin heme group. In humans four different globins are found, referred to as α, β, γ and δ. Normally, human hemoglobin consists of two α-globin chains and two of the β-globins. The second chain pair determines the hemoglobin variant of issue.

Thalassemias are particularly widespread in the Mediterranean, Middle East and East Asian populations but, in the course of demographic movements, they also occur in central and northern Europe and in America.



11

Hämoglobin-Analytik

Das Hämoglobin ist der eisenhaltige rote Blutfarbstoff, der in den Erythrozyten vorkommt und für den Sauerstofftransport im Organismus verantwortlich ist. Das Hämoglobinmolekül ist ein tetramerer Globin-Komplex, der aus vier Polypeptidketten besteht, von denen jeweils zwei Ketten identisch sind. Alle vier Untereinheiten tragen eine farbgebende Häm-Komponente (Eisenporphyringerüst). Beim Menschen sind vier verschiedene Globinketten bekannt, die mit α, β, γ und δ bezeichnet werden. Normalerweise setzt sich der humane Hämoglobinkomplex aus zwei α-Globinketten und zwei weiteren β-Globinketten zusammen. Dieses zweite Kettenpaar bestimmt die vorliegende Hämoglobinvariante.

Thalassämien sind besonders bei der Bevölkerung des Mittelmeerraumes, Nahost und Ostasien verbreitet, kommen aber aufgrund demographischer Bewegungen auch in Mitteleuropa, Nordeuropa und Amerika vor.

11.1 Hemoglobin Variants

CE IVD

Hemoglobin (Hb) consists of four polypeptide chains called globins and one heme molecule bound to each globin. Different genetic mutations may lead to abnormalities of hemoglobin: structural defects, thalassemic syndromes and the hereditary persistence of foetal Hb.
Abnormal hemoglobin shows decreased function of different severity and, depending on the type of hemoglobinopathy, tendencies towards promoting vaso-occlusion (clogging of blood vessels) by erythrocytes. Among the most severe clinical expressions are syndromes such as sickle cell anaemia, hypochromic anaemia and familial cyanose. These syndromes may be caused by different mutations and an adequate therapy requires the exact identification of the hemoglobin opathy. Some of these will not be sufficiently eliminated by symptomatic therapy such as blood transfusion, but require laborious approaches such as bone marrow transplantation. However, carriers of the genetic defects may minimise the manifestation of the disease by an adapted lifestyle, thus an early diagnosis, especially for children, is of paramount importance.

The Chromsystems reagent kit for the HPLC determination of hemoglobin variants in whole blood allows for a fast sample preparation and a powerful and reproducible separation of all major abnormal hemoglobins such as HbS, HbC, HbE and HbD as well as markers for thalassemia such as HbA_2 and HbF within 9 minutes. No interfering peaks are detected.

> All important hemoglobin variants within 9 min
> Improved sample throughput and efficiency

Das Hämoglobinmolekül (Hb) ist ein Komplex, der aus vier Globin-Polypeptidketten und einem Häm-Molekül besteht. Genmutationen können zu modifizierten Polypeptidketten und damit zur Bildung anomaler Hämoglobinvarianten führen. Dazu gehören Defekte an der Struktur, Thalassämien sowie eine erblich bedingte Persistenz des fetalen Hämoglobins. Anormale Hämoglobine zeigen eine verminderte Funktion unterschiedlichen Ausmaßes. Abhängig vom Typ der Hämoglobinopathie gibt es Tendenzen zur Begünstigung von Gefäßverschlüssen durch Erythrozyten. Zu den schwersten klinischen Verläufen zählen Syndrome wie Sichelzellanämie, hypochrome Anämie und familiär bedingte Zyanosen. Diese Syndrome können durch verschiedene Mutationen hervorgerufen werden und erfordern für die Therapie eine exakte Identifikation der Hämoglobinopathie. Oft hilft keine symptomatische Therapie alleine wie beispielsweise Bluttransfusionen, vielmehr sind aufwändigere Verfahren wie eine Knochenmarkstransplantation erforderlich. Jedoch können Träger des Gendefekts die Krankheitssymptome durch eine entsprechende Lebensweise minimieren. Deshalb hat insbesondere bei Kindern eine frühe Diagnose eine sehr große Bedeutung.

Der Chromsystems Reagenzienkit zur Bestimmung der Hämoglobinvarianten ermöglicht die schnelle Erfassung und reproduzierbare Trennung der häufigsten Hämoglobinvarianten wie HbS, HbC, HbE und HbD sowie Marker für Thalassämie wie HbA_2 und HbF innerhalb von 9 Minuten. Keine interferierende Peaks werden detektiert.

> Alle wichtigen Hämoglobinvarianten in 9 Minuten
> Verbesserter Probendurchsatz und höhere Effizienz

Parameters:
HbA_{1c}, HbA_2, HbC, HbD, HbE, HbF, HbS

Hemoglobin Variants

Order no.	Product
15330	Hemoglobin Variants For 1000 tests
	Components available separately
15331	Buffer A, 2.1 l
15331/C	Buffer A, 5.0 l
15332	Buffer B, 2.8 l
15332/C	Buffer B, 5.0 l
15334	Hemolysis Reagent, 500 ml
15335	Wash Buffer, 1.0 l
15390	HPLC Column, equilibrated, with test chromatogram, 1 pc.
	Accessories
15007/B	Reaction Vials, 1000 pcs.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.

Specifications

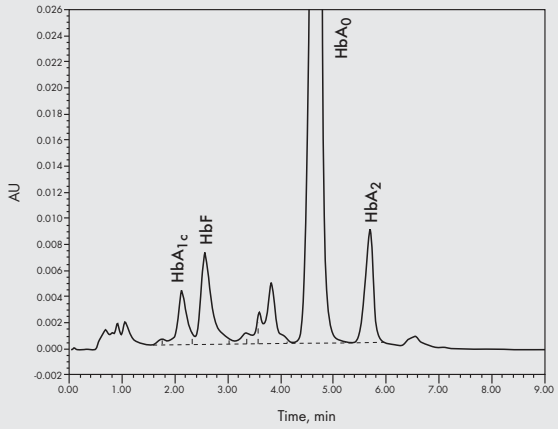
Linearity:	up to at least 75 % (HbA_2) up to at least 70 % (HbF)
Limit of quantification:	2 % (HbA_2) 1 % (HbF)
Intraassay:	CV < 8 %
Interassay:	CV < 4 %
Recovery:	100 % (HbA_2) 99.2 % (HbF)
Analysis time:	9 min

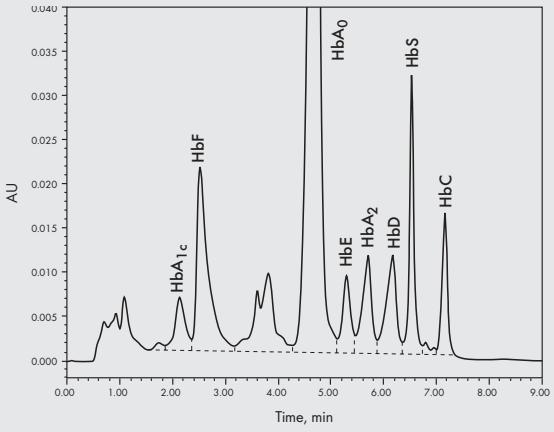
Pre-analytic Treatment

Specimens: whole blood, can be transported without cooling.
Stability of specimens: at room temperature approx. 24 h, at +2 to +8 °C up to 36 h, for longer storage periods freeze below -18 °C. Once thawed, samples should not be refrozen.

Sample Preparation

→ Dilute 5–8 µl capillary whole blood with 1 ml Hemolysis Reagent, mix well.
→ Inject 10–20 µl of the hemolysis mixture into the HPLC system.





HPLC Parameters

Binary HPLC gradient system with UV/VIS detector.

Injection volume: 10–20 µl
Flow rate 1.5 ml/min
Wavelength: 415 nm
Column temp.: ambient (~ 25 °C)

11.2 β-Thalassemia Testing Short Program for HbA_2 and HbF

CE IVD

In thalassemias the synthesis of one or more of the globin chains is disturbed. Depending on the chain affected, the condition is divided into α-, β-, δ or γ-thalassemia. The most frequently affected globin chain is the β-chain (β-thalassemia). In patients homozygotic for this defect, the β-chain is not syn-thesised at all; in hetereozygotic patients the synthesis is reduced by about 20 %. Compensation is achieved by the increased synthesis of HbA_2 or HbF. In the case of β-thalassemia major HbF is increased and HbAs remains within the normal range, whereas in β-thalassemia minor HbA_2 exhibits an elevated level and about twice as high as in comparison to a healthy organism.
Besides thalassemias, genetic mutations in the globins can occur that lead to modified polypeptide chains, and thus to abnormal hemoglobin variants. Occurrence of thalassemias in combination with other genetically determined hemoglobin abnormalities is also possible.

The Chromsystems assay for β-thalassemia testing allows the reliable quantification of HbA_2 and HbF. The column's high separation capability allows the determination of the most common variants HbA_{1c}, HbA_2, HbC, HbF and HbS in less than 6 minutes. A column material specially designed for this specific separation process allows a stabilised separation of HbA_2 from the other Hb-molecules even with aged columns. This helps to avoid misinterpretations and eliminate false quantifications and qualifications.

> Simultaneous quantifications of HbS and HbC within 5.5 minutes
> HbA_2 will be quantified in presence of HbE and HbD

Bei Thalassämien ist die Synthese einer oder mehrerer Globinketten-Typen des Hämoglobins gestört. Je nach betroffenem Typ werden α-, β-, δ-, γ-Thalassämien unterschieden. Am häufigsten ist die β-Kette betroffen (β-Thalassämie). Bei der homozygoten β-Thalassämia major fehlt die β-Kettensynthese völlig. Bei der heterozygoten β-Thalassämia minor ist sie um ca. 20 % erniedrigt. Zum Ausgleich werden vermehrt HbA_2 und HbF gebildet: bei β-Thalassämia major vorwiegend HbF, bei der β-Thalassämia minor vorwiegend HbA_2.
Neben Thalassämien können Genmutationen auftreten, die zu modifizierten Polypeptidketten und damit zu anomalen Hämoglobinvarianten führen. Ebenso treten Kombinationen von Thalassämien mit verschiedenen erblich bedingten Hämoglobin-Varianten auf.

Dieser Chromsystems Kit für das Testen auf β-Thalassämie ermöglicht eine sichere Quantifizierung von HbA_2 und HbF. Die hohe Trennleistung der Säule ermöglicht die Erfassung der häufigsten Varianten HbA_{1c}, HbA_2, HbC, HbF und HbS in weniger als 6 min. Ein speziell für diese Trennung konzipiertes Säulenmaterial ermöglicht auch mit gealterten Säulen eine stabile Trennung des HbA_2 von den anderen Hb-Molekülen. Verwechslungen sowie falsche Quantifizierungen und Qualifizierungen werden so vermieden.

> Gleichzeitige Quantifizierung von HbS und HbC in 5,5 Minuten möglich
> Quantifizierung von HbA_2 ohne Interferenzen durch HbD und HbE

Parameters:
HbA_{1c}, HbA_2, HbC, HbF, HbS

β-Thalassemia Testing Short Program for HbA_2 and HbF

Order no.	Product
15440	β-Thalassemia For 1000 tests
	Components available separately
115441	Buffer A, 2.1 l
15441/C	Buffer A, 5.0 l
15442	Buffer B, 2.8 l
15442/C	Buffer B, 5.0 l
15444	Hemolysis Reagent, 500 ml
15445	Wash Buffer, 1.0 l
15490	HPLC Column, equilibrated, with test chromatogram
	Accessories
15007/B	Reaction Vials, 1000 pcs.
15009	PEEK-encased Prefilter, 5 µm, 5 pcs.
15010	PEEK Prefilter Housing, 1 pc.
15100	HPLC Column for HbA_{1c} Anaylysis

Specifications

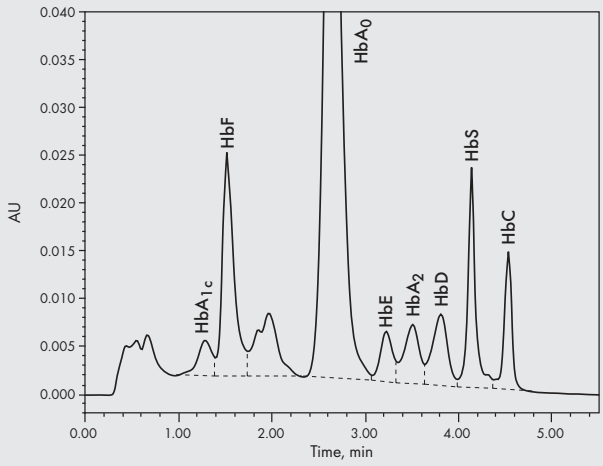
Linearity:	up to 75 % (HbA_2) up to 82 % (HbF)
Limit of quantification:	2 % (HbA_2) 1 % (HbF)
Intraassay:	CV < 5 %
Interassay:	CV < 10 %
Recovery:	101 %
Analysis time:	< 5.5 min

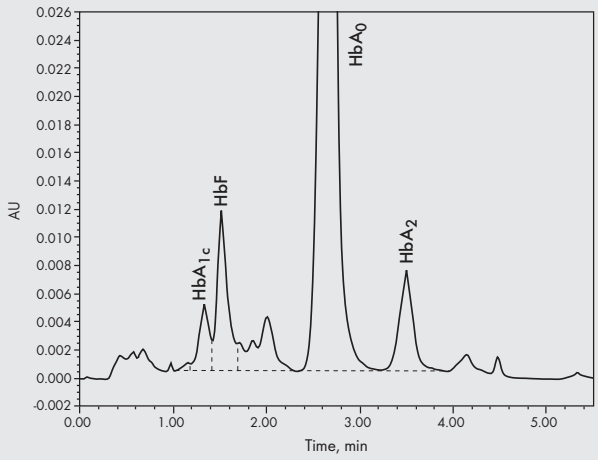
Pre-analytic Treatment

Specimens: whole blood, can be transported without cooling. Stability of specimens: at room temperature approximately 3 days, at +2 to +8 °C up to 1 week, below -18 °C up to 6 months. Once thawed, samples should not be refrozen.

Sample Preparation

→ Dilute 5–8 µl capillary whole blood with 1 ml Hemolysis Reagent, mix well.
→ Inject 10–20 µl of the hemolysis mixture into the HPLC system.





HPLC Parameters

Binary HPLC gradient system with UV/VIS detector.

Injection volume: 10–20 µl
Flow rate 2.3 ml/min
Wavelength: 415 nm
Column temp.: ambient (~ 25 °C)

12

Instruments and Modules

Our modules and components are tailored to provide perfect access to the Chromsystems assays. They have been developed to enable an efficient and rapid workflow in clinical diagnostics. The systems offer analytical reproducibility as well as low standard deviations, ensuring highly reliable results in the clinical laboratory.

Instrumente und Module

Unsere Module und Komponenten bieten den idealen Zugang zu den darauf abgestimmten Kits von Chromsystems und ermöglichen eine effiziente und schnelle Arbeitsweise in der klinischen Diagnostik. Die Systeme liefern Daten mit einer hohen Reproduzierbarkeit und geringen Standardabweichungen und ermöglichen so zuverlässigeErgebnisse im klinischen Laboratorium.

12.1 Electrochemical Detector CLC 100

Order no.	Product
42100	Electrochemical Detector Chromsystems CLC 100, with flow cell and accessories
	Spare Parts and Accessories:
41202	Complete Flow Cell for ECD
41208	Main Cell Body
41210	Housing of the Working Electrode
41203	Glassy Carbon Working Electrode
41204	Silver Working Electrode
41243	Copper Working Electrode
41255	Gold Working Electrode
41256	Platinum Working Electrode
41206	Spacer, 50 µm (yellow), 3 pcs.
41207	Spacer, 30 µm (orange), 3 pcs.
41211	Reference Electrode Ag/AgCl
41231	O-ring for Reference Electrode
41212	Reference Electrode Insert with Vicoglass
41239	KCl Solution, 3 mol/l, 50 ml

Technical Specifications

Working principle:	amperometric
Working electrode:	glassy carbon in zirconium oxide
Reference electrode:	Ag/AgCl, refillable
Cell volume:	2.5 µl
Working potential:	± 1.60 V
Range:	0.02–100 nA full scale
Offset:	0.01–0.20 V
Autozero:	internal/external
Rise time:	0.5–10.0 s
Power requirements:	110–240 V, 50–60 Hz,
Dimensions:	355 x 226 x 160 mm (L x W x H)
Weight:	9 kg

> Short equilibration time
> Flow cell easy to handle
> Suitable for narrow-bore columns
> AUTOZERO Function

12.2 Programmable Autosampler CLC 220

Order no.	Product
42250	Programmable Autosampler CLC 220
42251	Programmable Autosampler, upgrade solution for cooling/heating of the sample rack from +4 °C to +60 °C
	Optional available
42362	Solvent Bottle Tray, 1 pc. (see page 169)
	Accessories
J0404	Autosampler Vials, amber glass, 1.5 ml
J0405	Autosampler Vials, clear glass, 2.5 ml
J0403	Micro-inserts for Autosampler Vials J0404, 0.3 ml
J0501	Autosampler Microvials, PP, 12 x 32 mm, 0.3 ml
J0406	Crimp Caps, rubber/PTFE septa, 11 mm
J0502	PE Snap Ring Caps, rubber septa, 11 mm
J0503	PE Snap Ring Caps, PTFE blue, 11 mm, cross-slitted
J0402	Crimper for Crimp Caps, 11 mm
J6001	PEEK Capillary, 0.25 mm i. d., blue coded, 5 m
J6002	PEEK Capillary, 0.50 mm i. d., orange coded, 5 m
J6010	Capillary Cutter, 1 pc.
J5502	PEEK Fingertight Fitting 1/16“, 5 pcs.
J0407	HPLC Column End Caps, 6 pcs.,
42220	Rotor Seal PPS
42221	Injection Needle
42222	Air Needle

Technical Specifications

Material:	stainless steal, optional: PEEK
Sample racks:	2 racks for 60 vials (1.5 ml) or 192 samples (microtiter plates)
Injection volume:	0.1–999.9 µl
Sample dosage:	500 µl glass syringe, linear stepper, motor-driven
Sample loop:	exchangeable, standard 100 µl or other volumes
Dosage method:	partial or full loop mode
Injection valve:	2-positions 6-port, motor-driven
Reproducibility:	CV < 0.5 %, variable volume injection
Communication:	RS 232 interface and remote control
Power requirements:	100–250 V, 47–63 Hz
Sample heating/cooling:	+4 °C to +60 °C
Injection precision:	< 0.5 %
Carry over:	< 0.05 % with wash program
Dimensions:	478 x 396 x 275 mm (L x W x H)
Weight:	approx. 12 kg

- **> Fully automated system; capacity of up to 120 samples for injection into the HPLC system**
- **> Injection volumes can be varied by programming**
- **> Injection valve and syringe are easily accessible, simplifying instrument maintenance**
- **> Improved capillary lead gives a much lower risk of blocking**
- **> Integration with a computer-controlled data system**
- **> Sample dosing is controlled by a stepper motor-driven syringe**

12.3 HPLC Pumps CLC 320 and Q-CLC 340

Order no.	Product
42350	HPLC Pump Chromsystems CLC 320
42360	HPLC Pump Chromsystems Q-CLC 340
	Optional available
42361	4-Channel Vacuum Degasser, integrated in the solvent delivery system Q-CLC 340
42362	Solvent Bottle Tray, 1 pc. (see page 169)

Technical Specifications

HPLC Pump CLC 320

Solvent delivery system:	dual piston
Maximal pressure:	40 MPa (400 bar; 0–6000 PSI)
Flow rate:	0.001–10 ml/min
Compressibility factor:	from 0.6 to 1.0
Operating modes:	constant flow
Display:	4 inch color TFT
Programmable run time:	0.1–999.9 min
Programmable delay time:	0.1–999.9 min
Power requirements:	100–250 V, 47–63 Hz
Dimensions:	478 x 396 x 165 mm (L x W x H)
Weight:	approx. 7 kg

HPLC Pump Q-CLC 340

Gradient:	quaternary low pressure mixing
Maximal pressure:	40 MPa (400 bar; 0–6000 PSI)
Flow rate:	0.001–10 ml/min
Compressibility factor:	programmable from 0.7 to 1.0
Operating modes:	gradient and isocratic
Display:	4 inch color TFT
Special functions:	integrated control of the quaternary gradient menu-driven programming
Dimensions:	478 x 396 x 165 mm (L x W x H)
Weight:	approx. 7 kg

- **> High flow rate consistency**
- **> Low pulsation**
- **> Reliable flow with all common mobile phases, making it ideally suited for routine clinical diagnostic use**
- **> Smaller volume for the vacuum degasser – requiring only 500 µl**
- **> Pump head drive is permanently lubricated as well as accessible, decreasing the maintenance effort significantly**

12.4 HPLC Column Oven CLC 360 and Solvent Bottle Tray

Order no.	Product
42395	HPLC Column Oven Chromsystems CLC 360

Technical Specifications

Material:	stainless steel, optional: PEEK, PPS
Temperature range:	+5 °C to +100 °C (peltier)
Temperature accuracy:	< 0.1 °C
Temperature program:	heating/cooling (peltier)
Safety features:	temperature fuse; leakage sensor
Time program:	programmable, 10 steps (optional)
Column holder:	diameter 8 mm, length 100–250 mm
Display:	4 inch colour TFT
Power requirements:	100–250 V, 47–63 Hz
Dimensions:	478 x 396 x 165 mm (L x W x H)
Weight:	approx. 7 kg

> Temperature controller for stable column temperatures with active heating/cooling system and Peltier technology
> Highly sensitive leak sensor: also detects vapors of organic solvents
> Overheat protection
> Temperature fuse shuts down the unit in case of electronic defects

Order no.	Product
42362	Solvent Bottle Tray, 1 pc.

Specifications

Material:	solvent-resistent reservoir stainless steel, bottle holder PE-HD
Dimensions:	427x 396 x 90.5 mm (L x W x H)

> Allows clean and convenient storage of four bottles with up to one liter capacity
> The dimensions are perfectly matched to the modules CLC 220, CLC 320, Q-CLC 340, CLC 360 and CLC 420

12.5 UV-VIS Detector CLC 420

Order no.	Product
42450	UV-VIS Detector Chromsystems CLC 420
	Optional available
42362	Solvent Bottle Tray, 1 pc. (see page 169)
	Accessories
42453	Deuterium Lamp 35 W, pre- aligned
42454	Tungsten Lamp, pre-aligned

Technical Specifications

Lamps:	deuterium, tungsten
Wavelength range:	190–800 nm
Wavelength accuracy:	± 2 nm
Wavelength program:	programmable, 10 steps
Noise:	± 1 x 10^{-5} AU (240 nm)
Drift:	< 3 x 10^{-4} AU/h
Flow cell:	10 mm pathlength, 12 µl cell volume + heat exchanger
Display:	4 inch color TFT
Power requirements:	100–250 V, 50–60 Hz
Dimensions:	478 x 396 x 165 mm (L x W x H)
Weight:	approx. 7 kg

> Highly sensitive single-channel UV-VIS detector
> Wavelength adjustment possible, carried out with no moving mechanical parts
> Detector well-suited to clinical routine analysis

12.6 Sample Concentrator

Order no.	Product
42720	Sample Concentrator for 96 Well Plates
42730	Sample Concentrator for Autosampler Vials

Components available separately

Sample concentrator head for microplates
Sample concentrator head for vials
Dri-Block® heater (digital)
Plastic spacers pk/2
PTFE coated needle, 76 mm
Block for 96 well plates (order no. 42720)
Block for vials (order no. 42730)

Technical Specifications

Maximum gas pressure:	must not exceed 2 psi
Maximum vertical travel:	320 mm
Maximum gas usage:	15 l/min
Gas:	any inert gas (often nitrogen)
Gas intake nozzle diameter:	6.35 mm (1/4“)
Dimensions:	240 x 295 x 530 mm (W x D x H)
Weight:	3.5 kg

- **> Fast evaporation of solvents**
- **> Light and compact unit for easy use in fume cupboards**
- **> High-quality stainless-steel needles**
- **> Accurate height control**
- **> Chromsystems-adapted blocks available for specific assay requirements**

12.7 Chromsystems Heat Sealer

The heat sealer is used for sealing 96 well plates with a heat seal, and in turn, protects them from evaporation or contamination during storage. It allows the adjustment of both sealing time and temperature, and produces a visual countdown from the display during the sealing process. This ensures reliable and consistent results of the sealing process.

For our automated HPLC, UHPLC and LC-MS/MS assays it is recommended to use heat seals.

> Easy sealing of 96 well plates
> Adjustable time and temperature
> Ergonomic lever
> Compatible with a wide range of microplates
> Fast startup time
> Small footprint

Der Heat Sealer ermöglicht die schnelle Versiegelung von 96-Well-Platten mit verschweißbaren Abdeckfolien. Der Inhalt ist so vor Austrocknung, Verdunstung und Kontamination während der Lagerung geschützt. Versiegelungszeit und -temperatur sind frei wählbar, und beim Versiegelungsprozess kann die verbleibende Zeit auf dem Display überwacht werden. Das Instrument gewährleistet zuverlässige und konsistente Ergebnisse des Versiegelungsprozesses.

Für unsere automatisierten HPLC-, UHPLC- und LC-MS/MS-Kits sind verschweißbare Abdeckfolien empfehlenswert.

Order no.	Product
42740	Chromsystems Heat Sealer

Technical Specifications

Sealing temperature range	125–200 °C (1 °C increments)
Sealing time range:	1–9 seconds (0.5 second increments)
Time taken to warm up to 170 °C:	< 10 minutes
Power requirements:	100–230 VAC nominal
Dimensions:	210 x 300 x 430 mm (W x D x H)
Weight:	7.5 kg

> Einfache Versiegelung von 96-Well-Platten
> Einstellbare Zeit und Temperatur
> Ergonomischer Hebel
> Kompatibel mit einer Vielzahl von Mikrotiterplatten
> Kurze Inbetriebnahmezeit
> Kleine Stellfläche

12.8 2-Position 6-Port Switching Valve CLC 230

Order no.	Product
42234	**Valve Actuator CLC 230**
	Accessories
15009	Prefilters, 5 µm, 5 pcs.
15011	Prefilters, 2 µm, 5 pcs.
15010	Prefilter Housing, 1 pc.
J6001	PEEK Capillary, 0.25 mm i. d., blue coded, 5 m
J6002	PEEK Capillary, 0.5 mm i. d., orange coded, 5 m
J0061	PEEK Union, 2 pcs.
J5502	PEEK Fingertight Fitting 1/16", 5 pcs.
CS 2601201	Rotor Seal PEEK S 6010, 1 pc.
CS 2601155	Rotor Seal PPS, 1 pc.

Technical Specifications

Pressure:	max. 400 bars/40 MPa/5800 PSI (depending on mounted valve)
Wetted materials:	stainless steel (depending on mounted valve and rotor seal)
Actuation time:	< 100 ms
External control:	RS-232: random position access relay pulse: reset position, next position USB: virtual COM-port
Motor specification:	1.8° stepper motor
Power requirements:	90–260 V, 50-60 Hz
Dimensions:	200 x 150 x 120 mm (L x W x H)
Weight:	2.7 kg

> Ideal for online sample preparation
> Suitable as switching valve for HPLC and LC-MS/MS
> Additionally available:
column switching valve for up to 6 columns

Assay Overview by Order Number

Assay	Order Number	Automation	Detection*	Assay page	Controls page
Chapter 2: Biogenic Amines					
VMA, HVA, 5-HIAA in Urine	1000/B		EC	28	16
VMA, HVA, 5-HIAA in Urine for Gilson® ASPEC™	1000/B/A1, A5, A9	Gilson® ASPEC™	EC	28	16
Metanephrines in Urine	2020		EC	20	16
Metanephrines in Urine for Gilson® ASPEC™	2020/A1, A5, A9	Gilson® ASPEC™	EC	20	16
Metanephrines in Urine Combined Method	2020/COMBI		EC	22	16
Serotonin in Serum/Plasma/Whole Blood	3030		EC	26	18
Serotonin in Urine	4000		EC	25	16
Catecholamines in Plasma	5000		EC	17	18
Catecholamines in Urine	6000		EC	14	16
Catecholamines in Urine for Gilson® ASPEC™	6000/A1, A5, A9	Gilson® ASPEC™	EC	14	16
Catecholamines in Urine Combined Method	6000/COMBI		EC	22	16
5-HIAA in Urine	51000		EC	31	16
Chapter 3: Osteoporosis Diagnosis					
25-OH-Vitamin D_3/D_2 in Serum/Plasma Standard Method	38038		UV	35	37
25-OH-Vitamin D_3/D_2 in Serum/Plasma Online Method	38900/1000		UV	36	37
Crosslinks in Urine	48000		F	39	40
Crosslinks in Urine for Gilson® ASPEC™	48000/A1, A5, A9	Gilson® ASPEC™	F	39	40
Chapter 4: Vitamin Profiling					
Vitamin B_6 in Plasma/Serum	31000/S		F	60	61
Vitamin B_6 in Whole Blood	31000/WB		F	60	61
Vitamins A and E in Serum/Plasma Standard Method	34000		UV	47	52
One Step Vitamins A and E in Serum/Plasma with Pre-mixed Tubes	34000/Premix		UV	48	52
Vitamins A and E in Serum/Plasma UHPLC with Pre-mixed Tubes	34900/UHPLC		UV	49	52
Automated Vitamins A and E in Serum/Plasma with HPLC	34700/F	Tecan, Hamilton	UV	50, 51	52
Automated Vitamins A and E in Serum/Plasma with UHPLC	34900/F	Tecan, Hamilton	UV	50, 51	52
Vitamin B_1 in Whole Blood	35000		F	54	55
Vitamin B_2 in Whole Blood	37000		F	57	58
Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma Standard Method	52052		F	63	69
Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma with Pre-mixed Tubes	52052/Premix		F	64	69
Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma UHPLC	52952/UHPLC		F	66	69
Automated Vitamins B_1/B_6 in Whole Blood with HPLC	52752/F	Tecan, Hamilton	F	67, 68	69
Automated Vitamins B_1/B_6 in Whole Blood with UHPLC	52952/UHPLC/F	Tecan, Hamilton	F	67, 68	69
Chapter 5: Monitoring Oxidative Stress					
β-Carotene in Serum/Plasma	32000		UV-VIS	73	74
Vitamin C in Plasma/Serum	65065		UV	85	87
Automated Vitamin C in Plasma/Serum	65765/F	Tecan, Hamilton	UV	86	87
Glutathione in Whole Blood	66000		F	79	80

Assay	Order Number	Automation	Detection*	Assay page	Controls page
Malondialdehyde in Plasma/Serum	67000		F	82	83
Coenzyme Q10 in Serum/Plasma/Whole Blood	68000		UV	76	77
Chapter 6: Porphyrin Profiling					
Porphyrins in Urine	44000		F	91	92
Chapter 7: Occupational Medicine					
o-Cresol, p-Cresol and Phenol in Urine	41000		F	103	104
Hippuric Acid, Methylhippuric Acids, Mandelic Acid and Phenylglyoxylic Acid in Urine	43000		UV	100	101
t,t-Muconic Acid in Urine	47000		UV	106	107
t,t-Muconic Acid in Urine for Gilson® ASPEC™	47000/A1, A5, A9	Gilson® ASPEC™	UV	106	107
1-Hydroxypyrene in Urine	53000		F	97	98
1-Hydroxypyrene in Urine for Gilson® ASPEC™	53000/A1	Gilson® ASPEC™	F	97	98
Chapter 8: Risk Factor for Arteriosclerosis					
Homocysteine in Plasma/Serum	45000		F	111	112
Chapter 9: Chronic Alcohol Abuse					
CDT in Serum Standard Method (for binary gradient system)	54020		UV-VIS	117	121
CDT in Serum Standard Method (for ternary gradient system)	54030		UV-VIS	117	121
Automated CDT in Serum using 96 Well Filter Plates	54730/F	Tecan	UV-VIS	120	121
One Step CDT in Serum, Fast Elution with Pre-mixed Tubes	54930/500		UV-VIS	118, 119	121
Chapter 10: Therapeutic Drug Monitoring					
Rufinamide, Felbamate and Lacosamide in Serum/Plasma	21000		UV	155	156
Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F		UV	132	134, 135
Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR		UV	132	134, 135
Antiepileptic Drugs in Serum/Plasma, Fast Elution for Gilson® ASPEC™	23000/F	Gilson® ASPEC™	UV	132	134, 135
Antiepileptic Drugs in Serum/Plasma, High Resolution for Gilson® ASPEC™	23000/HR	Gilson® ASPEC™	UV	132	134, 135
Levetiracetam (Keppra®) in Serum/Plasma	24000		UV	146	147
Amiodarone and Desethylamiodarone in Serum/Plasma	25000		UV	129	130
Olanzapine and Desmethylolanzapine in Serum/Plasma	26000		UV-VIS	152	153
Mycophenolic Acid in Plasma/Serum	46000		UV	149	150
Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000		UV	137, 138	139, 140
Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma for Gilson® ASPEC™	49000/A1, A5, A9	Gilson® ASPEC™	UV	137, 138	139, 140
Extended Benzodiazepines in Serum/Plasma	59000		UV	142	143, 144
Extended Benzodiazepines in Serum/Plasma for Gilson® ASPEC™	59000/A1, A5, A9	Gilson® ASPEC™	UV	142	143, 144
Antibiotics in Serum/Plasma	61000		UV	125	126, 127
Chapter 11: Hemoglobin Testing					
Hemoglobin Variants	15330		UV-VIS	161	-
β-Thalassemia Testing Short Program for HbA_2 and HbF	15440		UV-VIS	163	-

** EC = Electrochemical detection, F = Fluorescence detection, UV = UV detection, UV-VIS = UV-VIS detection*

Parameter Index

Parameter	Assay	Kit order no.	Kit page	Controls page
1-Hydroxypyrene (1-OH-pyrene)	1-Hydroxypyrene in Urin	53000	97	98
3,4-Dihydroxymandelic acid (DOMA)	–	–	–	16, 18
3,4-Dihydroxyphenylacetic acid (DOPAC)	–	–	–	16, 18
3,4-Dihydroxyphenylalanine (L-DOPA)	–	–	–	16, 18
3,4-Dihydroxyphenylglycol (DHPG)	–	–	–	16, 18
3-Methoxy-4-hydroxyphenylglycol (MHPG)	–	–	–	16, 18
3-Methoxytyramine	Metanephrines in Urine	2020	20	16
	Metanephrines in Urine Combined Method	2020/COMBI	22	16
5-HIAA	VMA, HVA, 5-HIAA in Urine	1000/B	28	16
	5-HIAA in Urine	51000	31	16
5-Hydroxyindolacetic acid (5-HIAA)	VMA, HVA, 5-HIAA in Urine	1000/B	28	16
	5-HIAA in Urine	51000	31	16
5-Hydroxytryptamine (serotonin)	Serotonin in Urine	4000	25	16
	Serotonin in Serum/Plasma/Whole Blood	3030	26	18
10-OH-carbamazepine	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
25-OH-vitamin D_3	25-OH-Vitamin D_3/D_2 in Serum/Plasma Standard Method	38038	35	37
	25-OH-Vitamin D_3/D_2 in Serum/Plasma Online Method	38900/1000	36	37
25-OH-vitamin D_2	25-OH-Vitamin D_3/D_2 in Serum/Plasma Standard Method	38038	35	37
	25-OH-Vitamin D_3/D_2 in Serum/Plasma Online Method	38900/1000	36	37
a-Tocopherol (vitamin E)	Vitamins A and E in Serum/Plasma Standard Method	34000	47	52
	One Step Vitamins A and E in Serum/Plasma with Pre-mixed Tubes	34000/Premix	48	52
	Vitamins A and E in Serum/Plasma UHPLC with Pre-mixed Tubes	34900/UHPLC	49	52
	Automated Vitamins A and E in Serum/Plasma with HPLC and UHPLC	34700/F, 34900/F	50, 51	52
ß-Carotene	β-Carotene in Serum/Plasma	32000	73	74
Adrenaline	Catecholamines in Urine	6000	14	16
	Catecholamines in Plasma	5000	17	18
	Catecholamines, Metanephrines in Urine Combined Method	6000/COMBI	22	16
All-trans-ß-carotene	β-Carotene in Serum/Plasma	32000	73	74
Alprazolam	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	140, 144
Ampicillin	Antibiotics in Serum/Plasma	61000	125	126, 127
Amiodarone	Amiodarone and Desethylamiodarone in Serum/Plasma	25000	129	130
Amitriptyline	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Ascorbic acid (vitamin C)	see vitamin C			
Asialotransferrin	CDT in Serum Standard Method	54020, 54030	117	121
	One Step CDT in Serum, Fast Elution with Pre-mixed Tubes	54930/500	118, 119	121
	Automated CDT in Serum using 96 Well Filter Plates	54730/F	120	121
Bromazepam	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Carbamazepine	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
Carbamazepine-10,11-epoxide	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
Carbohydrate deficient transferrin	CDT in Serum Standard Method	54020, 54030	117	121
	One Step CDT in Serum, Fast Elution with Pre-mixed Tubes	54930/500	118, 119	121
	Automated CDT in Serum using 96 Well Filter Plates	54730/F	120	121
Carotene (ß-carotene)	β-Carotene in Serum/Plasma	32000	73	74
CDT	CDT in Serum Standard Method	54020, 54030	117	121

Parameter	Assay	Kit order no.	Kit page	Controls page
CDT	One Step CDT in Serum, Fast Elution with Pre-mixed Tubes	54930/500	118, 119	121
	Automated CDT in Serum using 96 Well Filter Plates	54730/F	120	121
Cefepime	Antibiotics in Serum/Plasma	6100 0	125	126, 127
Ceftazidime	Antibiotics in Serum/Plasma	61000	125	126, 127
Chlordiazepoxide	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Citalopram	–	–	–	156
Clobazam	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Clomipramine	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Clonazepam	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Clozapine	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Coenzyme Q10 (ubiquinone)	Coenzyme Q10 in Serum/Plasma/Whole Blood	68000	76	77
Coproporphyrin I	Porphyrins in Urine	44000	91	92
Coproporphyrin III	Porphyrins in Urine	44000	91	92
Cresol (o-cresol, p-cresol)	o-Cresol, p-Cresol and Phenol in Urine	41000	103	104
Deoxypyridinoline	Crosslinks in Urine	48000	39	40
Desalkylflurazepam	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Desethylamiodarone	Amiodarone and Desethylamiodarone in Serum/Plasma	25000	129	130
Desipramin	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Desmethylmesuximide	Rufinamide, Felbamate and Lacosamide in Serum/Plasma	21000	155	156
	–	–	–	134
Desmethylolanzapine	Olanzapine and Desmethylolanzapine in Serum/Plasma	26000	152	153
Diazepam	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Disialotransferrin	CDT in Serum Standard Method	54020, 54030	117	121
	One Step CDT in Serum, Fast Elution with Pre-mixed Tubes	54930/500	118, 119	121
	Automated CDT in Serum using 96 Well Filter Plates	54730/F	120	121
DHPG (3,4-dihydroxyphenylglycol)	–	–	–	16, 18
DOMA (3,4-dihydroxymandelic acid)	–	–	–	16, 18
DOPAC (3,4-dihydroxyphenylacetic acid)	–	–	–	16, 18
Dopamine	Catecholamines in Urine	6000	14	16
	Catecholamines in Plasma	5000	17	18
	Catecholamines, Metanephrines in Urine Combined Method	6000/COMBI	22	16
Doxepin	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Epinephrine (adrenaline)	see adrenaline			
Eslicarbazepine	Rufinamide, Felbamate and Lacosamide in Serum/Plasma	21000	155	156
Ethosuximide	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
FAD (flavin adenine dinucleotide)	Vitamin B_2 in Whole Blood	37000	57	58
Felbamate	Rufinamide, Felbamate and Lacosamide in Serum/Plasma	21000	155	156
Flavin adenine dinucleotide (FAD)	Vitamin B_2 in Whole Blood	37000	57	58
Flavin mononucleotide (FMN)	Vitamin B_2 in Whole Blood	37000	57	58
Flunitrazepam	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
FMN (flavin mononucleotide)	Vitamin B_2 in Whole Blood	37000	57	58
Glutathione (GSH, GSSG)	Glutathione in Whole Blood	66000	79	80

Parameter	Assay	Kit order no.	Kit page	Controls page
GSH (free glutathione)	Glutathione in Whole Blood	66000	79	80
GSSG (glutathione disulfide)	Glutathione in Whole Blood	66000	79	80
HbA_{1c}	Hemoglobin Variants	15330	161	–
	β-Thalassemia Testing Short Program	15440	163	–
HbA_2	Hemoglobin Variants	15330	161	–
	β-Thalassemia Testing Short Program	15440	163	–
HbC	Hemoglobin Variants	15330	161	–
	β-Thalassemia Testing Short Program	15440	163	–
HbD	Hemoglobin Variants	15330	161	–
HbE	Hemoglobin Variants	15330	161	–
HbF	Hemoglobin Variants	15330	161	–
	β-Thalassemia Testing Short Program	15440	163	–
HbS	Hemoglobin Variants	15330	161	–
	β-Thalassemia Testing Short Program	15440	163	–
Hemoglobin	Hemoglobin Variants	15330	161	–
	β-Thalassemia Testing Short Program	15440	163	–
Heptacarboxyporphyrin	Porphyrins in Urine	44000	91	92
Hexacarboxyporphyrin	Porphyrins in Urine	44000	91	92
HIAA (5-HIAA)	VMA, HVA, 5-HIAA in Urine	1000/B	28	16
	5-HIAA in Urine	51000	31	16
Hippuric acid	Hippuric Acid, Methylhippuric Acids, Mandelic Acid and Phenylglyoxylic Acid in Urine	43000	100	101
Homocysteine	Homocysteine in Plasma/Serum	45000	111	112
Homovanillic acid (HVA)	VMA, HVA, 5-HIAA in Urine	1000/B	28	16
HVA (homovanillic acid)	VMA, HVA, 5-HIAA in Urine	1000/B	28	16
Hydroxyindolacetic acid (5-HIAA)	VMA, HVA, 5-HIAA in Urine	1000/B	28	16
	5-HIAA in Urine	51000	31	16
Imipramine	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Keppra®	Levetiracetam (Keppra®) in Serum/Plasma	24000	146	147
L-DOPA (3,4-dihydroxyphenylalanine)	–	–	–	16, 18
Lacosamide	Rufinamide, Felbamate and Lacosamide in Serum/Plasma	21000	155	156
Lamotrigine	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
Levetiracetam (Keppra ®)	Levetiracetam (Keppra®) in Serum/Plasma	24000	146	147
Linezolid	Antibiotics in Serum/Plasma	61000	125	126, 127
Lorazepam	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Malondialdehyde	Malondialdehyde in Plasma/Serum	67000	82	83
Mandelic acid	Hippuric Acid, Methylhippuric Acids, Mandelic Acid and Phenylglyoxylic Acid in Urine	43000	100	101
Maprotiline	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Medazepam	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Meropenem	Antibiotics in Serum/Plasma	61000	125	126, 127
Metanephrine	Metanephrines in Urine	2020	20	16
	Metanephrines in Urine Combined Method	2020/COMBI	22	16
Methoxytyramine (3-methoxytyramine)	Metanephrines in Urine	2020	21	17
	Metanephrines in Urine Combined Method	2020/COMBI	22	16
Methylhippuric acid (o-, m-, p-methylhippuric acid)	Hippuric Acid, Methylhippuric Acids, Mandelic Acid and Phenylglyoxylic Acid in Urine	43000	100	101
MHPG (3-methoxy-4-hydroxyphenylglycol)	–	–	–	16, 18
Midazolam	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Muconic acid (t-t-muconic acid)	t,t-Muconic Acid in Urine	47000	106	107

Parameter	Assay	Kit order no.	Kit page	Controls page
Mycophenolic acid	Mycophenolic Acid in Plasma/Serum	46000	149	150
Nitrazepam	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Noradrenaline (norepinephrine)	Catecholamines in Urine	6000	14	16
	Catecholamines in Plasma	5000	17	18
	Catecholamines, Metanephrines in Urine Combined Method	6000/COMBI	22	16
Norclobazam	–	–	–	140, 143, 144
Norclomipramine	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Norclozapine	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Nordiazepam	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
	Extended Benzodiazepines in Serum/Plasma	59000	142	144
Nordoxepin	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Norepinephrine (noradrenaline)	see noradrenaline			
Normethanephrine	Metanephrines in Urine	2020	20	16
	Metanephrines in Urine Combined Method	2020/COMBI	22	16
Nortriptyline	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
o-Cresol	o-Cresol, p-Cresol and Phenol in Urine	41000	103	104
Olanzapine	Olanzapine and Desmethylolanzapine in Serum/Plasma	26000	152	153
Oxcarbazepine (syn. oxcarbamazepine)	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
Oxazepam	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
p-Cresol	o-Cresol, p-Cresol and Phenol in Urine	41000	103	104
Pentacarboxyporphyrin	Porphyrins in Urine	44000	91	92
Pentasialotransferrin	CDT in Serum Standard Method	54020, 54030	117	121
	One Step CDT in Serum, Fast Elution with Pre-mixed Tubes	54930/500	118, 119	121
	Automated CDT in Serum using 96 Well Filter Plates	54730/F	120	121
Perazine	–	–	–	155
Phenobarbital	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
Phenol	o-Cresol, p-Cresol and Phenol in Urine	41000	103	104
Phenylglyoxylic acid	Hippuric Acid, Methylhippuric Acids, Mandelic Acid and Phenylglyoxylic Acid in Urine	43000	100	101
Phenytoin	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
Piperacillin	Antibiotics in Serum/Plasma	61000	125	126, 127
PLP (pyridoxal-5´phosphate)	Vitamin B_6 in Plasma/Serum	31000/S	60	61
	Vitamin B_6 in Whole Blood	31000/WB	60	61
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma	52052	63	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma Premix	52052/Premix	64	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma UHPLC	52952/UHPLC	66	69
	Automated Vitamins B_1/B_6 in Whole Blood with HPLC and UHPLC	52752/F, 52952/UHPLC/F	67, 68	69
Porphyrins	Porphyrins in Urine	44000	91	92
Primidone	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
Pyridinoline	Crosslinks in Urine	48000	39	40
Pyridoxal-5´phosphate (PLP)	Vitamin B_6 in Plasma/Serum	31000/S	60	61
	Vitamin B_6 in Whole Blood	31000/WB	60	61
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma	52052	63	69

Parameter	Assay	Kit order no.	Kit page	Controls page
Pyridoxal-5´phosphate (PLP)	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma Premix	52052/Premix	64	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma UHPLC	52952/UHPLC	66	69
	Automated Vitamins B_1/B_6 in Whole Blood with HPLC and UHPLC	52752/F, 52952/UHPLC/F	67, 68	69
Quetiapine	Olanzapine and Desmethylolanzapine in Serum/Plasma	26000	152	153
Retinol (vitamin A)	Vitamins A and E in Serum/Plasma Standard Method	34000	47	52
	One Step Vitamins A and E in Serum/Plasma with Pre-mixed Tubes	34000/Premix	48	52
	Vitamins A and E in Serum/Plasma UHPLC with Pre-mixed Tubes	34900/UHPLC	49	52
	Automated Vitamins A and E in Serum/Plasma with HPLC and UHPLC	34700/F, 34900/F	50, 51	52
Riboflavin (vitamin B_2)	Vitamin B_2 in Whole Blood	37000	57	58
Rufinamide	Rufinamide, Felbamate and Lacosamide in Serum/Plasma	21000	155	156
Serotonin (5-hydroxytryptamine)	Serotonin in Urine	4000	25	16
	Serotonin in Serum/Plasma/Whole Blood	3030	26	18
Sulbactam	Antibiotics in Serum/Plasma	61000	125	126, 127
Sultiame	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
t,t-Muconic acid	t,t-Muconic Acid in Urine	47000	106	107
Tazobactam	Antibiotics in Serum/Plasma	61000	125	126, 127
Temazepam	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Tetrasialotransferrin	CDT in Serum Standard Method	54020, 54030	117	121
	One Step CDT in Serum, Fast Elution with Pre-mixed Tubes	54930/500	118, 119	121
	Automated CDT in Serum using 96 Well Filter Plates	54730/F	120	121
Tetrazepam	Extended Benzodiazepines in Serum/Plasma	59000	142	143, 144
Thiamine diphosphate (TPP)	see thiamine pyrophosphate	–	–	–
Thiamine pyrophospate (TPP)	Vitamin B_1 in Whole Blood	35000	54	55
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma	52052	63	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma Premix	52052/Premix	64	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma UHPLC	52952/UHPLC	66	69
	Automated Vitamins B_1/B_6 in Whole Blood with HPLC and UHPLC	52752/F, 52952/UHPLC/F	67, 68	69
Tocopherol (a-tocopherol)	Vitamins A and E in Serum/Plasma Standard Method	34000	47	52
	One Step Vitamins A and E in Serum/Plasma with Pre-mixed Tubes	34000/Premix	48	52
	Vitamins A and E in Serum/Plasma UHPLC with Pre-mixed Tubes	34900/UHPLC	49	52
	Automated Vitamins A and E in Serum/Plasma with HPLC and UHPLC	34700/F, 34900/F	50, 51	52
Trazodone	–	–	–	140, 144
TPP (thiamine pyrophospate)	Vitamin B_1 in Whole Blood	35000	54	55
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma	52052	63	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma Premix	52052/Premix	64	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma UHPLC	52952/UHPLC	66	69
	Automated Vitamins B_1/B_6 in Whole Blood with HPLC and UHPLC	52752/F, 52952/UHPLC/F	67, 68	69
Trileptal®	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135
Trimipramine	Benzodiazepines and Tricyclic Antidepressants (TCA) in Serum/Plasma	49000	137, 138	139, 140
Trisialotransferrin	CDT in Serum Standard Method	54020, 54030	117	121
	One Step CDT in Serum, Fast Elution with Pre-mixed Tubes	54930/500	118, 119	121
	Automated CDT in Serum using 96 Well Filter Plates	54730/F	120	121
Ubiquinone	Coenzyme Q10 in Serum/Plasma/Whole Blood	68000	76	77
Uroporphyrin	Porphyrins in Urine	44000	91	92
Vanillylmandelic acid (VMA)	VMA, HVA, 5-HIAA in Urine	1000/B	28	16
Vitamin A (retinol)	Vitamins A and E in Serum/Plasma Standard Method	34000	47	52
	One Step Vitamins A and E in Serum/Plasma with Pre-mixed Tubes	34000/Premix	48	52

Parameter	Assay	Kit order no.	Kit page	Controls page
Vitamin A (retinol)	Vitamins A and E in Serum/Plasma UHPLC with Pre-mixed Tubes	34900/UHPLC	49	52
	Automated Vitamins A and E in Serum/Plasma with HPLC and UHPLC	34700/F, 34900/F	50, 51	52
Vitamin B_1 (TPP)	Vitamin B_1 in Whole Blood	35000	54	55
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma	52052	63	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma Premix	52052/Premix	64	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma UHPLC	52952/UHPLC	66	69
	Automated Vitamins B_1/B_6 in Whole Blood with HPLC and UHPLC	52752/F, 52952/UHPLC/F	67, 68	69
Vitamin B_2 (riboflavin)	Vitamin B_2 in Whole Blood	37000	57	58
Vitamin B_6 (PLP)	Vitamin B_6 in Plasma/Serum	31000/S	60	61
	Vitamin B_6 in Whole Blood	31000/WB	60	61
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma	52052	63	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma Premix	52052/Premix	64	69
	Vitamin B_1 in Whole Blood and Vitamin B_6 in Whole Blood/Plasma UHPLC	52952/UHPLC	66	69
	Automated Vitamins B_1/B_6 in Whole Blood with HPLC and UHPLC	52752/F, 52952/UHPLC/F	67, 68	69
Vitamin C (ascorbic acid)	Vitamin C in Plasma/Serum	65065	85	87
	Automated Vitamin C in Plasma/Serum	65765/F	86	87
Vitamin D_2	25-OH-Vitamin D_3/D_2 in Serum/Plasma Standard Method	38038	35	37
	25-OH-Vitamin D_3/D_2 in Serum/Plasma Online Method	38900/1000	36	37
Vitamin D_3	25-OH-Vitamin D_3/D_2 in Serum/Plasma Standard Method	38038	35	37
	25-OH-Vitamin D_3/D_2 in Serum/Plasma Online Method	38900/1000	36	37
Vitamin E (a-tocopherol)	Vitamins A and E in Serum/Plasma Standard Method	34000	47	52
	One Step Vitamins A and E in Serum/Plasma with Pre-mixed Tubes	34000/Premix	48	52
	Vitamins A and E in Serum/Plasma UHPLC with Pre-mixed Tubes	34900/UHPLC	49	52
	Automated Vitamins A and E in Serum/Plasma with HPLC and UHPLC	34700/F, 34900/F	50, 51	52
VMA (vanillylmandelic acid)	VMA, HVA, 5-HIAA in Urine	1000/B	28	16
Zonisamide	Antiepileptic Drugs in Serum/Plasma, Fast Elution	22000/F	132	134, 135
	Antiepileptic Drugs in Serum/Plasma, High Resolution	22000/HR	132	134, 135

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