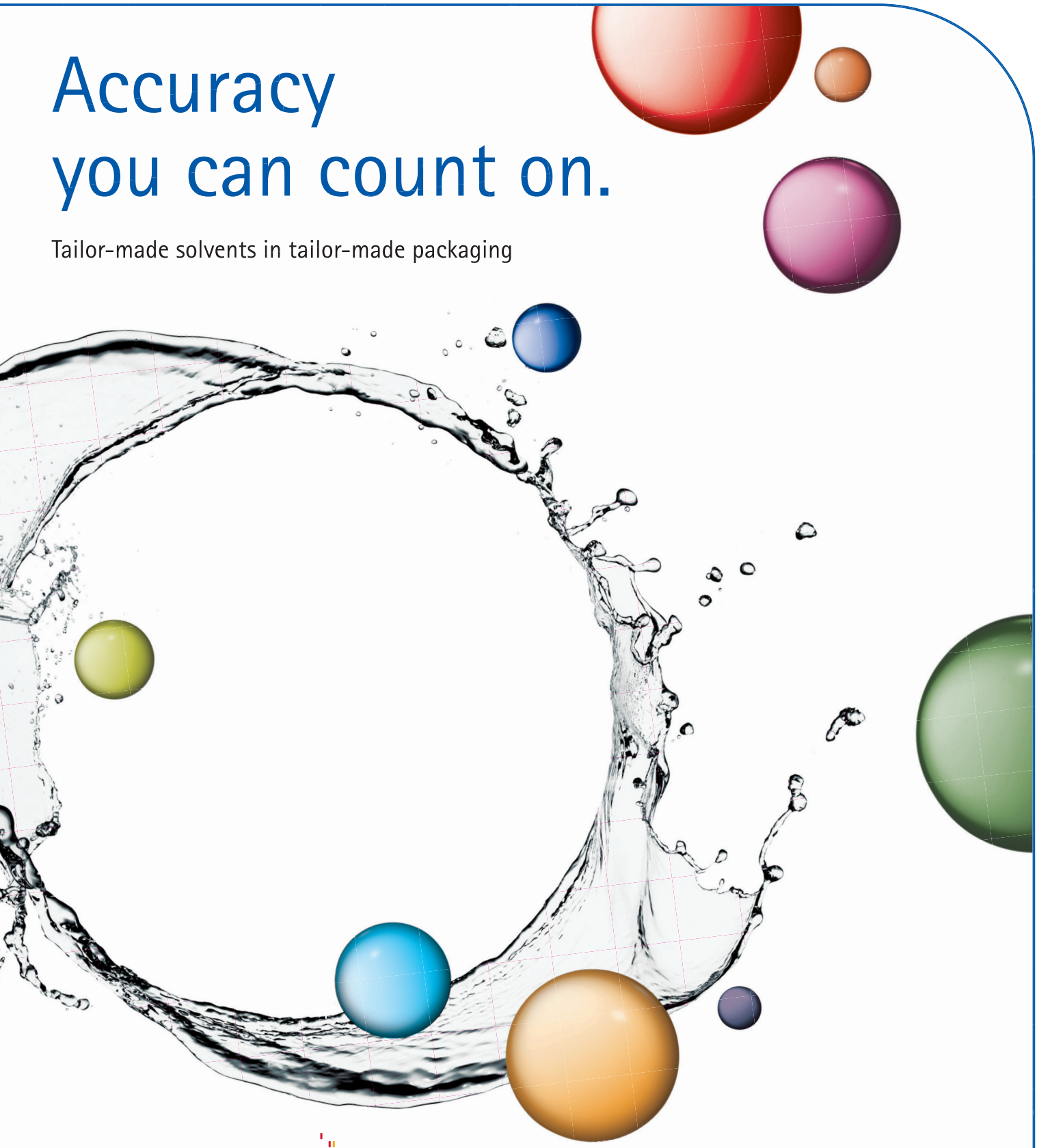
Accuracy you can count on.

Tailor-made solvents in tailor-made packaging



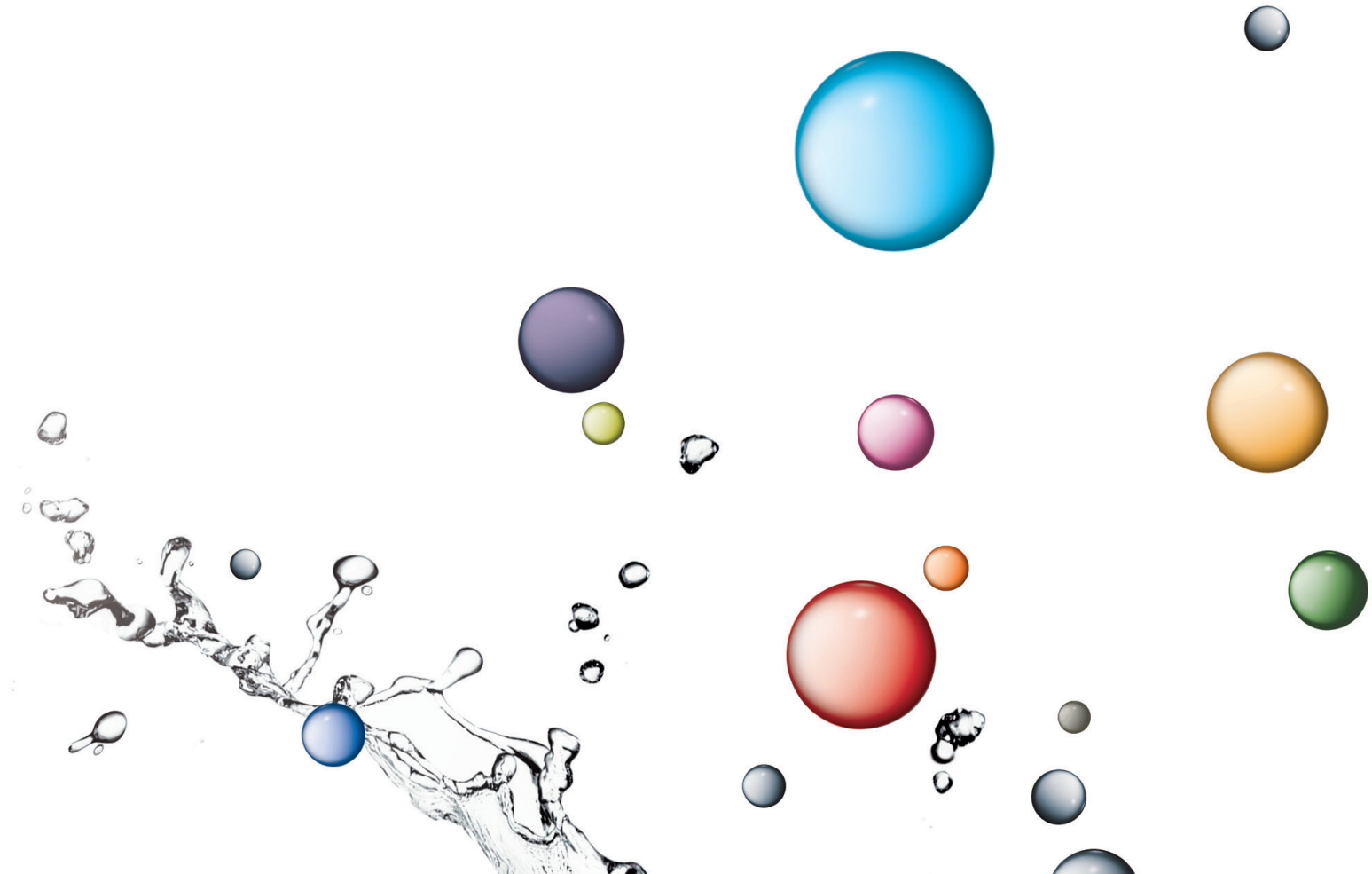
Merck Millipore is a division of MERCK

Tailor-made solvents

For over 150 years, our chemicals have been synonymous with dependable quality. To keep pace with the latest quality requirements, we develop all our products continually and progressively. As a result, they help you solve problems efficiently and economically in the laboratory, pilot plant and production.

As your reliable partner and one-stop supplier, Merck Millipore offers a comprehensive range of quality products and services. To make them better still, we listen carefully to our customers worldwide – then integrate the ideas, suggestions and feedback you provide. Building on this unique partnership of trust, we are already developing the products and services you will need tomorrow.

Merck Millipore protects you and the environment with solutions that stand for high quality and high safety; with products, packaging and extensive documentation, too. You benefit from the synergies when products and packaging match perfectly. That way, you are always well provided for.



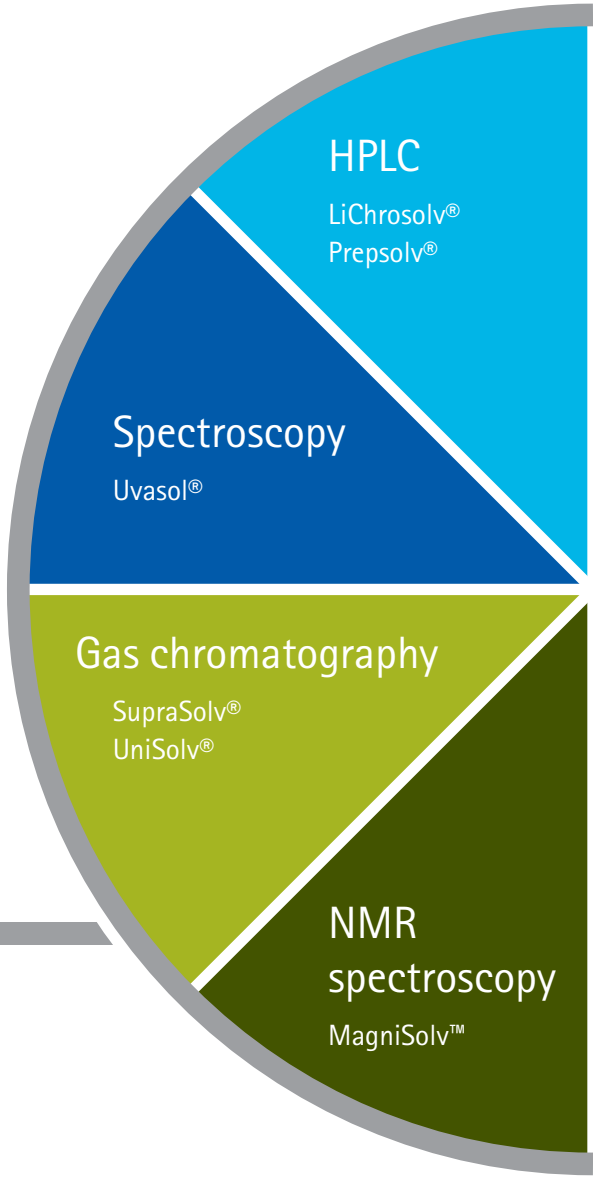
Instrumental analysis

HPLC
High performance liquid chromatography

Spectroscopy
IR, UV & fluorescence spectroscopy

Gas chromatography
Organic trace analysis

NMR
Nuclear magnetic resonance spectroscopy



Packaging and withdrawal systems

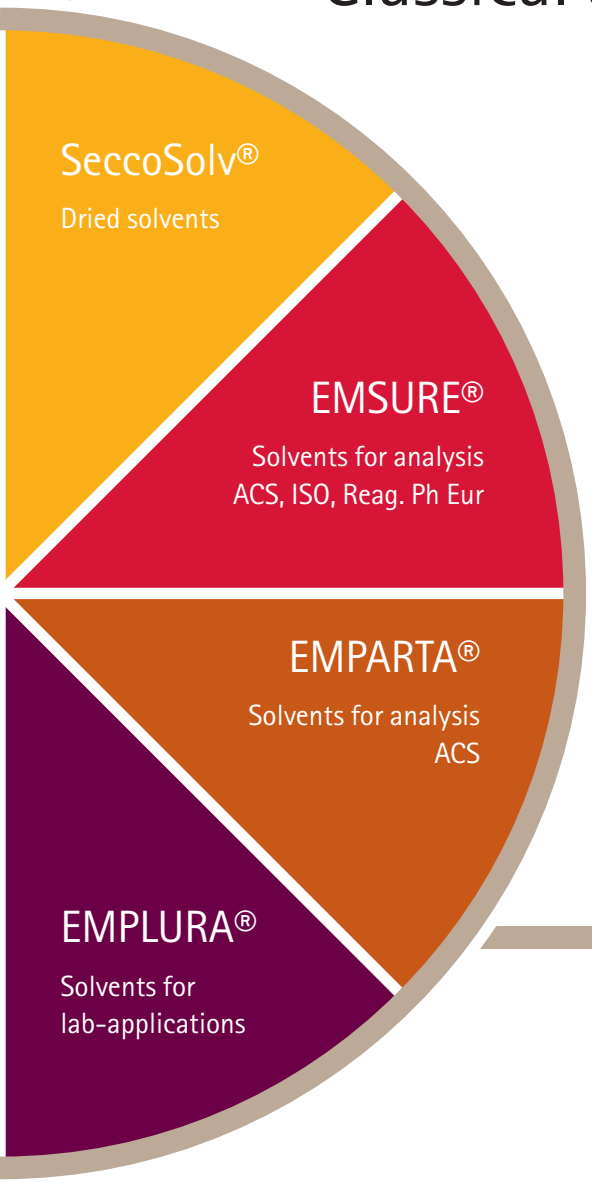
- Glass bottles
- Aluminum bottles
- Septum seal bottles
- Stainless steel barrels
- Barrels and containers
- Withdrawal systems and safety accessories

NEW

DNA-/RNA synthesis

Merck Millipore has now started to provide DNA-/RNA synthesis reagents worldwide

Classical analysis and synthesis



SeccoSolv®
DNA-/RNA-synthesis, peptide and organic synthesis

EMSURE®
Regulated and highly demanding lab applications

EMPARTA®
Classical analytical lab applications

EMPLURA®
Production, preparative laboratory work and cleaning purposes

Packaging and withdrawal systems

- Glass bottles
- HDPE bottles
- Septum seal bottles
- Stainless steel drums
- Barrels and containers
- Withdrawal systems and safety accessories

www.merckmillipore.com/solvents

Instrumental analysis

NEW

Classical analysis and synthesis

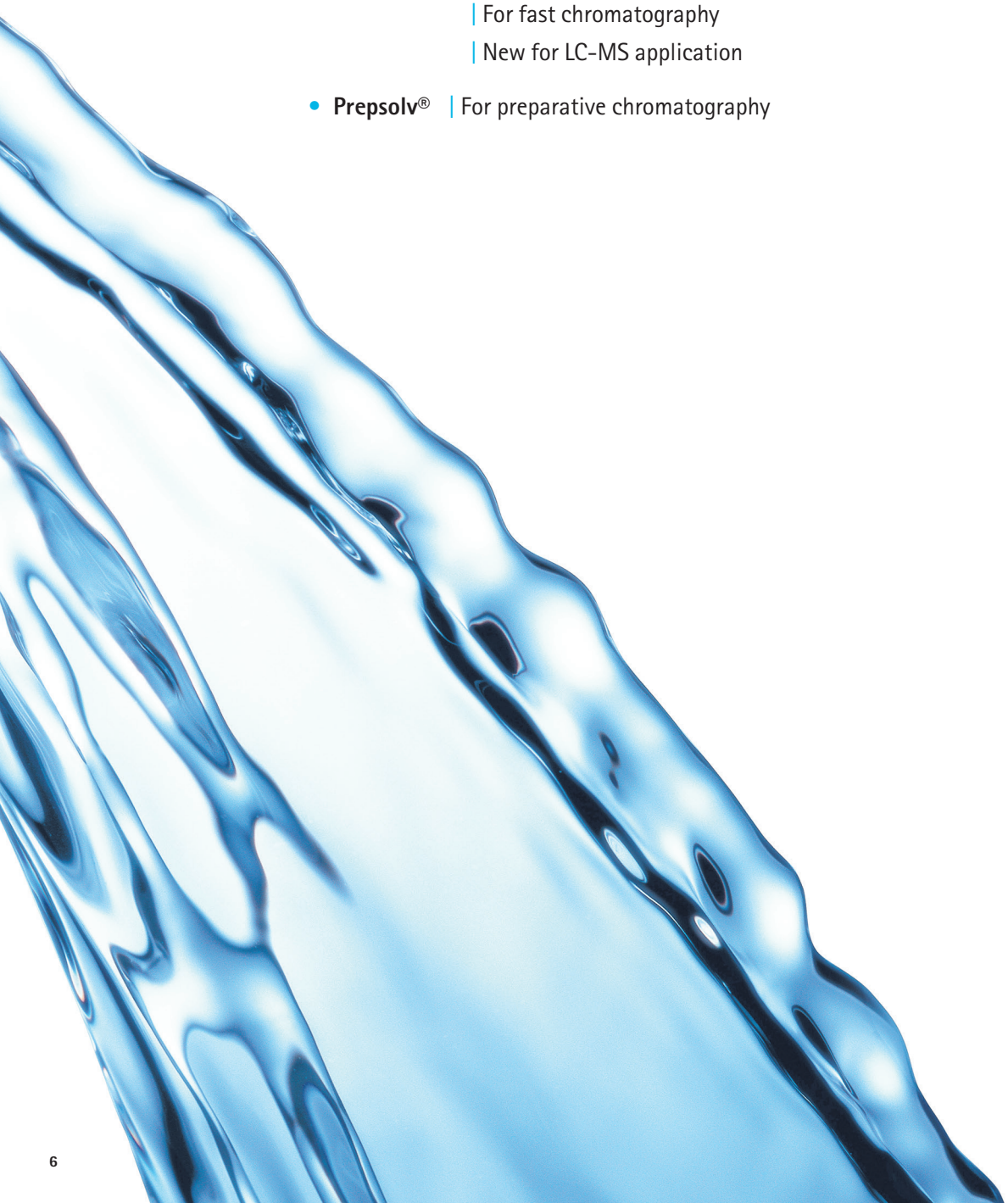
HPLC High performance liquid chromatography

LiChrosolv® | Prepsolv®

HPLC is now a key technique in research and development, pharmaceutical quality control and environmental analysis. Due to the various tasks involved, high-performance solvents are a must.

Merck Millipore offers:

- **LiChrosolv®** | For analytical HPLC
  | For fast chromatography
  | New for LC-MS application
- **Prepsolv®** | For preparative chromatography



Isocratic and gradient elution

With their high degree of UV transmittance, low particle count, low acidity and alkalinity and low evaporation residue level, **LiChrosolv®** solvents are ideal for reproducible separations. They are produced from specially selected raw materials, and undergo a number of purification steps prior to final packaging. Since separations are normally carried out under gradient conditions in analytical HPLC, we offer solvents in 'gradient grade' as well as 'isocratic grade'. This enables you to minimize the gradient effect of the solvent involved – for example in enantiomeric separations on chiral phases.

Preparative chromatography

Prepsolv® solvents are tailored to the requirements of preparative HPLC to facilitate scale-up from analytical to preparative separations. With their extremely low evaporation residue (< 1 mg/l) and low water content, they ensure optimal protection for columns. In preparative chromatography installations that use significant quantities of high quality solvents, optimum separation results depend on solvents being delivered and used correctly; this is why Merck Millipore packs all solvents under inert gas.

Fast chromatography / LC-MS detection

With their ultra low detection limits, these techniques are becoming increasingly popular in pharmaceutical and biotechnical industries. Merck Millipore presents a new generation of LC-MS **LiChrosolv® hypergrade** which meets all the requirements of LC-MS ionization methods (ESI/APCI positive and negative mode) for best quantitative results in triple quadrupole performance. Thanks to its low level of ionic background and ion suppression, this quality ensures high ionization efficiency. The packaging material has been improved to meet LS-MS quality requirements perfectly. A new standard for the unlimited application of high performance chromatography has been set.

Your benefits

LiChrosolv®

- High quality gains time, gives trust
- Documented as being suitable for UV, fluorescence and mass detection
- Optimized peak baseline separation
- High resolution and sensitivity in LC-MS
- Interference free baseline for better reproducibility

Prepsolv®

- High quality reputations
- Best reproducibility of final results
- High flexibility in packsize and supply concepts

HPLC

LiChrosolv® | Prepsolv®

HPLC packaging

Merck Millipore provides all relevant solvents for large-scale application in returnable stainless steel barrels preferentially in 30 l and 185 l or 400 l, 1,000 l and 1,400 l stainless steel containers. This helps to improve profitability and reduces packaging waste. The packaging is definitely inert to the chemical contents, strong for repeated transport and are provided complete with two types of opening for versatility of connection. The extensive range of withdrawal systems ensure that the solvents can always be safely and easily used without any risk of contamination. If desired Merck Millipore will supply tailor-made volumes and concepts to fit the need of the individual customer. Ask Merck Millipore first.

▶ **Additional information is available in the chapter: Packaging and withdrawal systems (see page 40)**

Ordering information
LiChrosolv® A-B

	Product	Purity (GC) min. [%]	Evap. residue max. [mg/l]	Water max. [%]	Acidity max. [meq/g]	Alkalinity max. [meq/g]	UV-transmission at [nm]	Content / Packaging	Ord. No.
A	**Acetone**	99.8	2	0.05	0.0002	0.0002	335 (50 %), 340 (80 %), 350 (98 %)	1 l GL	**1.00020.1000**
								2.5 l GL	**1.00020.2500**
								4 l GL	**1.00020.4000**
				Details see page 18				5 l AL	**1.00020.5000**
								10 l ST	**1.00020.9010**
	Acetonitrile hypergrade, LC-MS suitability	99.9	1	0.01	0.0001	0.0002	191 (25 %), 195 (85 %), 200 (96 %), 215 (98 %), 230 (99 %)	1 l GL	**1.00029.1000 ***
								2.5 l GL	**1.00029.2500 ***
				Details see page 15				10 l ST	**1.00029.9010**
								30 l ST	**1.00029.9030**
	Acetonitrile gradient grade, UPLC | UHPLC suitability. Reag. Ph Eur, ACS conform	99.9	2	0.02	0.0002	0.0002	193 (60 %), 195 (80 %), 230 (98 %)	1 l GL	**1.00030.1000**
								2.5 l GL	**1.00030.2500**
								4 l GL	**1.00030.4000**
				Details see page 11, 15 and 18				5 l AL	**1.00030.5000**
								10 l ST	**1.00030.9010**
								30 l ST	**1.00030.9030**
								185 l ST	**1.00030.9185**
	Acetonitrile isocratic grade	99.8	4	0.05	0.0005	0.0002	195 (70 %), 200 (90 %), 240 (98 %)	1 l GL	**1.14291.1000**
								2.5 l GL	**1.14291.2500**
								4 l GL	**1.14291.4000**
								5 l AL	**1.14291.5000**
								10 l ST	**1.14291.9010**
								30 l ST	**1.14291.9030**
								185 l ST	**1.14291.9185**
B	**1-Butanol**	99.8	2	0.05	0.0002	0.0002	230 (75 %), 240 (85 %), 310 (99 %)	1 l GL	**1.01988.1000**
				Details see page 18				2.5 l GL	**1.01988.2500**

New extended specification NEW

All solvents are filtered through 0.2 µm. | GL = glass bottle | AL = aluminum bottle | ST = stainless steel returnable barrel | * = special treated amber glass bottle

Ordering information
LiChrosolv® B-H

	Product	Purity (GC) min. [%]	Evap. residue max. [mg/l]	Water max. [%]	Acidity max. [meq/g]	Alkalinity max. [meq/g]	UV-transmission at [nm]	Content / Packaging	Ord. No.
B	tert-Butyl methyl ether	99.8	2	0.02	0.0002	0.0002	240 (60 %), 255 (85 %), 280 (98 %)	1 l GL	1.01845.1000
								2.5 l GL	1.01845.2500
				Details see page 18				10 l ST	1.01845.9010
								30 l ST	1.01845.9030
								185 l ST	1.01845.9185
C	1-Chlorobutane	99.8	2	0.01	0.0002	0.0002	227 (60 %), 232 (80 %), 250 (98 %)	1 l GL	1.01692.1000
				Details see page 18					
	Chloroform stabilized with 2-methyl-2-butene and methanol	99.8	5	0.01	0.0002	0.0002	255 (70 %), 260 (85 %), 300 (98 %)	1 l GL	1.02444.1000
								2.5 l GL	1.02444.2500
				Details see page 18				4 l GL	1.02444.4000
								10 l ST	1.02444.9010
	Cyclohexane	99.9	2	0.01	0.0002	0.0002	230 (75 %), 240 (90 %), 260 (99 %)	1 l GL	1.02827.1000
				Details see page 18				2.5 l GL	1.02827.2500
D	1,2-Dichloro-ethane	99.8	2	0.02	0.0002	0.0002	240 (85 %), 245 (90 %), 270 (99 %)	1 l GL	1.13713.1000
				Details see page 18					
	Dichloro-methane stabilized	99.9	5	0.01	0.0002	0.0002	240 (70 %), 245 (90 %), 260 (99 %)	1 l GL	1.06044.1000
								2.5 l GL	1.06044.2500
								4 l GL	1.06044.4000
				Details see page 18				10 l ST	1.06044.9010
								30 l ST	1.06044.9030
	1,4-Dioxane	99.8	2	0.02	0.0002	0.0002	245 (50 %), 270 (80 %), 300 (98 %)	1 l GL	1.03132.1000
				Details see page 18				2.5 l GL	1.03132.2500
E	Ethanol gradient grade, UPLC | UHPLC suitability	99.9	2	0.1	0.0002	0.0002	225 (60 %), 240 (85 %), 260 (98 %)	1 l GL	1.11727.1000
								2.5 l GL	1.11727.2500
								4 l GL	1.11727.4000
				Details see page 11 and 18				30 l ST	1.11727.9030
								185 l ST	1.11727.9185
	Ethyl acetate	99.8	2	0.05	0.0002	0.0002	260 (50 %), 265 (80 %), 270 (98 %)	1 l GL	1.00868.1000
								2.5 l GL	1.00868.2500
				Details see page 18				4 l GL	1.00868.4000
								10 l ST	1.00868.9010
H	n-Heptane	99.3	2	0.005	0.0002	0.0002	210 (50 %), 220 (80 %), 245 (98 %)	1 l GL	1.04390.1000
								2.5 l GL	1.04390.2500
				Details see page 18				10 l ST	1.04390.9010
								30 l ST	1.04390.9030
								185 l ST	1.04390.9185
	n-Hexane	98.0	1	0.01	0.0002	0.0002	210 (50 %), 220 (85 %), 245 (98 %)	1 l GL	1.04391.1000
								2.5 l GL	1.04391.2500
								4 l GL	1.04391.4000
				Details see page 18				5 l AL	1.04391.5000
								10 l ST	1.04391.9010
								30 l ST	1.04391.9030
								185 l ST	1.04391.9185

All solvents are filtered through 0.2 µm. | GL = glass bottle | AL = aluminum bottle | ST = stainless steel returnable barrel

Ordering information
LiChrosolv® I-Z

	Product	Purity (GC) min. [%]	Evap. residue max. [mg/l]	Water max. [%]	Acidity max. [meq/g]	Alkalinity max. [meq/g]	UV-transmission at [nm]	Content / Packaging	Ord. No.
I	Isohexane (C_6H_{14} Isomere)	99.0	2	0.005	0.0002	0.0002	210 (60 %), 220 (80 %), 245 (98 %)	2.5 l GL	**1.04335.2500**
				Details see page 18					
	Isooctane	99.0	2	0.01	0.0002	0.0002	210 (50 %), 220 (80 %), 245 (98 %)	1 l GL	**1.04717.1000**
				Details see page 18				2.5 l GL	**1.04717.2500**
M	Methanol hypergrade, LC-MS suitability	99.9	1	0.01	0.0002	0.0002	210 (35 %), 220 (60 %), 230 (75 %), 260 (98 %)	1 l GL	**1.06035.1000 ***
								2.5 l GL	**1.06035.2500 ***
	Methanol gradient grade, UPLC | UHPLC suitability. Reag. Ph Eur, ACS conform	99.9	2	0.02	0.0002	0.0002	210 (20 %), 220 (60 %), 230 (75 %), 235 (83 %), 250 (95 %), 260 (98 %)	1 l GL	**1.06007.1000**
								2.5 l GL	**1.06007.2500**
								4 l GL	**1.06007.4000**
				Details see page 11 and 18				5 l AL	**1.06007.5000**
								10 l ST	**1.06007.9010**
								30 l ST	**1.06007.9030**
								185 l ST	**1.06007.9185**
	Methanol isocratic grade	99.8	3	0.03	0.0002	0.0002	225 (50 %), 240 (80 %), 265 (98 %)	1 l GL	**1.06018.1000**
								2.5 l GL	**1.06018.2500**
								4 l GL	**1.06018.4000**
								5 l AL	**1.06018.5000**
								10 l ST	**1.06018.9010**
								30 l ST	**1.06018.9030**
								185 l ST	**1.06018.9185**
P	1-Propanol	99.8	2	0.02	0.0002	0.0002	230 (70 %), 240 (80 %), 270 (98 %)	1 l GL	**1.01024.1000**
								2.5 l GL	**1.01024.2500**
								NEW 4 l GL	**1.01024.4000**
	2-Propanol gradient grade, UPLC | UHPLC suitability	99.9	2	0.05	0.0002	0.0002	220 (80 %), 230 (90 %), 250 (99 %)	1 l GL	**1.01040.1000**
								2.5 l GL	**1.01040.2500**
								4 l GL	**1.01040.4000**
				Details see page 11 and 18				5 l AL	**1.01040.5000**
								10 l ST	**1.01040.9010**
								30 l ST	**1.01040.9030**
T	Tetrahydro-furan not stabilized	99.9	1	0.02	0.0002	0.0002	218 (30 %), 230 (35 %), 250 (65 %), 280 (95 %)	1 l GL	**1.08101.1000**
								2.5 l GL	**1.08101.2500**
				Details see page 18				4 l GL	**1.08101.4000**
								10 l ST	**1.08101.9010**
								30 l ST	**1.08101.9030**
	Toluene	99.9	2	0.05	0.0002	0.0006	300 (70 %), 310 (80 %), 350 (98 %)	1 l GL	**1.08327.1000**
				Details see page 18				2.5 l GL	**1.08327.2500**
								4 l GL	**1.08327.4000**
W	Water gradient grade, LC-MS and UPLC | UHPLC suitability	–	5	–	–	–	–	1 l GL	**1.15333.1000 ***
								2.5 l GL	**1.15333.2500 ***
				Details see page 11, 16 and 18				NEW 4 l GL	**1.15333.4000 ***
								10 l ST	**1.15333.9010**
								30 l ST	**1.15333.9030**

New extended specification NEW

New for LC-MS application NEW

All solvents are filtered through 0.2 µm. | GL = glass bottle | AL = aluminum bottle | ST = stainless steel returnable barrel | * = special treated amber glass bottle

Detailed information

LiChrosolv® gradient grade | For UPLC and UHPLC

	Product	Evap. residue max. [mg/l]	Gradient max. [mAU] at 210 nm	235 nm	254 nm	Fluorescence[1] max. [ppb] at 254 nm	365 nm	Content / Packaging	Ord. No.
A	Acetonitrile gradient grade UPLC | UHPLC suitability. Reag. Ph Eur, ACS conform	2	1.0	–	0.5	1.0	0.5	1 l GL	1.00030.1000
								2.5 l GL	1.00030.2500
								4 l GL	1.00030.4000
								5 l AL	1.00030.5000
								10 l ST	1.00030.9010
								30 l ST	1.00030.9030
								185 l ST	1.00030.9185
E	Ethanol gradient grade UPLC | UHPLC suitability	2	–	5.0	2.0	–	–	1 l GL	1.11727.1000
								2.5 l GL	1.11727.2500
								4 l GL	1.11727.4000
								30 l ST	1.11727.9030
								185 l ST	1.11727.9185
M	Methanol gradient grade UPLC | UHPLC suitability. Reag. Ph Eur, ACS conform	2	–	2.0	1.0	1.0	0.5	1 l GL	1.06007.1000
								2.5 l GL	1.06007.2500
								4 l GL	1.06007.4000
								5 l AL	1.06007.5000
								10 l ST	1.06007.9010
								30 l ST	1.06007.9030
								185 l ST	1.06007.9185
P	2-Propanol gradient grade UPLC | UHPLC suitability	2	–	1.0	1.0	–	–	1 l GL	1.01040.1000
								2.5 l GL	1.01040.2500
								4 l GL NEW	1.01040.4000
								5 l AL NEW	1.01040.5000
								10 l ST NEW	1.01040.9010
								30 l ST NEW	1.01040.9030
W	Water for chromatography LC-MS and UPLC | UHPLC suitability	5	5.0	–	0.5	1.0	0.5	1 l GL	1.15333.1000 *
								2.5 l GL	1.15333.2500 *
								4 l GL	1.15333.4000 *
								10 l ST	1.15333.9010
								30 l ST	1.15333.9030

New for LC-MS application NEW

All solvents are filtered through 0.2 µm. | 1 = calculated as Quinine in 0.05 mol/l H_2SO_4 | GL = glass bottle | AL = aluminum bottle | ST = stainless steel returnable barrel | * = special treated amber glass bottle

Ordering information
Ready to use | Blends

	Product	Assay TFA [%]	Assay ACN [%]	Assay H_2O [%]	Content / Packaging	Ord. No.
A	**Acetonitrile + 0.05 % Acetic acid (v/v) hypergrade, LC-MS suitability**				2.5 l GL	**1.59006.2500**
NEW					4 l GL	**1.59006.4000**
NEW	**Acetonitrile + 0.05 % Formic acid (v/v) hypergrade, LC-MS suitability**				2.5 l GL	**1.59003.2500**
					4 l GL	**1.59003.4000**
	Acetonitrile + 0.05 % Trifluoroacetic acid (v/v) hypergrade, LC-MS suitability	0.045 - 0.055			2.5 l GL	**4.80672.2500**
NEW	**Acetonitrile + 0.1 % Acetic acid (v/v) hypergrade, LC-MS suitability**				2.5 l GL	**1.59004.2500**
					4 l GL	**1.59004.4000**
NEW	**Acetonitrile + 0.1 % Formic acid (v/v) hypergrade, LC-MS suitability**				1 l GL	**1.59002.1000**
					2.5 l GL	**1.59002.2500**
					4 l GL	**1.59002.4000**
	Acetonitrile + 0.1 % Trifluoroacetic acid (v/v) hypergrade, LC-MS suitability	0.095 - 0.105			2.5 l GL	**4.80448.2500**
NEW					4 l GL	**4.80448.4000**
					30 l ST	**4.80448.9030**
	Acetonitrile + Water 60:40 (v/v)		59.0 - 61.0	39.0 - 41.0	4 l GL	**4.80853.4000**
	Acetonitrile + Water 80:20 (v/v)				2.5 l GL	**4.80159.2500**
M	**Methanol + Water 30:70 (v/v)**				30 l ST	**4.80508.9030**
W	**Water + 0.05 % Acetic acid (v/v) hypergrade, LC-MS suitability**				2.5 l GL	**1.59008.2500**
NEW					4 l GL	**1.59008.4000**
	Water + 0.05 % Trifluoroacetic acid (v/v) hypergrade, LC-MS suitability	0.045 - 0.055			2.5 l GL	**4.80170.2500**
NEW					4 l GL	**4.80170.4000**
NEW	**Water + 0.1 % Acetic acid (v/v) hypergrade, LC-MS suitability**				2.5 l GL	**1.59007.2500**
					4 l GL	**1.59007.4000**
NEW	**Water + 0.1 % Formic acid (v/v) hypergrade, LC-MS suitability**				4 l GL	**1.59013.4000**
	Water + 0.1 % Trifluoroacetic acid (v/v) hypergrade, LC-MS suitability	0.095 - 0.105			2.5 l GL	**4.80112.2500**
NEW					4 l GL	**4.80112.4000**
					30 l ST	**4.80112.9030**

GL = glass bottle | ST = stainless steel returnable barrel

Detailed information
LiChrosolv®

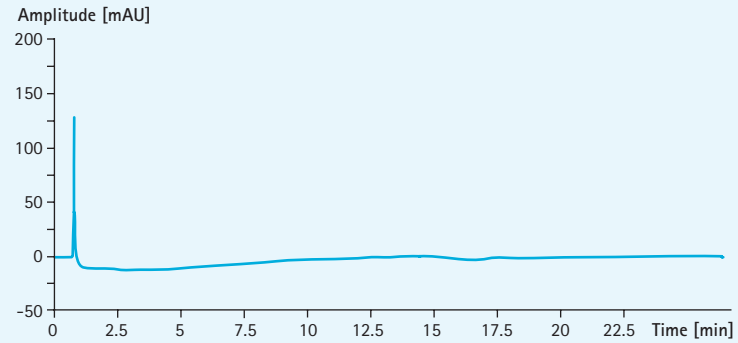


Fig. 1 *Batch chromatogram (gradient profile) of LiChrosolv® Acetonitrile gradient grade (100030).*

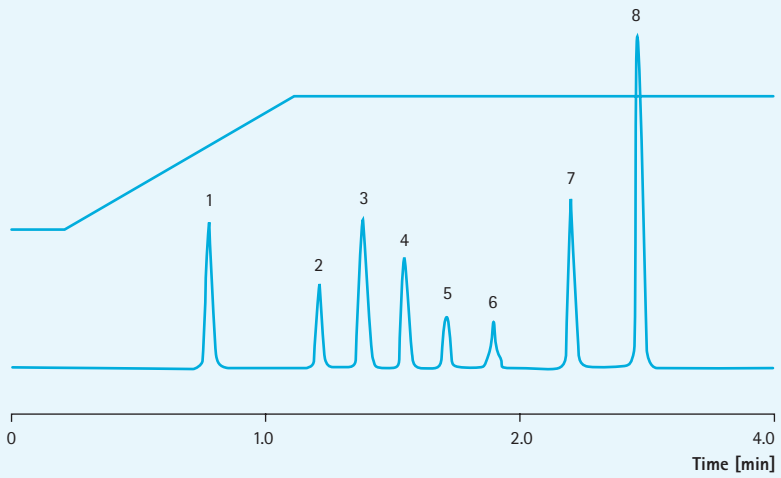


Fig. 2a *Optimized peak baseline separation. Interfering free baseline.*

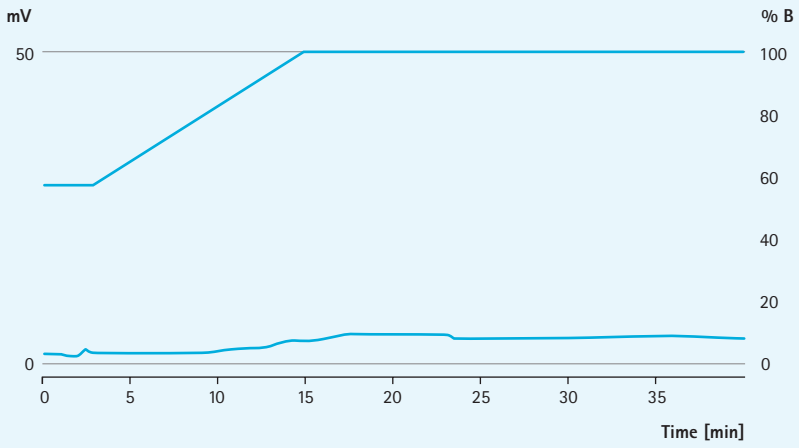


Fig. 2b *Blank value of Acetonitrile LiChrosolv® hypergrade in PAH determination according to EPA 610.*

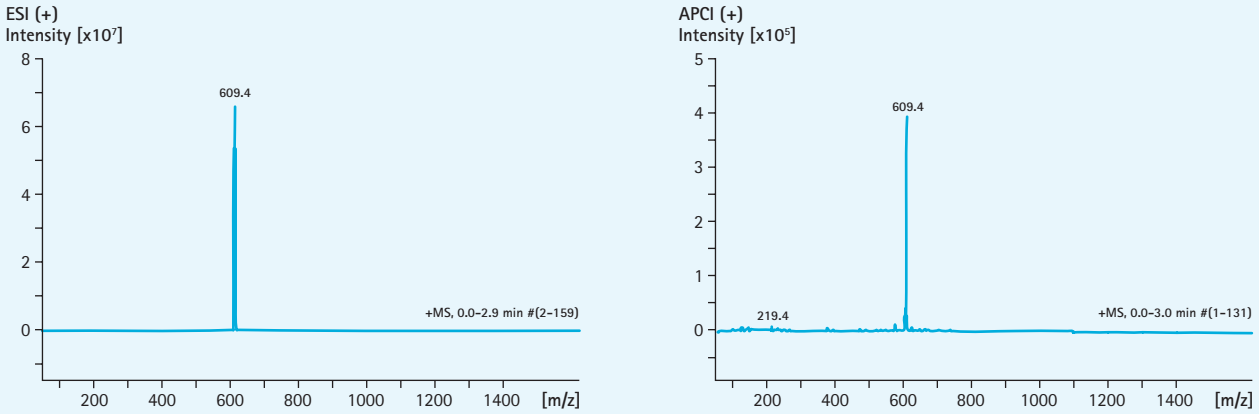


Fig. 3 *Mass spectrum of LiChrosolv® Acetonitrile hypergrade (100029). Mobile phase Acetonitrile special LC-MS grade. Intensity of single background mass peak based on reserpine standard (m/z 609.4) in e.g. ESI (+) and APCI (+) mode.*

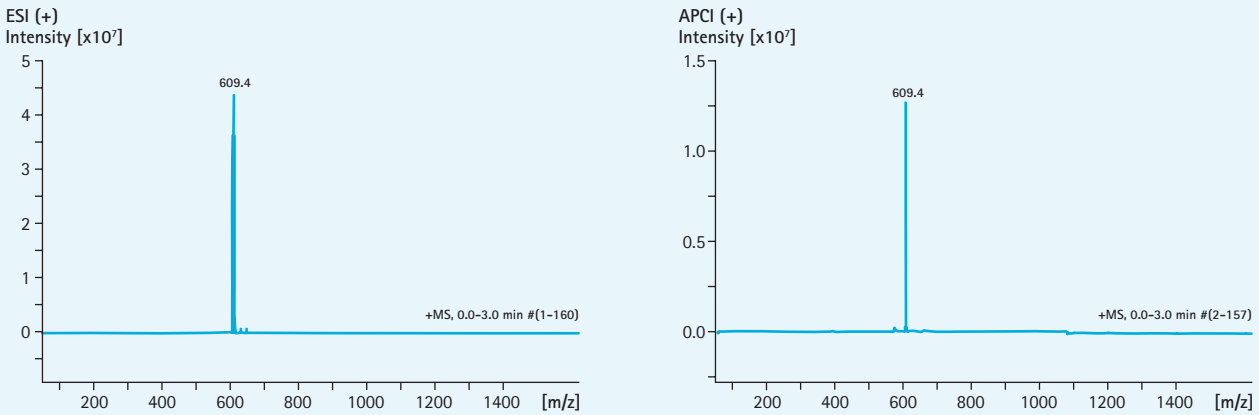


Fig. 4 *Mass spectrum of LiChrosolv® Methanol hypergrade (106035). Mobile phase Methanol special LC-MS grade. Intensity of single background mass peak based on reserpine standard (m/z 609.4) in e.g. ESI (+) and APCI (+) mode.*

Detailed information

LiChrosolv® hypergrade | NEW for LC-MS method ESI (+)(-) and APCI (+)(-)

Acetonitrile hypergrade LC-MS suitability	Cat. No. 100029 Spec. values
Purity (GC)	≥ 99.9 %
Identity (IR)	conforms
Residue on evaporation	≤ 1.0 mg/l
Water	≤ 0.01 %
Color	≤ 10 Hazen
Acidity	≤ 0.0001 meq/g
Alkalinity	≤ 0.0002 meq/g
NEW Al (Aluminum) *	≤ 10 ppb
Ca (Calcium) *	≤ 10 ppb
Fe (Iron) *	≤ 10 ppb
Mg (Magnesium) *	≤ 10 ppb
Na (Sodium) *	≤ 50 ppb
K (Potassium) *	≤ 5 ppb
Every other single metal (ICP-MS) *	≤ 5 ppb
Gradient grade	
at 210 nm	≤ 0.8 mAU
at 254 nm	≤ 0.3 mAU
Fluorescence	
as quinine at 254 nm	≤ 1 ppb
as quinine at 365 nm	≤ 0.5 ppb
Transmission	
at 191 nm	≥ 25 %
at 195 nm	≥ 85 %
at 200 nm	≥ 96 %
at 215 nm	≥ 98 %
from 230 nm	≥ 99 %
Suitability for PAH analysis (HPLC fluorescence-detection)	conforms
At an excitation between 240 and 600 nm (with t Δλ = 10 nm) the emission intensity in the range of 250 - 700 nm is smaller then the following standards: Chinin-Standard (1 ng/ml; 0.05 mol/l H_2SO_4), PAH Standard (1:100,000, Acetonitrile; NIST SRM 1647B)	
Suitability for pesticide analysis (HPLC UV-detection)	conforms
Suitability for LC-MS (tested with ion trap MS); Intensity of background mass peak based on reserpine:	
Mode: ESI 200 µl pos | APCI 200 µl pos	≤ 2 ppb
Mode: ESI 200 µl neg | APCI 200 µl neg	≤ 20 ppb

New enhanced specification

Filtered by 0.2 µm stainless steel filter | Suitable for UPLC | UHPLC | Ultra Fast HPLC-instruments | Suitable for Q-TOF LC-MS | * = enhanced specifications

Methanol hypergrade LC-MS suitability	Cat. No. 106035 Spec. values
Purity (GC)	≥ 99.9 %
Identity (IR)	conforms
Residue on evaporation	≤ 1.0 mg/l
Water	≤ 0.01 %
Color	≤ 10 Hazen
Acidity	≤ 0.0002 meq/g
Alkalinity	≤ 0.0002 meq/g
NEW Al (Aluminum) *	≤ 10 ppb
Ca (Calcium) *	≤ 10 ppb
Fe (Iron) *	≤ 10 ppb
Mg (Magnesium) *	≤ 10 ppb
Na (Sodium) *	≤ 100 ppb
K (Potassium) *	≤ 5 ppb
Every other single metal (ICP-MS) *	≤ 5 ppb
Gradient Grade	
at 220 nm	≤ 2.0 mAU
at 235 nm	≤ 1.0 mAU
Fluorescence	
as quinine at 254 nm	≤ 1 ppb
as quinine at 365 nm	≤ 0.5 ppb
Transmission	
at 210 nm	≥ 35 %
at 220 nm	≥ 60 %
at 230 nm	≥ 75 %
from 260 nm	≥ 98 %
Suitability for LC-MS (tested with ion trap MS); Intensity of single background mass peak based on reserpine:	
Mode: ESI 200 µl pos | APCI 200 µl pos	≤ 2 ppb
Mode: ESI 200 µl neg | APCI 200 µl neg	≤ 20 ppb

New enhanced specification

Filtered by 0.2 µm stainless steel filter | Suitable for PAH-analysis | Suitable for UPLC | UHPLC | Ultra Fast HPLC-instruments | * = enhanced specifications

LiChrosolv® Acetonitrile hypergrade for LC-MS suitability in 1 and 2.5 l special treated amber glass bottles.

Detailed information

Water for chromatography | NEW: Now also suitable for LC-MS | UPLC | UHPLC

Water for chromatography [Cat. No. 115333] LC-MS and UPLC | UHPLC suitability	Spec. values		Spec. values
Residue on evaporation	≤ 5 mg/l	Spec. conductance at 25°C (at the time of manufacturing)	≤ 1 µS/cm
TOC (at the time of manufacturing)	≤ 30 ppb	Colony count	≤ 25 CFU/g
Al (Aluminum)	≤ 10 ppb	Fluorescence	
Ca (Calcium)	≤ 100 ppb	as quinine at 254 nm	≤ 1.0 ppb
Fe (Iron)	≤ 5 ppb	as quinine at 365 nm	≤ 0.5 ppb
Mg (Magnesium)	≤ 20 ppb	Gradient grade	
Na (Sodium)	≤ 200 ppb	at 210 nm *	≤ 3.0 mAU
K (Potassium)	≤ 10 ppb	at 254 nm *	≤ 0.5 mAU
Every other single metal (ICP-MS)	≤ 5 ppb	Gradient grade (basic absorption at 210 nm)	≤ 20 mAU
Anions (Ion chromatography):		Suitability for LC-MS (tested with ion trap MS); Intensity of single background mass peak based on reserpine:	
Chloride	≤ 10 ppb	Mode: ESI 200 µl pos | APCI 200 µl pos	≤ 1 ppb
Sulfate	≤ 10 ppb	Mode: ESI 200 µl neg | APCI 200 µl neg	≤ 20 ppb
Nitrate	≤ 10 ppb		
Phosphate	≤ 10 ppb		

Filtered by 0.2 µm stainless steel filter | Suitable for Ultra Fast HPLC-instruments | Suitable for Q-TOF LC-MS | * = enhanced specifications

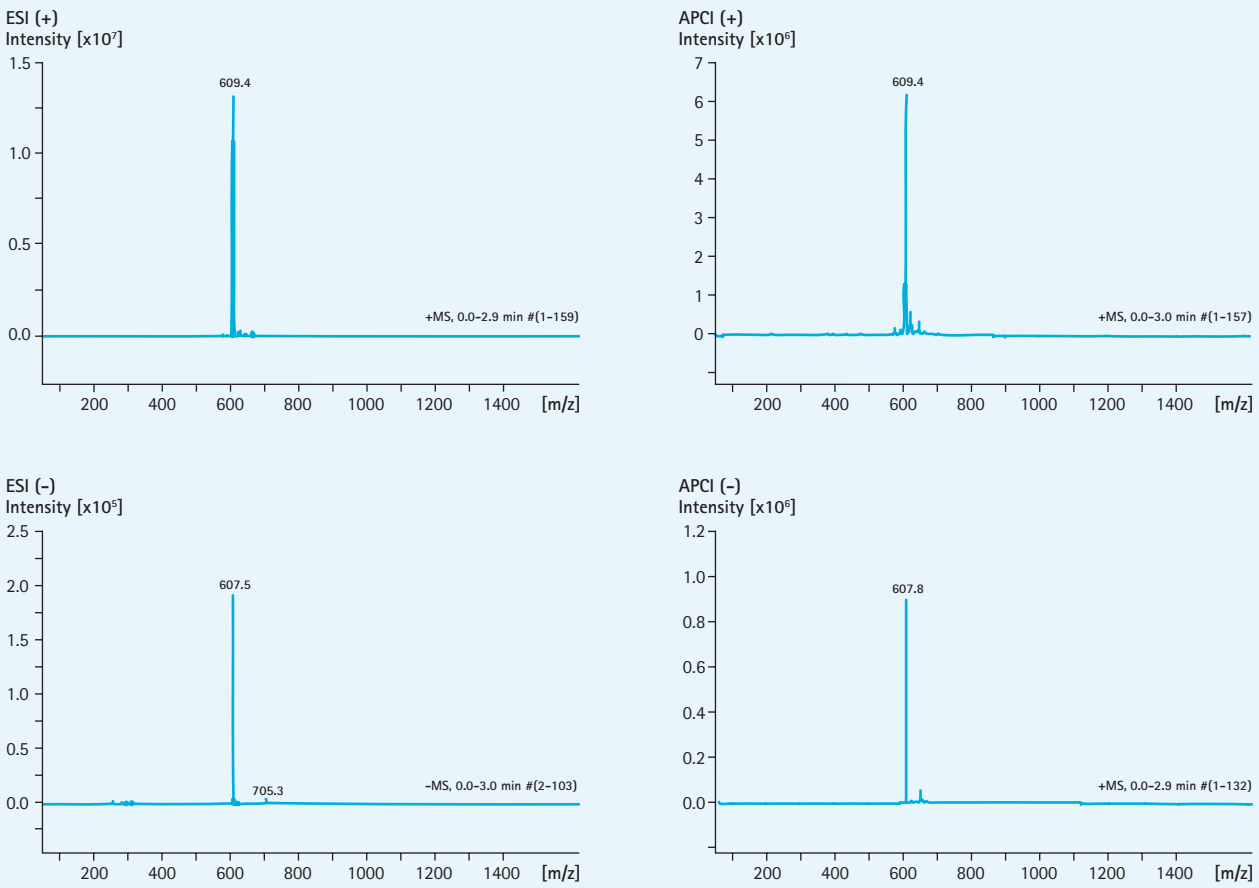


Fig. 5 *Mass spectrum of LiChrosolv® Water (115333). Intensity of single background mass peak based on reserpine standard in ESI (+) and APCI (+) mode; ESI (-) and ACPI (-) mode.*

Ordering information

Prepsolv® | For preparative chromatography

	Product	Purity (GC) min. [%]	Evap. residue max. [mg/l]	Water max. [%]	Acidity max. [meq/g]	Alkalinity max. [meq/g]	UV-transmission at [nm]	Content / Packaging	Ord. No.
A	Acetonitrile	99.8	1	0.05	0.0005	0.0002	220 (90 %), 240 (98 %)	2.5 l GL	**1.13358.2500**
								30 l ST	**1.13358.9030**
								185 l ST	**1.13358.9185**
E	Ethylacetate	99.8	1	0.05	0.0002	0.0002	270 (50 %), 300 (98 %)	30 l ST	**1.13353.9030**
H	n-Hexane	95.0	1	0.01	0.0002	0.0002	220 (50 %), 250 (98 %)	30 l ST	**1.04394.9030**
M	Methanol	99.8	1	0.05	0.0002	0.0002	225 (50 %), 265 (98 %)	2.5 l GL	**1.13351.2500**
								4 l GL	**1.13351.4000**
								30 l ST	**1.13351.9030**
								185 l ST	**1.13351.9185**
P	2-Propanol	99.8	1	0.05	0.0002	0.0002	220 (50 %), 260 (98 %)	2.5 l GL	**1.13350.2500**

GL = glass bottle | ST = stainless steel returnable barrel

Specially these items are also available in tailor-made volumes, preferentially in 400 l, 1,000 l and 1,400 l stainless steel containers with rental contracts.

Detailed information
LiChrosolv® | Solvents for chromatography

Elutropic series	Total polarity index acc. to Snyder [1]	Molar mass	Refractive index	Boiling point	Vapor pressure	Dynamic viscosity		Dielectric constant	Dipole moment acc. to Snyder
		[g/mol]	[n 20°/D]	[°C]	[hPa] 20°C	[mPa · s] 22°C	40°C	[DK] 20 or 25°C	
n-Heptane	–	100.21	1,388	98.4	48	0.40	0.33	1.9	0
n-Hexane	0.0	86.18	1,375	68.9	160	0.31	0.26	1.9	0
Cyclohexane	0.0	84.16	1,427	80.7	104	0.94	0.71	2.0	0
Isohexane	0.0	86.18	1,376	55 - 62	160 - 190	0.32 (20°C)	0.27	2.0	0
Isooctane	0.4	114.23	1,392	99.2	51	0.51	0.50	1.9	0
Toluene	2.3	92.14	1,496	110.6	29	0.58	0.47	2.4	0.36
tert-Butyl methyl ether	2.9	88.15	1,369	55	268	0.36 (20°C)	–	–	–
Benzene	3.0	78.12	1,501	80.0	101	0.65 (20°C)	–	2.28	0
1-Chlorobutane	–	92.57	1,402	78	110	0.47 (20°C)	–	7.15	1.74
Chloroform	3.4	119.38	1,446	61.7	210	0.56	0.47	4.8	1.01
Dichloromethane	3.4	84.93	1,424	40.0	453	0.43	0.36	9.1	1.60
1,2-Dichloroethane	3.7	98.97	1,445	83.4	87	0.80	0.65	10.6	1.75
1-Butanol	3.9	74.12	1,399	117.2	67	2.95	1.78	17.8	1.66
Tetrahydrofuran	4.2	72.11	1,405	66.0	200	0.47	0.38	7.4	1.63
2-Propanol	4.3	60.10	1,378	82.4	43	2.27	1.35	18.3	1.66
Ethylacetate	4.3	88.10	1,372	77.1	97	0.44	0.36	6.0	1.78
1,4-Dioxane	4.8	88.11	1,422	101.0	41	1.21	0.92	2.2	0.40
Ethanol	5.2	46.07	1,361	78.5	59	1.20	0.83	24.3	1.70
Acetone	5.4	58.08	1,359	56.2	233	0.32	0.27	20.7	2.88
Acetonitrile	6.2	41.05	1,344	81.6	97	0.39	–	37.5	3.92
Methanol	6.6	32.04	1,329	65.0	128	0.52	0.45	32.6	1.70
Water	9.0	18.01	1,333	100.0	23	0.95	0.65	80.2	1.85

LD = median lethal dose | LC = median lethal concentration | No responsibility is taken for the correctness of the details provided.

(1) L.R. Snyder, J.J. Kirkland; Introduction to Modern Liquid Chromatography, John Wiley & Sons. Inc., New York, (1979)

(2) Detailed solvents tables acc. to H. Halpaap can be found in: Einführung in HDPE, ed. R.E. Kaiser, (1979); HPTLC, ed. A. Zlatkis, R.E. Kaiser Elsevier and IfC (1977)

(3) Detailed information: Material Safety Data Sheets (MSDS) provided by Merck Millipore

ε° against Al_2O_3 acc. to Snyder [1]	Flow coefficient [2] x [mm²/s] DC-(silica gel 60 precoated plate) 22°C			UV cut-off	Acute orale toxicity [3]	Acute inhalation toxicity [3]	Acute dermal toxicity [3]	Cat. No.
	Migration distance			[nm]	LD_{50} rat [mg/kg]	LC_{50} rat (4 h) [mg/l]	LD_{50} rabbit [mg/kg]	
	50 mm	70 mm	100 mm					
0.01	9.2	10.6	11.4	200	> 2,000	103 g/m³	3,400	**104390**
0.01	12.5	13.9	14.6	195	25,000	171.6	> 2,000	**104391**
0.04	5.4	6.3	6.7	200	> 5,000	14	> 2,000	**102827**
0.09	12.5	13.9	14.6	195	> 2,000	> 5	> 2,000	**104335**
0.01	7.9	8.3	8.7	215	> 2,500	37.5	–	**104717**
0.29	8.3	9.3	11.0	284	636	28.1	12,124	**108327**
0.2	–	–	–	210	> 2,000	85	> 2,000	**101845**
0.32	–	–	–	280	930	44	> 8,260	**101768**
0.26	–	–	–	220	2,200	> 8,000	–	**101692**
0.40	9.0	10.5	11.6	245	695	47.7	–	**102444**
0.42	10.1	11.8	13.2	232	1,600	88,000 mg/m³ (30 min)	> 2,000 (LD_{50} rat)	**106044**
0.44	7.6	8.4	8.9	230	670	7.2	2,800	**113713**
0.7	–	–	–	265	790	> 18	3,400	**101988**
0.57	10.9	11.9	12.6	212	1,650	53.9	–	**108101**
0.82	2.1	2.3	2.5	205	5,045	46.5	12,800	**101040**
0.59	9.2	10.9	12.1	256	5,620	5.86 (8 h)	> 18,000	**100868**
0.56	5.2	6.0	6.5	215	5,200	48.5 - 54.3	7,600	**103132**
0.88	3.4	3.9	4.2	210	6,200	95.6	–	**111727**
0.56	12.7	14.7	16.2	330	5,800	76	20,000	**100020**
0.65	12.6	14.0	15.4	190	2,730 - 3,800	27.3	988	**100030**
0.95	5.6	6.5	7.1	205	5,628	85.26	–	**106007**
–	5.1	5.7	5.8	–	–	–	–	**115333**

LiChrosolv® Acetonitrile gradient grade for liquid chromatography in 1, 2.5 and 4 l glass bottles.

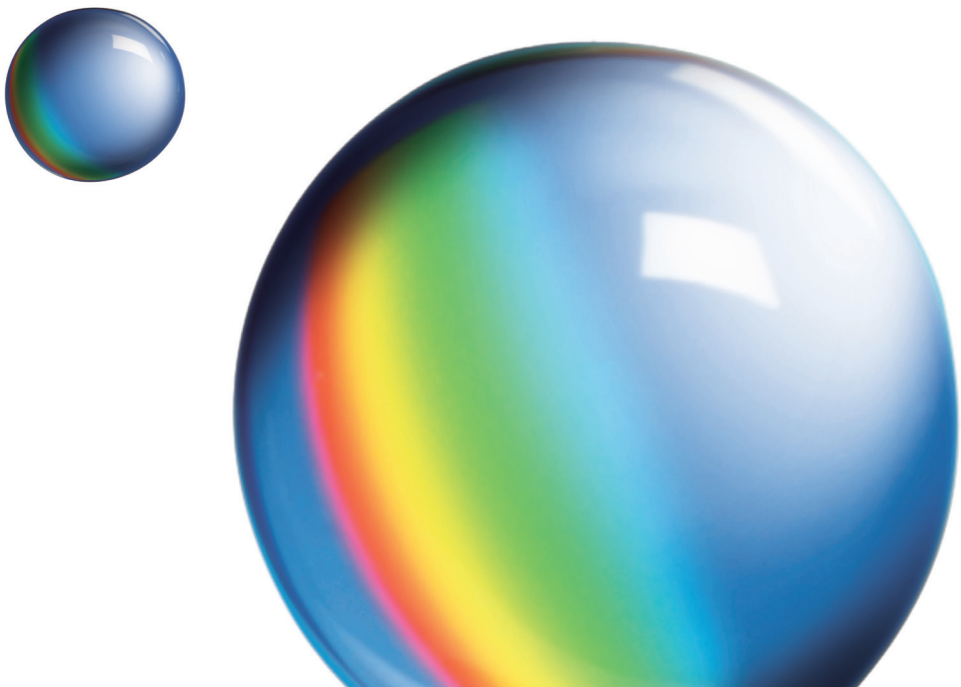
Spectroscopy

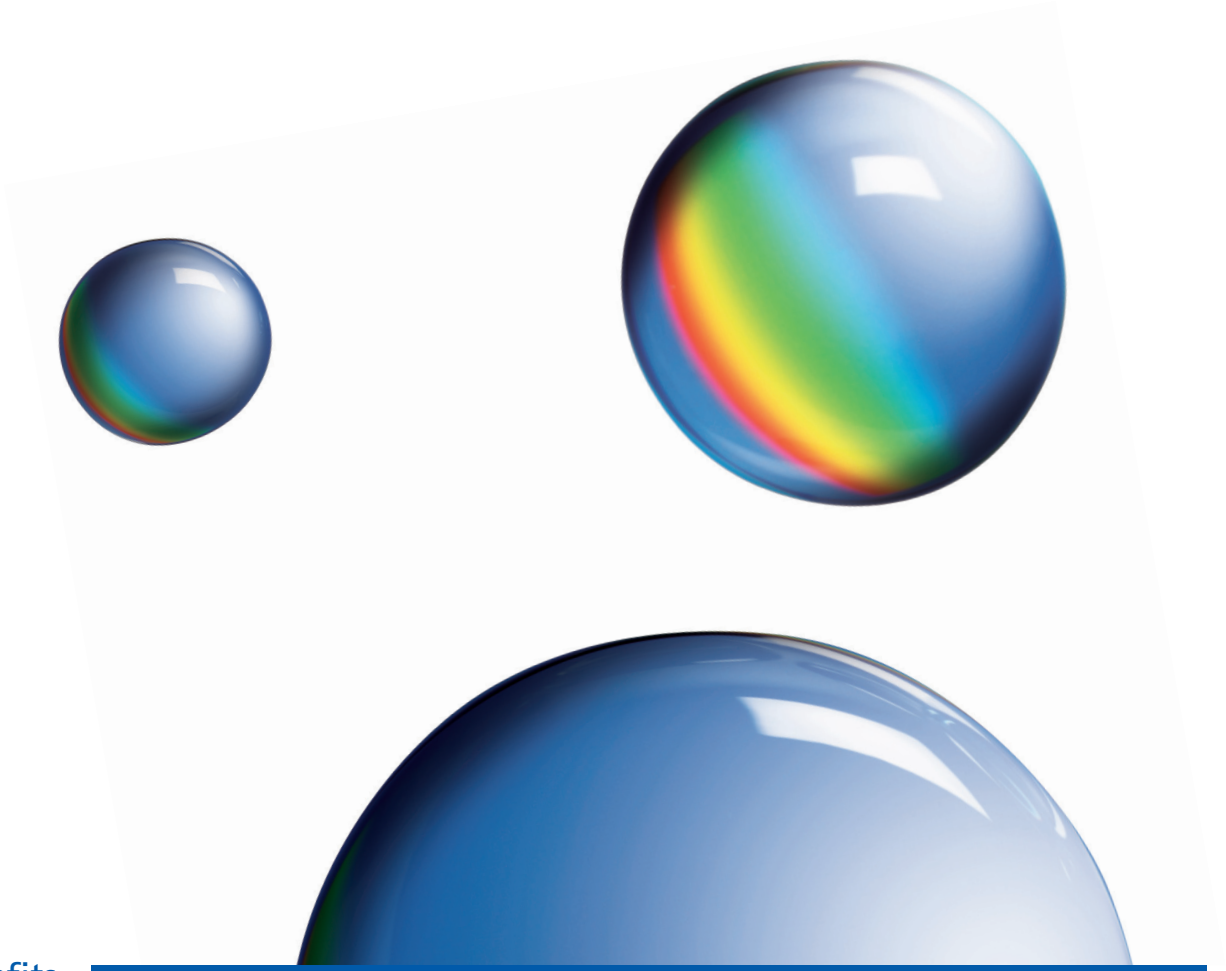
Uvasol®

UV/VIS and infrared spectroscopy are reliable and accurate methods used in modern analytical laboratories. Their versatility makes them indispensable for numerous analytical problems, and the wide variety of sample types reflects their value as an analytical tool.

Two important applications for spectroscopy are the identification of unknown substances, and the determination of concentrations of known substances. In both cases, accurate analytic results depend on the use of very pure solvents for sample preparation.

Merck Millipore **Uvasol®** solvents are specially designed for spectroscopy and other applications that demand solvents of the highest spectral purity. To ensure consistent product quality, **Uvasol®** solvents are made from premium quality raw materials, and are subjected to stringent purification procedures. The refinement process permits higher levels of security in applications, and prevents misinterpretation of analytical results caused by traces of UV, IR and fluorescence contamination.





Your benefits

- **Accurate, reliable analytical results and minimal risk of misinterpretation** due to highest UV transmittance / lowest UV absorbance as well as highest chemical purity
- **Suitable for Ph Eur and USP methods** due to specified UV transmittance / absorbance in accordance with Reag. Ph Eur and ACS
- **Time and cost savings (no need for repeat analysis)** due to highest batch-to-batch consistency
- **Application security** due to application-tested quality

Spectroscopy
Uvasol®

Best chemical purity

The quality of Uvasol® solvents is documented by e.g. minimal inherent fluorescence. This can be demonstrated by the comparison of the fluorescence spectrum of Isooctane Uvasol® (Fig. 2) and the fluorescence spectrum of Isooctane Uvasol® including a Quinine standard of 1 ppb (Fig. 1). This application points out that the fluorescence of Uvasol® is free of any impurities.

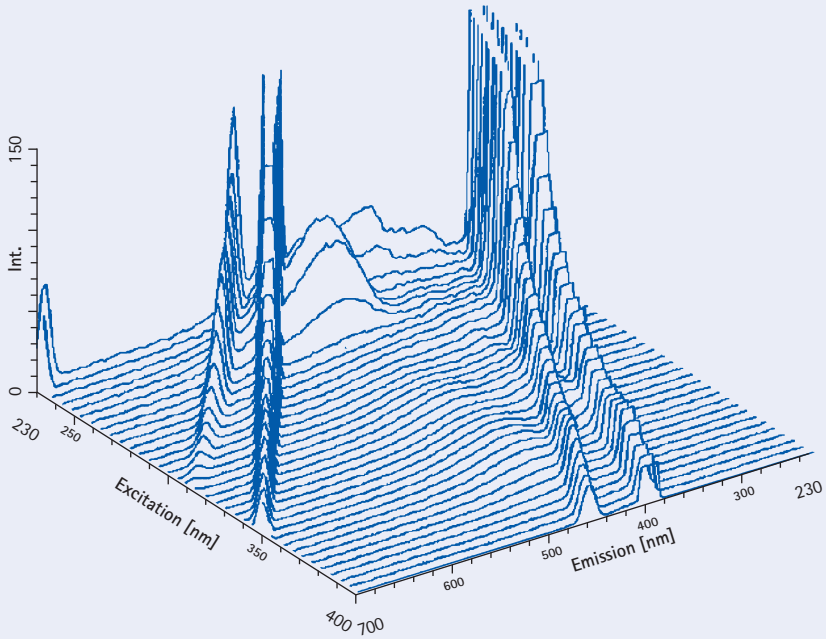


Fig. 1 *Isooctane Uvasol®, fluorescence spectrum, Quinine standard, 1 ppb.*

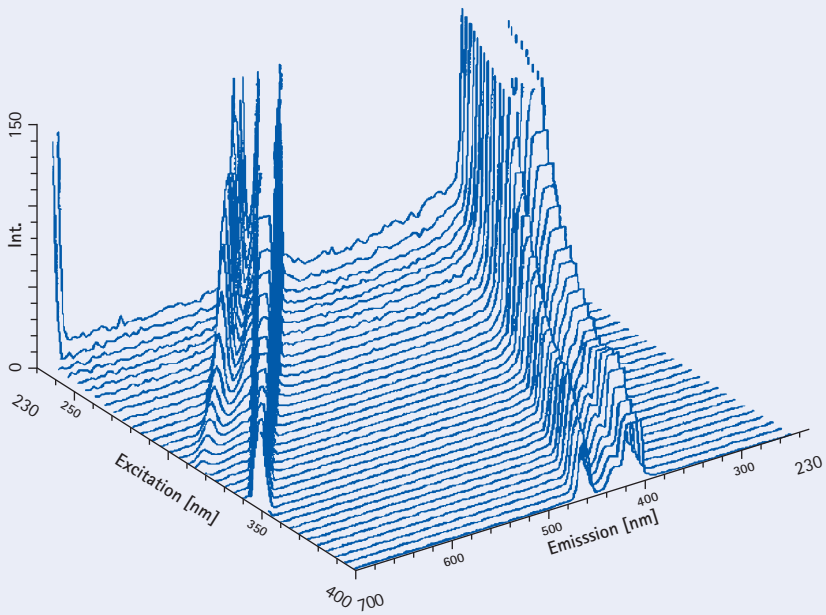


Fig. 2 *Isooctane Uvasol®, fluorescence spectrum, batch I208518.*

Uvasol® for UV- and infrared spectroscopy – best optical purity

Uvasol® solvents have the highest and widest specification of the UV range in the market. In all specifications the minimum transmittance for 5 typical wavelengths are specified. Figure 4 shows the high UV-transmittance of Isooctane Uvasol. It has a very high transmittance even in low wavelengths areas, resulting in accurate and reliable analytical results. Figure 3 shows the low infrared absorbance of Isooctane Uvasol® in the relevant wavenumbers > 4,500 for this application. The lower the absorbance is, the more precise are your analytical results. Costly repeat analysis or even the loss of valuable samples can thus be prevented.

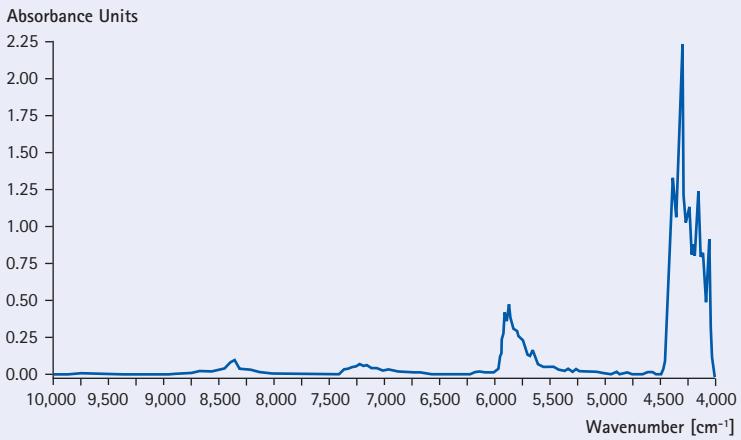


Fig. 3 *Isooctane Uvasol®, IR spectrum, batch I208518.*

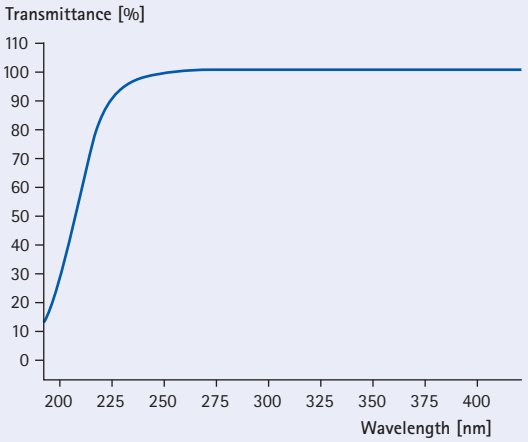


Fig. 4 *Isooctane Uvasol®, UV spectrum, batch I208518.*

Potassium bromide Uvasol® for infrared spectroscopy

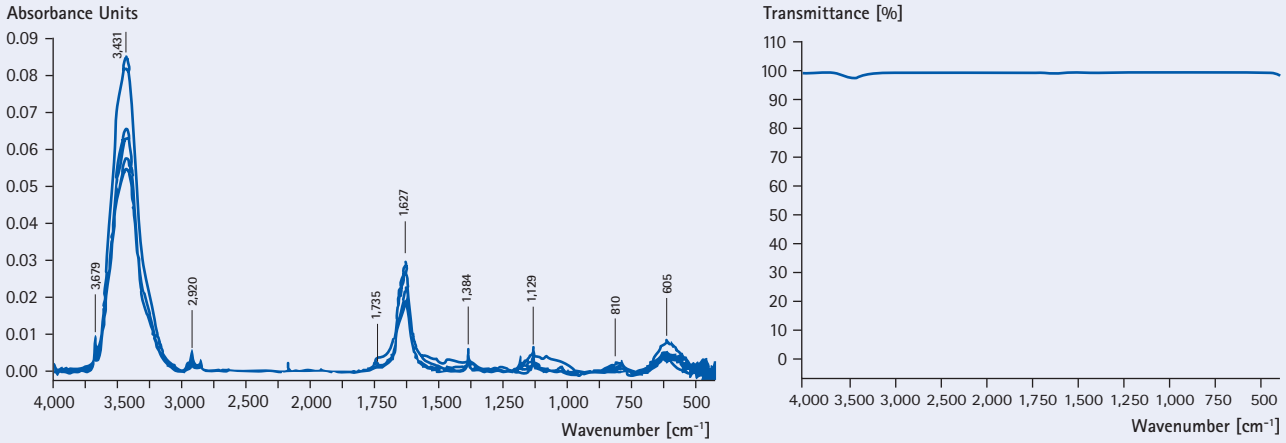


Fig. 5 *FT-IR absorbance spectra of representative batches of Uvasol® potassium bromide at 5 mm path length and transmittance spectra (blank) at 0.7 mm path length (32 scans, 2 cm⁻¹ resolution, DTGS detektor, Bruker IFS-48).*

The technique of potassium bromide pelletising for infrared spectroscopy has a high quality demand of the used potassium bromide. Potassium bromide Uvasol®, prepared by a special method of purification and subsequent treatment, is adjusted to a mean particle size of 150 µm. This is sufficient for the preparation of perfectly good pellets without the need for further pre-treatment and the associated risk of contamination. It also retains its powdery form over a period of years if stored in an air-tight condition. Its physical suitability for pelletising is checked by a special application test and its chemical purity established by full spectrum FT-IR analysis. The intensities for the OH- and CH-bands in particular are indicated as these occur frequently in critical applications (see Fig. 5).

Ordering information
Uvasol® A-S

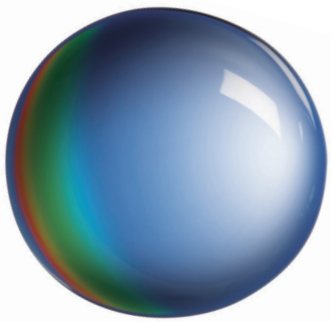
	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]	Fluorescence max. [ppb] (254 nm)	(365 nm)	UV-transmittance at [nm]	Content / Packaging	Ord. No.
A	Acetone	99.9	0.0002	0.05	–	1.0	330 (15 %), 335 (60 %), 340 (85 %), 345 (95 %), 350 (99 %)	500 ml GL	1.00022.0500
								2.5 l GL	1.00022.2500
	Acetonitrile	99.9	0.0002	0.01	0.5	0.5	190 (20 %), 195 (60 %), 200 (90 %), 215 (95 %), 230 (98 %)	1 l GL	1.00016.1000
								2.5 l GL	1.00016.2500
B	tert-Butyl methyl ether	99.9	0.0002	0.01	1.0	1.0	215 (40 %), 235 (55 %), 240 (60 %), 255 (85 %), 260 (90 %), 280 (98 %)	1 l GL	1.01984.1000
C	Carbon disulfide	99.9	0.001	0.01	–	–	–	1 l GL	1.02210.1000
	Chloroform, stabilized	99.0	0.0002	0.01	1.0	1.0	245 (15 %), 250 (50 %), 255 (60 %), 260 (85 %), 270 (98 %)	500 ml GL	1.02447.0500
								2.5 l GL	1.02447.2500
	Cyclohexane	99.9	0.0002	0.005	1.0	1.0	208 (20 %), 220 (55 %), 230 (80 %), 240 (90 %), 250 (98 %)	500 ml GL	1.02822.0500
								2.5 l GL	1.02822.2500
D	Dichloro-methane, stabilized	99.9	0.0002	0.01	1.0	1.0	235 (30 %), 240 (70 %), 245 (85 %), 250 (95 %), 255 (98 %),	500 ml GL	1.06048.0500
								2.5 l GL	1.06048.2500
	Diethyl ether, stabilized	98.0	0.0003	0.03	1.0	1.0	220 (30 %), 235 (55 %), 250 (80 %), 270 (90 %), 300 (98 %)	1 l GL	1.00930.1000
	N,N-Dimethyl-formamide	99.9	0.0002	0.02	–	1.0	270 (25 %), 275 (60 %), 290 (80 %), 300 (90 %), 330 (98 %)	500 ml GL	1.02937.0500
								2.5 l GL	1.02937.2500
	Dimethyl sulfoxide	99.8	0.0004	0.05	–	7.0	270 (35 %), 280 (50 %), 310 (80 %), 330 (90 %), 350 (97 %)	500 ml GL	1.02950.0500
								2.5 l GL	1.02950.2500
E	Ethanol	99.9	0.0002	0.05	1.0	1.0	207 (20 %), 220 (55 %), 235 (80 %), 240 (85 %), 245 (90 %), 260 (98 %)	500 ml GL	1.00980.0500
								2.5 l GL	1.00980.2500
	Ethyl acetate	99.9	0.0002	0.01	2.0	1.0	255 (20 %), 260 (75 %), 263 (80 %), 265 (90 %), 270 (98 %)	500 ml GL	1.00863.0500
								2.5 l GL	1.00863.2500
H	n-Heptane	99.3	0.0002	0.005	1.0	1.0	200 (20 %), 210 (55 %), 220 (80 %), 228 (90 %), 245 (98 %)	500 ml GL	1.04366.0500
								2.5 l GL	1.04366.2500
	n-Hexane	99.0	0.0002	0.005	1.0	1.0	195 (10 %), 210 (60 %), 217 (80 %), 225 (90 %), 245 (98 %)	500 ml GL	1.04372.0500
								2.5 l GL	1.04372.2500
I	Isooctane	99.8	0.0002	0.005	1.0	1.0	205 (30 %), 215 (65 %), 220 (80 %), 225 (85 %), 235 (90 %), 245 (98 %), 255 (99 %)	500 ml GL	1.04718.0500
								2.5 l GL	1.04718.2500
M	Methanol	99.9	0.0002	0.01	1.0	1.0	205 (10 %), 210 (30 %), 220 (60 %), 230 (80 %), 240 (90 %), 250 (95 %), 260 (98 %)	500 ml GL	1.06002.0500
								2.5 l GL	1.06002.2500
	2-Methyl-butane	99.8	0.0005	0.005	1.0	1.0	190 (50 %), 200 (65 %), 210 (85 %), 215 (90 %), 240 (98 %)	1 l GL	1.06056.1000
P	n-Pentane	99.5	0.0002	0.005	1.0	1.0	200 (50 %), 210 (70 %), 215 (85 %), 225 (95 %), 240 (98 %)	1 l GL	1.07179.1000
	Potassium bromide	–	–	–	–	–	–	100 g GL	1.04907.0100
								500 g GL	1.04907.0500
	2-Propanol	99.9	0.0002	0.05	1.0	1.0	210 (30 %), 220 (65 %), 230 (80 %), 240 (90 %), 250 (95 %), 260 (98 %)	1 l GL	1.00993.1000
								2.5 l GL	1.00993.2500

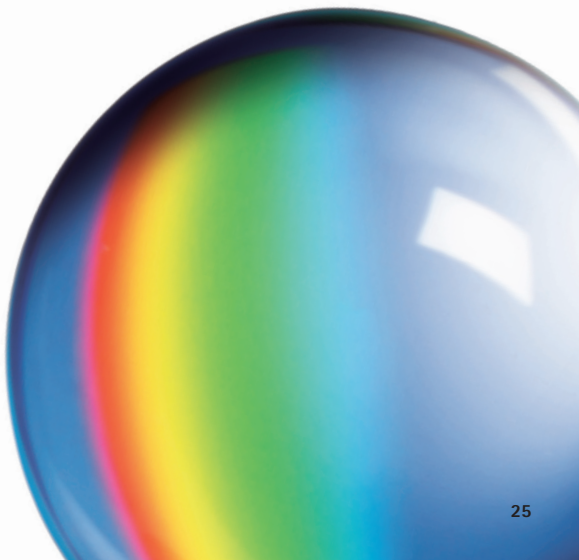
All solvents are filtered through 0.2 µm. | Color: max. 10 Hazen | Acidity: max. 0.0002 meq/g | Alkalinity: max. 0.0002 meq/g | GL = glass bottle

Ordering information
Uvasol® T-Z

	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]	Fluorescence max. [ppb] (254 nm)	(365 nm)	UV-transmittance at [nm]	Content / Packaging	Ord. No.
T	**Tetrachloro-ethylene**	99.9	0.0005	0.01	–	1.0	290 (20 %), 295 (65 %), 300 (80 %), 305 (85 %)	500 ml GL	**1.00965.0500**
								2.5 l GL	**1.00965.2500**
	Tetrahydro-furan	99.9	0.0002	0.01	1.0	1.0	215 (30 %), 245 (50 %), 265 (80 %), 275 (90 %), 310 (98 %)	500 ml GL	**1.08110.0500**
								2.5 l GL	**1.08110.2500**
	Toluene	99.9	0.0002	0.01	–	1.0	285 (15 %), 290 (60 %), 300 (80 %), 310 (90 %), 335 (96 %), 350 (98 %)	1 l GL	**1.08331.1000**
	1,1,2-Trichloro-trifluoro ethane	99.9	0.0005	0.005	–	–	–	2.5 l GL	**1.08239.2500**
	Trifluoro acetic acid	99.8	0.005	0.1	–	–	265 (10 %), 305 (50 %), 320 (80 %), 325 (90 %)	25 ml GL	**1.08262.0025**
								100 ml GL	**1.08262.0100**
								1 l GL	**1.08262.1000**
								2.5 l GL	**1.08262.2500**

All solvents are filtered through 0.2 µm. | Color: max. 10 Hazen | Acidity: max. 0.0002 meq/g | Alkalinity: max. 0.0002 meq/g | GL = glass bottle





▶ Packaging and withdrawal systems see page 40

Gas chromatography

SupraSolv® | UniSolv®

SupraSolv® and **UniSolv®** solvent qualities are ideal for all gas chromatography laboratory applications, such as highly sensitive pesticide and dioxin analysis. To ensure cutting-edge performance, we manufacture these solvents within special distillation cuts using the latest production processes. Only highly enriched solvents are used for the suitability test with various detection methods.

Merck Millipore is committed to developing solvents with the highest possible degree of purity. This is why we tailor our solvent specifications to your individual areas of application.

Security and reliability for gas chromatography

SupraSolv® and **UniSolv®** provide the analyst with the necessary security and reliability for today's applications, especially when monitoring and determining environmentally relevant substances in soil and water samples, e.g. polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), polychlorinated dibenzodioxins (PCDD), pesticides, but also highly volatile chlorinated hydrocarbons present in ppb trace amounts only.

SupraSolv® solvents for headspace gas chromatography

SupraSolv® solvents for headspace gas chromatography are developed particularly for the analysis of residual solvents in drug substances, excipients, and drug products according to Ph Eur and USP. Their high purity is provided by special designed production processes – for correct, reliable and reproducible results of analysis.

UniSolv® – a universal solvent for every application

Special clean-up procedures facilitate the production of unique high-performance **UniSolv®** solvents suited equally to the determination of components in the medium- and high-boiling range and even in the low-boiling range. No other solvent on the market is able to cover such an extensive detection range. Our customers just need one solvent quality – independent of the sample (e.g. water or soil) and independent of the detection method (GC-ECD, GC-FID, GC-MS).

Your benefits

- Accurate, reliable and reproducible results due to minimal signal-to-noise ratio
- Time and cost savings due to the best possible batch consistency, thus avoiding analysis repetition
- The most comprehensive application area due to the largest retention time range
- Better cost efficiency – UniSolv® is applicable for all main GC-detection methods (GC-ECD, GC-FID, GC-MS)

Gas chromatography
SupraSolv®

SupraSolv® solvents from Merck Millipore are designed specially for sample preparation in gas chromatography. No matter if you use ECD, FID or MS – our comprehensive portfolio of GC solvents offers a dedicated product quality for your specific application and detection method. Our SupraSolv® ECD and FID quality is specially developed and tested for ECD (Electron Capture Detector) and FID (Flame Ionization Detector). SupraSolv® MS is dedicated for use in gas chromatography coupled with mass spectrometric detection. Both SupraSolv® qualities are carefully tested for these specific detectors, and show a minimal signal-to-noise ratio in a specified retention time range. Fig. 1 shows a GC-ECD reference chromatogram from Trichlorobenzene to Decachlorobiphenyle (internal standard Lindane = 3 pg/ml) compared to a typical GC-ECD batch chromatogram of n-Hexane SupraSolv® ECD and FID. SupraSolv® shows minimal interference signals in the relevant retention time; thus results of analysis are reliable, reproducible and accurate.

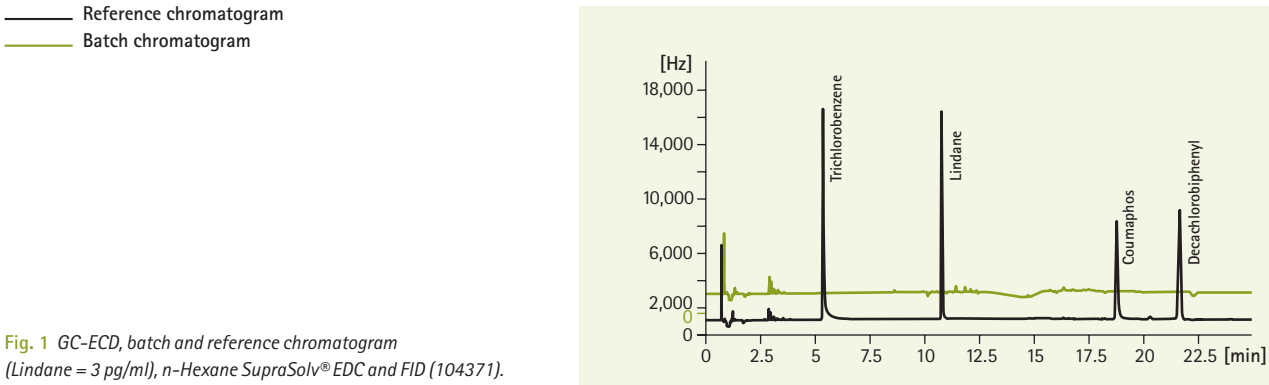


Fig. 1 *GC-ECD, batch and reference chromatogram (Lindane = 3 pg/ml), n-Hexane SupraSolv® EDC and FID (104371).*

EPA Method 508: Determination of chlorinated pesticides in water, standard chromatogram

Classical pesticide analysis according EPA method 508 is employed for the qualitative and quantitative determination of pesticides in food and environmental samples. The method uses GC-ECD. The specified ECD retention time range of SupraSolv® ECD and FID covers all analytes of interest for this application, resulting in best application security.

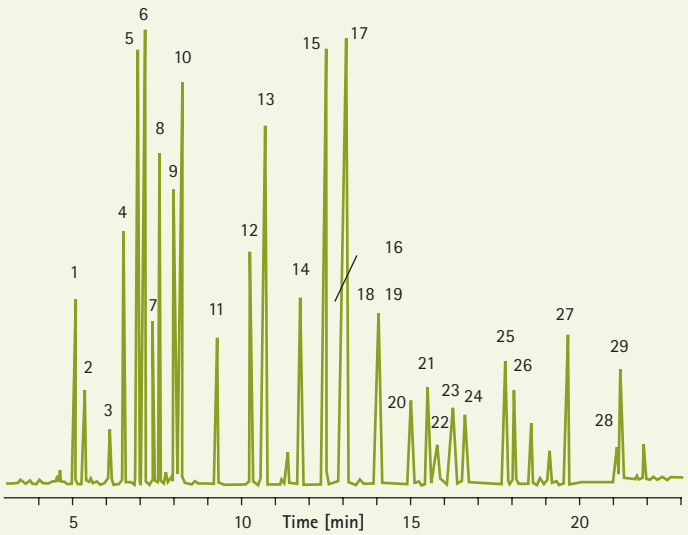


Fig. 2 *Chlorinated pesticides: EPA Method 508, GC-ECD.*

1. Etridiazole
2. Chloroneb
3. Propachlor
4. Trifluralin
5. α-BHC
6. Hexachlorobenzene
7. β-BHC
8. Ω-BHC
9. γ-BHC
10. Chlorothalonil
11. Heptachlor
12. Aldrin
13. DCPA
14. Heptachlor epoxide
15. γ-Chlordane
16. Endosulfan I
17. α-Chlordane
18. Dieldrin
19. 4,4'-DDE
20. Endrin
21. Endosulfan II
22. Chlorobenzilate
23. 4,4'-DDD
24. Endrin aldehyde
25. Endosulfan sulfate
26. 4,4'-DDT
27. Methoxichlor
28. cis-Permethrin
29. trans-Permethrin

Gas chromatography
SupraSolv® headspace

SupraSolv® solvents for the analysis of residual solvents according to Ph Eur and USP

Headspace gas chromatography is a precise, well-accepted method for the analysis of residual solvents in drug substances and products. It is recommended as the preferred method of analysis for this application by the European Pharmacopoeia (Chapter 2.4.24) and the United States Pharmacopoeia (Chapter 467).

The ICH (International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use) Guideline Q3C "Impurities: Guideline for Residual Solvents" divides all residual solvents into three classes according to their harmfulness for human health, and defines permissible maximum concentrations in actives, excipients and drug products. Both the European and the United States Pharmacopoeia refer to this guideline. Accurate analysis with headspace gas chromatography demands the use of very pure solvents with extremely low concentrations of the defined residual solvents.

By specifying for SupraSolv® headspace the concentrations of all residual solvents of the three defined classes in the ICH guideline, Merck Millipore offers a precise purity window for this application – for unique, application-orientated quality. Since we also perform a headspace application test on each batch, every delivery gives you the reliability, accuracy and analytical safety you need.

Extract of specification

Every residual solvent of **class 1** acc. ICH ≤ 1 µg/g
Every residual solvent of **class 2** acc. ICH ≤ 10 µg/g
Every residual solvent of **class 3** acc. ICH ≤ 50 µg/g

ICH = International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use.

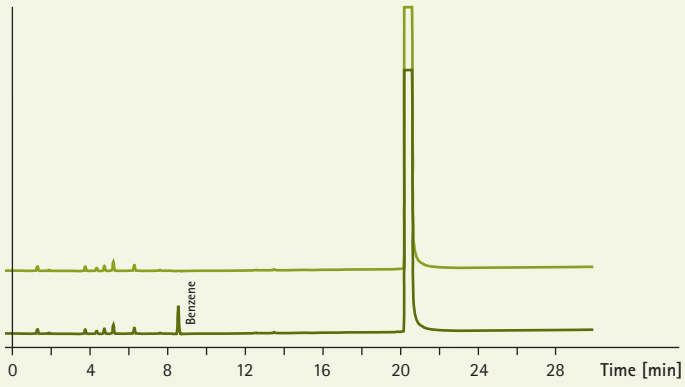


Fig. 3 *Chromatogram of DMSO Headspace SupraSolv® 101900 without addition compared to a chromatogram of DMSO Headspace SupraSolv® 101900 with 0.8 ppm benzene.*

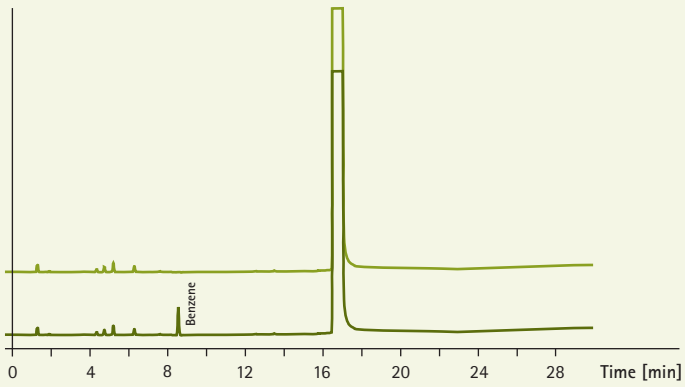


Fig. 4 *Chromatogram of DMF Headspace SupraSolv® 100202 without addition compared to a chromatogram of DMF Headspace SupraSolv® 100202 with 0.8 ppm benzene.*

Gas chromatography
UniSolv®

Unique and universal

Like SupraSolv®, UniSolv® solvents from Merck Millipore are designed for challenging sample preparation tasks in gas chromatography such as sensitive detection processes in residue and environmental analysis. Unlike the more specialized SupraSolv® products, however, our unique UniSolv® range of solvents is a truly universal solution. Thanks to special clean-up procedures, its specification is even broader and higher than that of SupraSolv®: The specified retention time range for ECD is larger (so even low-boiling substances can be reliably detected), while the permissible concentration of interference signals within the retention time range for all detectors is lower. UniSolv® solvents can be used with the most relevant GC detectors (GC-ECD, GC-FID, GC-MS). No other GC solvent on the market is able to cover such an extensive application range: Using UniSolv®, you need only one solvent quality regardless of sample (e.g. water or soil) or detection method. You benefit from more flexibility, better cost-efficiency and high reliability.

Reference chromatogram
Batch chromatogram

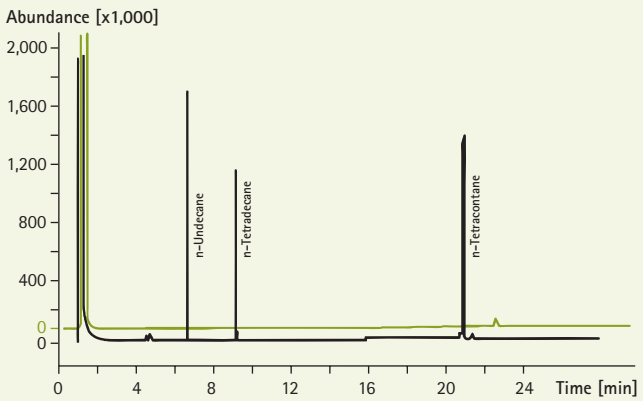


Fig. 6 *GC-FID, n-Hexane UniSolv® (104369).*

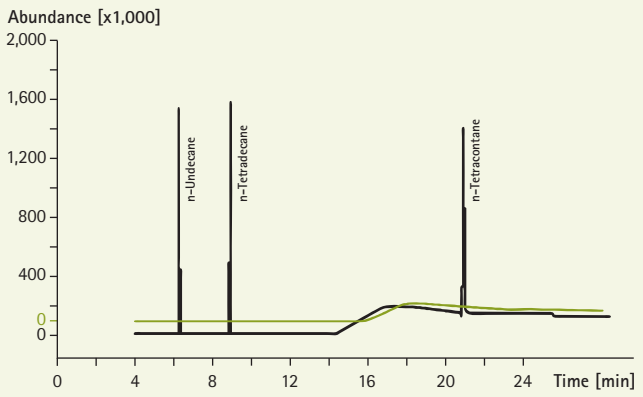


Fig. 7 *GC-MS, n-Hexane UniSolv® (104369).*

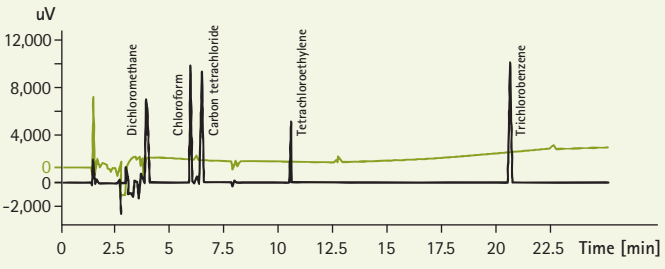


Fig. 8a *GC-ECD, n-Hexane UniSolv® (104369), low boiling range.*

Reference chromatogram
Batch chromatogram

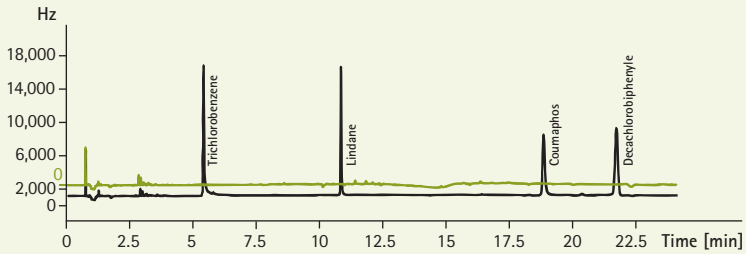


Fig. 8b *GC-ECD, n-Hexane UniSolv® (104369), medium- and high boiling range.*

SupraSolv® and UniSolv® | What is the difference?

Specifications at a glance	GC-ECD Dichloromethane to 1,2,4-Trichlorobenzene (Tetrachloromethane standard)	GC-ECD pesticide analysis 1,2,4-Trichlorobenzene to Decachlorobiphenyle (Lindane standard)	GC-FID n-Undecane to n-Tetracontane (n-Tetradecane standard)	GC-MS n-Undecane to n-Tetracontane; scan range 30 – 600 amu (n-Tetradecane standard)
SupraSolv® solvents for gas chromatography ECD and FID	–	max. 3 pg/ml	max. 3 ng/ml	–
SupraSolv® solvents for gas chromatography MS	–	–	–	max. 3 ng/ml
UniSolv® solvents for organic trace analysis	max. 1 ng/ml	max. 2 pg/ml	max. 2 ng/ml	max. 2 ng/ml

Features UniSolv®

- The specified retention time range for ECD is larger than that for SupraSolv®. Even low-boiling substances can be reliably detected.
- The permissible concentration of interference signals within the retention time range is lower than that for SupraSolv®.

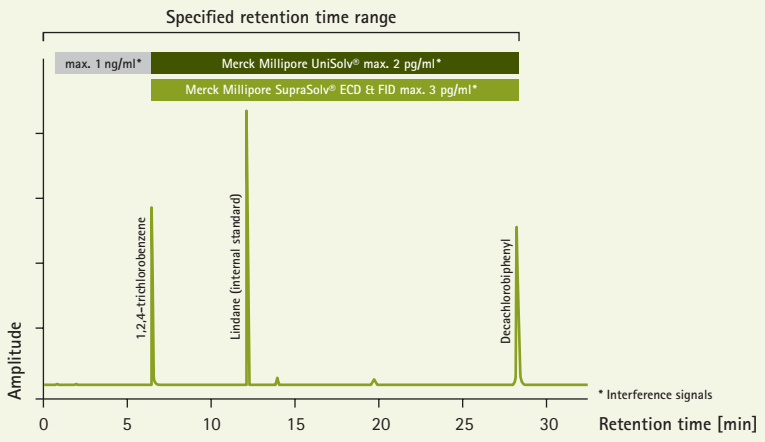


Fig. 9 *SupraSolv® and UniSolv® in comparison.*

▶ **Detailed brochure: Naturally pure (W 282144)**
▶ **Packaging and withdrawal systems see page 40**

Ordering information
SupraSolv® solvents for gas chromatography ECD and FID

	Product	Purity (GC) min. [%]	Evap. residue max. [mg/l]	Water max. [%]	Color max. [Hazen]	Content / Packaging	Ord. No.
A	Acetone	99.8	3.0	0.05	10	1 l GL	1.00012.1000
						2.5 l GL	1.00012.2500
						4 l GL	1.00012.4000
						30 l ST	1.00012.9030
	Acetonitrile	99.8	3.0	0.05	10	1 l GL	1.00017.1000
						2.5 l GL	1.00017.2500
						4 l GL	1.00017.4000
B	tert-Butyl methyl ether	99.8	3.0	0.02	10	1 l GL	1.01995.1000
						2.5 l GL	1.01995.2500
C	Chloroform, stabilized	99.8	5.0	0.01	10	1 l GL	1.02432.1000
						2.5 l GL	1.02432.2500
	Cyclohexane	99.8	3.0	0.01	10	1 l GL	1.02817.1000
						2.5 l GL	1.02817.2500
						4 l GL	1.02817.4000
						10 l ST	1.02817.9010
D	Dichloromethane, stabilized	99.8	5.0	0.01	10	1 l GL	1.06054.1000
						2.5 l GL	1.06054.2500
						4 l GL	1.06054.4000
						10 l ST	1.06054.9010
	Diethyl ether, stabilized	98.0	3.0	0.05	10	1 l GL	1.00931.1000
						2.5 l GL	1.00931.2500
	N,N-Dimethylformamide	99.8	3.0	0.05	10	1 l GL	1.10983.1000
						2.5 l GL	1.10983.2500
NEW E	Ethanol	99.8	3.0	0.05	10	1 l GL	1.02371.1000
						2.5 l GL	1.02371.2500
						4 l GL	1.02371.4000
	Ethyl acetate	99.8	3.0	0.02	10	1 l GL	1.10972.1000
						2.5 l GL	1.10972.2500
						4 l GL	1.10972.4000
						10 l ST	1.10972.9010
NEW H	n-Heptane	99.8	3.0	0.02	10	1 l GL	1.04360.1000
						2.5 l GL	1.04360.2500
	n-Hexane	98.0 *	3.0	0.01	10	1 l GL	1.04371.1000
						2.5 l GL	1.04371.2500
						4 l GL	1.04371.4000
						10 l ST	1.04371.9010
						30 l ST	1.04371.9030
I	Isohexane	99.8	3.0	0.01	10	2.5 l GL	1.04340.2500
	Isooctane	99.8	3.0	0.01	10	1 l GL	1.15440.1000
						2.5 l GL	1.15440.2500
M	Methanol	99.8	3.0	0.1	10	1 l GL	1.06011.1000
						2.5 l GL	1.06011.2500
						4 l GL	1.06011.4000
NEW P	n-Pentane	99.8	3.0	0.02	10	1 l GL	1.00882.1000
						2.5 l GL	1.00882.2500
						4 l GL	1.00882.4000
	Petroleum benzine (40 – 60°C)	–	3.0	0.01	10	1 l GL	1.01772.1000
						2.5 l GL	1.01772.2500
						4 l GL	1.01772.4000
						10 l ST	1.01772.9010
						30 l ST	1.01772.9030
	2-Propanol	99.8	3.0	0.1	10	1 l GL	1.00998.1000
						2.5 l GL	1.00998.2500
T	Toluene	99.8	3.0	0.03	10	1 l GL	1.08389.1000
						2.5 l GL	1.08389.2500
						4 l GL	1.08389.4000
						10 l ST	1.08389.9010

GL = glass bottle | ST = stainless steel returnable barrel | * = sum of hexane isomers + methyl cyclopentane (GC) ≥ 99.8 % | GC-ECD (retention range 1,2,4-Trichlorobenzene to Decachlorobiphenyle individual signals (Lindane standard)) ≤ 3 pg/ml | GC-FID (retention range n-Undecane to n-Tetracontane individual signals (n-Tetradecane standard)) ≤ 3 ng/ml

Ordering information
SupraSolv® solvents for gas chromatography MS

	Product	Purity (GC) min. [%]	Evap. residue max. [mg/l]	Water max. [%]	Color max. [Hazen]	Content / Packaging	Ord. No.
A	Acetone	99.8	3.0	0.05	10	1 l GL	1.00658.1000
						2.5 l GL	1.00658.2500
	Acetonitrile	99.8	3.0	0.05	10	1 l GL	1.00665.1000
						2.5 l GL	1.00665.2500
C	Cyclohexane	99.8	3.0	0.01	10	1 l GL	1.00667.1000
						2.5 l GL	1.00667.2500
D	Dichloromethane, stabilized	99.8	5.0	0.01	10	1 l GL	1.00668.1000
						2.5 l GL	1.00668.2500
E	Ethyl acetate	99.8	3.0	0.02	10	1 l GL	1.00789.1000
						2.5 l GL	1.00789.2500
H	n-Hexane	98.0 *	3.0	0.01	10	1 l GL	1.00795.1000
						2.5 l GL	1.00795.2500
M	Methanol	99.8	3.0	0.1	10	1 l GL	1.00837.1000
						2.5 l GL	1.00837.2500
T	Toluene	99.8	3.0	0.03	10	1 l GL	1.00849.1000
						2.5 l GL	1.00849.2500

GL = glass bottle | * = sum of hexane isomers + methyl cyclopentane (GC) ≥ 99.8 % | GC-MS (retention range n-Undecane to n-Tetracontane; scanning area 30 – 600 amu individual signals (n-Tetradecane standard)) ≤ 3 ng/ml

SupraSolv® headspace For the analysis of residual solvents according to ICH, Ph Eur and USP

	Product	Purity (GC) min. [%]	Evap. residue max. [mg/l]	Water max. [%]	Color max. [Hazen]	Content / Packaging	Ord. No.
NEW D	N,N-Dimethylacetamide	99.8	3.0	0.05	10	500 ml GL	1.00399.0500
						1 l GL	1.00399.1000
	N,N-Dimethylformamide	99.8	3.0	0.05	10	NEW 500 ml GL	1.00202.0500
						500 ml SB	1.00202.0501
						1 l GL	1.00202.1000
						2.5 l GL	1.00202.2500
	Dimethyl sulfoxide	99.8	3.0	0.05	10	NEW 500 ml GL	1.01900.0500
						500 ml SB	1.01900.0501
						1 l GL	1.01900.1000
						2.5 l GL	1.01900.2500
NEW M	1-Methyl-2-pyrrolidone	99.8	3.0	0.05	10	500 ml GL	1.02497.0500
						1 l GL	1.02497.1000
						2.5 l GL	1.02497.2500
NEW W	Water	–	5.0	–	–	1 l GL	1.00577.1000
						2.5 l GL	1.00577.2500

GL = glass bottle | SB = septum seal bottle ▶ **SeccoSept® septum seal bottle see page 58** | Every residual solvent of class 1 acc. ICH ≤ 1 µg/g | Every residual solvent of class 2 acc. ICH ≤ 10 µg/g | Every residual solvent of class 3 acc. ICH ≤ 50 µg/g

UniSolv® solvents for organic trace analysis

	Product	Purity (GC) min. [%]	Evap. residue max. [mg/l]	Water max. [%]	Color max. [Hazen]	Content / Packaging	Ord. No.
D	Dichloromethane, stabilized	99.9	3.0	0.005	10	1 l GL	1.06454.1000
H	n-Hexane	99.0*	3.0	0.005	10	1 l GL	1.04369.1000
						2.5 l GL	1.04369.2500
P	n-Pentane	99.9	3.0	0.01	10	1 l GL	1.07288.1000
						2.5 l GL	1.07288.2500
	Petroleum benzine (40 – 60°C)	–	3.0	0.005	10	1 l GL	1.16740.1000
						2.5 l GL	1.16740.2500
T	Toluene	99.9	3.0	0.005	10	1 l GL	1.08388.1000
						2.5 l GL	1.08388.2500

GL = glass bottle | * Sum of hexane isomers + methylcyclopentane (GC) ≥ 99.9 % | GC-ECD (retention range Dichloromethane to 1,2,4-Trichlorobenzene individual signals (Tetrachloromethane standard)) ≤ 1 ng/ml | GC-ECD (retention range 1,2,4-Trichlorobenzene to Decachlorobiphenyle individual signals (Lindane standard)) ≤ 2 pg/ml | GC-FID (retention range n-Undecane to n-Tetracontane individual signals (n-Tetradecane standard)) ≤ 2 ng/ml | GC-MS (retention range n-Undecane to n-Tetracontane; scanning area 30 – 600 amu individual signals (n-Tetradecane standard)) ≤ 2 ng/ml

NMR Nuclear magnetic resonance spectroscopy

MagniSolv™ | Deuterated solvents

Deuterated solvents are required wherever chemical research is carried out. And when it comes to NMR spectroscopy – the most important method in the structural analysis of organic molecules – they are indispensable.

NMR is a non-destructive, information-rich analytical technique which helps researchers to understand molecular structure and dynamics. NMR experiments provide information on connectivity – i.e., which atoms are attached to each other in a molecule, their spatial orientation, and how molecules move in their natural environment. This kind of structural information is particularly important in proteomics / genomics and drug discovery applications, where scientists desire a deeper understanding of protein target molecules and their spatial relationships with synthetic drug candidates.

Wide range of highest quality

A wide range of **MagniSolv**™ deuterated solvents with extremely low residual water, excellent chemical purity, and the highest isotopic enrichment available can satisfy the most demanding requirements of researchers. In this solvent range the "classical" standard products and "exotic" specialities are represented.

Reliability

Depending on application and sensitivity of the NMR spectrometer Merck Millipore offers solvents with deuteration degrees between 98 % and 99.96 %. In case of all the water soluble deuterated standard products, water content is specified according to both Karl Fischer and NMR. This is an unique benefit for our customers and underpins the position of Merck Millipore as a supplier of chemicals of the highest quality and reliability.

Optimized packaging

Merck Millipore provides a wide range of different packaging types (bottles, practical ampoules and septum bottles) and packaging sizes. Concerning the septum bottles we have the broadest range of deuterated solvents in this customer friendly packaging material. Here Merck Millipore's vast experience in the optimization of packaging is a unique benefit that we can fully utilize. We are also prepared to offer large volumes of **MagniSolv**™ deuterated compounds. This also applies to special package sizes and other grades.

Your benefits

NMR spectroscopy

- Reliable results save time and give trust by
  - Excellent chemical purity and highest isotopic enrichment
  - Reliable deuteration degrees
  - Clear and clean baselines
  - Determination of water content in two ways (Karl Fischer and NMR)
- Innovative packaging for long-term storage without quality loss
- Resulting in high reproducibility of the analysis
- Easy, safe and accident-free handling with septum bottles and glass ampoules
- Flexibility through broad packaging variety resulting in less chemical and packaging waste

NMR Nuclear magnetic resonance spectroscopy

MagniSolv™ | Deuterated solvents

Whatever you require! Merck Millipore's deuterated solvents!

We provide a wide range of products in different packaging types and -sizes.

- Other brochure: Attractive, MagniSolv™ deuterated solvents from Merck Millipore (W 284110)
- LabTool: NMR chemical shifts (W 284109)

Ordering information
MagniSolv™ | Deuterated solvents A-D

	Product	Deuteration degree [%]	H_2O+D_2O (KF) [%]	H_2O (NMR) [%]	Density at 20°C [g/ml]	Quantity / Packaging	Content [g]	Ord. No.
A	**Acetic acid-D1 99.5 % D**	> 99.5	–	–	1.06	25 ml GL	26.50	**8.15035.0025**
	Acetic acid-D4 99.5 %	> 99.5	< 0.05	–	1.12	10 x 0.75 ml GA	8.40	**8.15036.0009**
						10 ml GA	11.20	**8.15036.0010**
	Acetone-D6 99.9 % D	> 99.9	< 0.03	< 0.02	0.87	10 x 0.5 ml GA	4.35	**1.00021.0005**
						10 x 0.75 ml GA	6.53	**1.00021.0009**
						10 ml SB	8.70	**1.00021.0010**
						25 ml GL	21.75	**1.00021.0025**
						100 ml GL	87.00	**1.00021.0100**
	Acetone-D6 99.96 % D	> 99.96	< 0.03	< 0.02	0.87	10 x 0.75 ml GA	6.53	**1.11969.0009**
	Acetonitrile-D3 99 % D	> 99	< 0.10	< 0.05	0.84	10 ml SB	8.40	**1.02904.0010**
	Acetonitrile-D3 99.8 % D	> 99.8	< 0.10	< 0.05	0.84	10 ml SB	8.40	**1.00220.0010**
	Acetonitrile-D3 99.96 % D	> 99.96	< 0.02	< 0.01	0.84	1 ml GA	0.84	**1.13753.0001**
						10 x 0.75 ml GA	6.30	**1.13753.0009**
	Ammonia-D3 26 wt % in D_2O	> 99.5	–	–	1.06	10 ml GA	10.60	**8.15008.0010**
						25 ml GL	26.50	**8.15008.0025**
B	**Benzene-D6 99.6 % D**	> 99.6	–	< 0.02	0.95	10 x 0.75 ml GA	7.13	**1.01789.0009**
						10 ml SB	9.50	**1.01789.0010**
						100 ml GL	95.00	**1.01789.0100**
	Benzene-D6 99.96 % D	> 99.96	–	–	0.95	10 x 0.75 ml GA	7.13	**1.01766.0009**
						10 ml GA	9.50	**1.01766.0010**
	tert-Butanol (ol-D) 99 % D	> 99	–	–	0.80	25 ml GL	20.00	**8.15014.0025**
C	**Chloroform 99.5 % D; 1 vol. % TMS stabilized with silver**	> 99.5	–	< 0.02	1.50	25 ml GL	37.50	**1.13359.0025**
						100 ml GL	150.00	**1.13359.0100**
	Chloroform-D1 99.8 % D not stabilized	> 99.8	–	< 0.01	1.50	25 ml GL	37.50	**1.02450.0025**
						100 ml GL	150.00	**1.02450.0100**
						500 ml GL	750.00	**1.02450.0500**
	Chloroform-D1 99.8 % D stabilized with silver	> 99.8	–	< 0.01	1.50	25 ml GL	37.50	**1.03420.0025**
						100 ml GL	150.00	**1.03420.0100**
						500 ml GL	750.00	**1.03420.0500**
	Chloroform 99.8 % D; 0.03 % TMS stabilized with silver	> 99.8	–	< 0.01	1.50	25 ml GL	37.50	**1.03296.0025**
						100 ml GL	150.00	**1.03296.0100**
						500 ml GL	750.00	**1.03296.0500**
	Chloroform-D1 99.96 % D	> 99.96	–	< 0.005	1.50	10 x 0.75 ml GA	11.25	**1.02446.0009**
						10 ml GA	15.00	**1.02446.0010**
	25 ml stabilized with silver					25 ml GL	37.50	**1.02446.0025**
	100 ml stabilized with silver					100 ml GL	150.00	**1.02446.0100**
	Cumene (Isopropylbenzene)-D12 99 % D	> 99	–	–	0.95	1 ml GA	0.87	**8.15023.0001**
	Cyclohexane-D12 99.5 % D	> 99.5	< 0.05	< 0.03	0.89	10 x 0.5 ml GA	4.45	**8.15024.0005**
						10 x 0.75 ml GA	6.68	**8.15024.0009**
						5 ml GA	4.45	**8.15024.0006**
D	**n-Decane-D22 99 % D**	> 99	–	–	0.85	1 ml GA	0.85	**8.15027.0001**
	Deuterium chloride 20 wt % in D_2O 99.5 % D	> 99.5	–	–	1.19	25 ml GL	29.75	**8.15016.0025**
	Deuterium chloride 20 wt % in D_2O 99.95 % D	> 99.95	–	–	1.19	10 ml GA	11.90	**8.15017.0010**
	Deuterium chloride 38 wt % in D_2O 99.5 % D	> 99.5	–	–	1.26	10 ml GA	12.60	**8.15018.0010**
						50 ml GL	63.00	**8.15018.0050**

GA = glass ampoule | SB = septum bottle | GL = glass bottle

Ordering information
MagniSolv™ | Deuterated solvents D-L

	Product	Deuteration degree [%]	H_2O+D_2O (KF) [%]	H_2O (NMR) [%]	Density at 20°C [g/ml]	Quantity / Packaging	Content [g]	Ord. No.
D	**Deuterium oxide 99.9 % D**	> 99.9	–	–	1.11	10 x 0.75 ml GA	8.33	**1.13366.0009**
						10 ml SB	11.10	**1.13366.0010**
						25 ml GL	27.75	**1.13366.0025**
						100 ml GL	111.00	**1.13366.0100**
						500 ml GL	555.00	**1.13366.0500**
	Deuterium oxide 99.96 % D	> 99.96	–	–	1.11	10 x 0.5 ml GA	5.55	**1.03428.0005**
						10 x 0.75 ml GA	8.33	**1.03428.0009**
						10 ml SB	11.10	**1.03428.0010**
						100 ml GL	111.00	**1.03428.0100**
	1.2-Dichlorobenzene-D4 99 % D	> 99	–	< 0.03	1.34	5 ml GA	6.70	**8.15029.0005**
	Dichloromethane-D2 99.8 % D	> 99.8	–	< 0.01	1.36	10 x 0.75 ml GA	10.20	**1.13720.0009**
						10 ml GA	13.60	**1.13720.0010**
	Dichloromethane-D2 99.96 % D	> 99.96	–	< 0.005	1.36	10 x 0.5 ml GA	6.80	**1.04200.0005**
						10 x 0.75 ml GA	10.20	**1.04200.0009**
						10 ml GA	13.60	**1.04200.0010**
	Diethylether-D10 99 % D	> 99	–	–	0.78	1 ml GA	1.00	**8.15031.0001**
	Dimethylacetamide-D9 99 % D	> 99	–	–	1.03	1 ml GA	1.03	**8.15032.0001**
	Dimethylformamide-D7 99.5 % D	> 99.5	< 0.05	< 0.03	1.05	1 ml GA	1.05	**1.11656.0001**
						10 x 0.75 ml GA	7.88	**1.11656.0009**
	Dimethylsulfate-D6 99.5 % D	> 99.5	–	–	1.40	5 ml GA	7.00	**8.15034.0005**
	Dimethylsulfoxide-D6 99.8 % D	> 99.8	< 0.03	< 0.02	1.19	10 x 0.5 ml GA	5.95	**1.03424.0005**
						10 x 0.75 ml GA	8.93	**1.03424.0009**
						10 ml SB	11.90	**1.03424.0010**
						10 ml GA	11.90	**1.03424.0011**
						25 ml GL	29.75	**1.03424.0025**
						50 ml SB	59.5	**1.03424.0050**
						100 ml GL	119.00	**1.03424.0100**
	Dimethylsulfoxide-D6 99.9 % D; 0.1 vol. % TMS	> 99.9	< 0.03	< 0.02	1.19	10 x 0.6 ml GA	7.14	**1.03587.0006**
						25 ml GL	29.75	**1.03587.0025**
						25 ml SB	29.75	**1.03587.0026**
						100 ml GL	119.00	**1.03587.0100**
	Dimethylsulfoxide-D6 99.8 % D; 0.03 vol. % TMS	> 99.8	–	–	1.19	50 ml SB	59.5	**1.03591.0050**
						100 ml GL	119.00	**1.03591.0100**
	Dimethylsulfoxide-06 99.9 % D	> 99.9	< 0.03	< 0.02	1.19	10 x 0.75 ml GA	8.93	**1.03643.0009**
	Dimethylsulfoxide-D6 99.96 % D	> 99.96	< 0.02	< 0.01	1.19	10 x 0.5 ml GA	5.95	**1.03562.0005**
						10 x 0.75 ml GA	8.93	**1.03562.0009**
						10 ml GA	11.90	**1.03562.0010**
						25 ml GL	29.75	**1.03562.0025**
	Dimethylsulfoxide-D6 99.96 % D; 0.03 vol. % TMS	> 99.96	< 0.02	< 0.01	1.19	5 ml GA	5.95	**1.03592.0005**
						25 ml GL	29.75	**1.03592.0025**
E	**Ethanol-D6 99 % D**	> 99	< 0.10	< 0.05	0.90	1 ml GA	0.90	**1.03450.0001**
	Ethanol (ol-D) abs. 99.5 % D	> 99.5	–	–	0.80	50 ml GL	40.00	**8.15037.0050**
F	**Formic acid-D2 97 wt % in D_2O**	> 99.5	–	–	1.27	10 ml GA	12.70	**1.13365.0010**
H	**Hexafluoro-2-propanol-D2 99.5 % D**	> 99.5	–	–	1.65	5 ml GA	8.25	**8.15041.0005**
	n-Hexane-D14 99 % D	> 99	–	–	0.77	1 ml GA	0.77	**8.15043.0001**
L	**Lithiumaluminiumdeuterid 98 %**	> 98	–	–	–	5 g GL	5.00	**8.15048.0005**

GA = glass ampoule | SB = septum bottle | GL = glass bottle

Ordering information
MagniSolv™ | Deuterated solvents M-Z

	Product	Deuteration degree [%]	H_2O+D_2O (KF) [%]	H_2O (NMR) [%]	Density at 20°C [g/ml]	Quantity / Packaging	Content [g]	Ord. No.
M	Methylcyclohexane-D14 99.5 % D	> 99.5	–	–	0.88	5 ml GA	4.40	8.15053.0005
	Methanol (ol-D) 99.5 % D	> 99.5	–	–	0.81	50 ml GL	40.50	8.15051.0050
						100 ml GL	81.00	8.15051.0100
	Methanol-D4 99.8 % D	> 99.8	< 0.03	–	0.89	1 ml GA	0.89	1.06028.0001
						10 x 0.5 ml GA	4.45	1.06028.0005
						10 x 0.75 ml GA	6.68	1.06028.0009
						10 ml SB	8.90	1.06028.0010
						25 ml GL	22.25	1.06028.0025
						25 ml SB	22.25	1.06028.0026
						100 ml GL	89.00	1.06028.0100
	Methanol-D4 99.95 % D	> 99.95	< 0.02	–	0.89	10 x 0.5 ml GA	4.45	1.06025.0005
						10 x 0.75 ml GA	6.68	1.06025.0009
	Methanol-D3 99.5 % D	> 99.5	–	–	0.87	1 ml GA	0.87	8.15052.0001
						5 ml GA	4.35	8.15052.0005
N	Naphthalene-D8 98 % D	> 98	–	–		1 g GL	1.00	8.15000.0001
	Nitrobenzene-D5 99.5 % D	> 99.5	–	–	1.25	10 ml GA	12.53	8.15001.0010
	Nitromethane-D3 99 % D	> 99	< 0.10	< 0.05	1.18	2 x 0.75 ml GA	1.77	1.02914.0002
O	n-Octane-D18 99 % D	> 99	–	–	0.82	1 g GA	0.82	8.15002.0001
P	Phenol-D6 98 % D	> 98	–	–	–	5 g GL	5.00	8.15003.0005
	Phosphoric acid-D3 85 wt % in D_2O 99 % D	> 99	–	–	1.74	10 ml GA	17.40	8.15058.0010
	2-Propanol (ol-D) 98 % D	> 98	–	–	0.79	25 ml GL	19.75	8.15044.0025
	2-Propanol-D8 99.5 % D	> 99.5	–	–	0.89	5 ml GA	4.45	8.15045.0005
	Pyridine-D5 99.8 % D	> 99.8	< 0.03	< 0.02	1.05	10 x 0.75 ml GA	7.88	1.07475.0009
						10 ml SB	10.50	1.07475.0010
S	Sodium deuterium oxide 30 wt % in D_2O 99.5 % D	> 99.5	–	–	1.46	25 ml GL	36.50	8.15055.0025
	Sulfuric acid-D2 96 - 98 wt % in D_2O	> 99.5	–	–	1.88	25 ml GL	47.00	8.15060.0025
						50 ml GL	94.00	8.15060.0050
	Styrene-D8 98 % D	> 99	–	–	0.98	1 ml GA	0.98	8.15061.0001
						10 ml GA	9.80	8.15061.0010
T	Tetrachloroethane-D2 99.5 % D	> 99.5	–	< 0.02	1.62	10 x 0.75 ml GA	12.15	1.03495.0009
						25 ml GL	40.50	1.03495.0025
	Tetramethylsilane	> 99.7	–		0.64	100 ml GL	64.00	1.08183.0100
	TMS-Propionic acid-D4-Na 98 % D	> 98	–	–	–	1 g GL	1.00	1.08652.0001
	Tetrahydrofuran-D8 99.5 % D	> 99.5	< 0.05	< 0.03	0.99	1 ml GA	0.99	1.13364.0001
						10 x 0.75 ml GA	7.43	1.13364.0009
						10 ml SB	9.90	1.13364.0010
	Toluene-D8 99.5 % D	> 99.5	–	< 0.02	0.94	10 ml SB	9.40	1.13368.0010
	Trifluoroacetic acid-D1 99.5 % D	> 99.5	< 0.05	< 0.03	1.50	10 ml GA	15.00	1.13363.0010
X	p-Xylene-D10 99.5 % D	> 99.5	–	–	0.95	10 ml GA	9.50	8.15005.0010

GA = glass ampoule | SB = septum bottle | GL = glass bottle

Easy and safe handling:
Safety by one point cut (OPC).

Packaging and withdrawal systems

Merck Millipore has a strong track record in developing practical packaging concepts and chemical packaging that preserve the high quality of our solvents. We have been authorized as an official inspection authority by the Federal Institute for Material Research and Testing of Germany (BAM).

Merck Millipore offers a unique variety of packaging sizes and types for **LiChrosolv®, Prepsolv®** (high performance liquid chromatography), **Uvasol®** (spectroscopy), **SupraSolv®, UniSolv®** (gas chromatography) and **SeccoSolv®** (dried solvents):

- Glass bottles
- Aluminum bottles
- Septum seal bottles (see page 56)
- Stainless steel barrels
- Other barrels and containers

For many years, Merck Millipore has worked closely with customers to develop solvent withdrawal systems that are tailor-made for our packaging types. Today, our broad range of withdrawal systems and containers is unrivalled in the industry. As a result, customers can rest assured that whatever the application, we can always supply the right container and the right withdrawal system. And since we provide a fully integrated system that includes solvent, container and withdrawal equipment, all components are perfectly matched for optimal results.

Your benefits

Packaging and withdrawal systems

- Application and demand orientated packaging sizes
- Easy, safe and contamination-free solvent handling
- Maximum safety due to an extensive portfolio of safety accessories
- Direct connection to laboratory equipment possible (e.g. HPLC-instruments)
- Ecological and economical benefit by using returnable containers
- Individual user installation or other customized solutions possible
- High lab safety with process automation by level sensor technology

Quantity guideline

Instrumental analysis

Merck Millipore's demanding quality standards apply not only to the reagents themselves but also to the packaging they are supplied in; each material being carefully developed and matched to its product specification. Our extensive variety of packaging types and sizes is unrivaled in the industry. Each of your individual demands can be covered with pack sizes from 0.5 l to 20,000 l and materials from glass and HDPE to metal and stainless steel.

Please select the size and material that suits your application best.

Bottles

Stainless steel barrels

	Bottles	Stainless steel barrels
Pack sizes	0.5 l – 5 l	10 l – 190 l
Annual consumption	0.5 l – 100 l	100 l – 1000 l

Standard packaging

Stainless steel barrels **mandatory returnable packaging**

- Advantage: no rinsing / cleaning / disposing
- Return unrinsed with original labels and tightly closed

Containers

190 l – 20,000 l

> 1000 l

Stainless steel containers **mandatory returnable packaging**

- Customized products and containers
- Individual processes with rental agreements

Safety & environment

- Each packaging material is strictly safety tested by the Federal Institute for Material Research and Testing of Germany (BAM) and designated as suitable for the transport of hazardous materials.
- Design improvements combined with Merck Millipore withdrawal systems and safety accessories allow optimal removal of any residual quantities – minimization of the environmental pollution risk.
- The usage of Merck Millipore withdrawal systems (e.g. direct connections to instruments, central lab supply) reduce the solvent vapors emitted to the environment during solvent usage.
- Unbreakable properties of e.g. Aluminum bottles or stainless steel barrels minimize the environmental pollution risks.
- Returnable stainless steel barrels reduce the packaging waste and save raw materials.

Packaging overview

Instrumental analysis

Glass bottles


500 ml


1 liter


2.5 liter


4 liter

- **Optimum characteristics for handling, storage and transport**
- **Safe footprint**
- **Low center of gravity**
- **Optimum emptying**
- **Safety screw cap S40 (Polypropylene) with a circlip as an originality device and a PTFE-insert for highest closeness**
- **High pressure resistance**
- **Special pouring lip for non-drip pouring**
- **Level sensors available**

To comply with transport regulations the glass bottles must be protected by pads of polystyrene. Such polystyrene packages are dispatched as packages of 6 x 1 l or 4 x 2.5 l in a special folding corrugated cardboard box that has been approved for transport purposes. For daily lab handling of glass bottles we recommend to use the safety carriers 9.20078.0001 for 0.5 l to 2.5 l or 1.20080.0001 for 4 l glass bottles.

Aluminum bottle


5 liter

- **Optimum characteristics for handling, storage and transport**
- **Safety screw cap S40 (Polypropylene) with a circlip as an originality device and a PTFE-insert for highest closeness**
- **UN certification to be sent without polystyrene outer packaging**
- **Optimum material characteristics (avoidance of interactions between solvents and packaging material)**
- **Low weight (easy handling and low transport costs)**
- **No risk of fracture**
- **Level sensors available**

Stainless steel barrels


10 liter


30 liter


185 liter

NEW

Closed system
For extremely water-sensitive applications Merck Millipore provide specially designed 10 l and 30 l stainless steel barrels which are dedicated to the product and completely closed.

- **Optimum material characteristics (avoidance of interactions between solvents and packaging material)**
- **Use as returnable barrels**
- **Can be combined with a variety of withdrawal systems and level sensors**
- **Optimum emptying**
- **Stackable**

Stainless steel, due to its properties (e.g. its inertness), is an ideal packaging material, particularly with regard to the maintenance of the quality of solvents. Merck Millipore has thus been using stainless steel barrels for various types of highly purified solvents for many years. The range of stainless steel barrels currently comprises 10 liter, 30 liter and 185 liter volumes.

▶ **For more details please have a look on page 50**

Other barrels and containers


400 liter

1,000 liter

1,400 liter

For applications with a high demand for high purity solvents – especially in preparative work – the use of specific packaging could be required. Also for this demands we offer different types of containers, which are designed especially for the use of high quality solvents. Our standard range includes 400 liter, 1,000 liter and 1,400 liter stainless steel pressure containers, which are employed customer- and product specific. If technical possible and allowed, we also fill other packaging that you provide.

Packaging details and safety accessories

Instrumental analysis

Glass bottles [available from 0.5 l up to 4 l]

Specially developed S40 thread
withstands higher contact pressure and ensures tighter seals

Specially formed, sharp thread lip
for safe drip free pouring

Specially treated high quality glass
with extreme durability due to constant wall thickness for highest safety and product quality

New S40 screw cap
Tamper proof closure will remain as ring on the bottle neck

Pour ring for safe and ergonomic withdraw
New tension-free manufacturing technology: "bottle out of one drop" to avoid any predetermined breaking point

Unique, clear and complete labeling
with product specifications and all relevant hazard declarations

Broad and stable base
for safe stand with low point of gravity

Technical data

Material:
Moulded amber glass, hydrolytic class 3

Available packaging size:
0.5 l, 1 l, 2.5 l and 4 l

Height, diameter and net weight (bottle size):
180 mm, ø 83 mm, approx. 450 g (0.5 l)
222 mm, ø 101 mm, approx. 600 g (1 l)
258 mm, ø 151 mm, approx. 1140 g (2.5 l)
350 mm, ø 162 mm, approx. 1525 g (4 l)

Safety accessories

Bottle opening key S40 / S28	1.08801.0001
Safety carrier for bottles up to 2.5 l	9.20078.0001
Safety carrier for 4 l bottles	1.40140.0001
HPLC-adapter with integrated level sensor for Merck Millipore bottles with S40 thread (supply)	9.67100.2001
Display for level sensor	9.67100.2004
Label set for self-labeling lab-mixtures according to GHS, DIN EN ISO & GLP	1.00801.0001
HPLC-S40-adapter (supply) with valve and filter for direct bottle connection to HPLC-tubes	1.03830.0001
HPLC-S40-adapter (disposal) for direct bottle connection to HPLC-tubes	1.03831.0001
Exhaust air filter for 1.03831.0001	1.03833.0001

Aluminum bottle [available for 5 l]

Specially developed S40 thread
withstands higher contact pressure
and ensures tighter seals

Specially formed, sharp thread lip
for safe drip free pouring

Specially treated high quality aluminum
with extreme durability, inertness
and shock resistance for highest safety
and product quality

No outer shipping packaging necessary
to protect the environment
and tobenefit from
economical advantages

New S40 screw cap
Tamper proof closure will remain as ring
on the bottle neck

Pour ring
for safe and ergonomic withdraw

Unique, clear and complete labeling
with product specifications
and all relevant hazard declarations

Low bottle weight
for easy, safe and economic solvents
handling

Technical data

Material:
Aluminum

Available packaging size:
5 l

Height, diameter and net weight:
298 mm, ø 175 mm, approx. 285 g

Safety accessories

Bottle opening key S40 / S28	1.08801.0001
HPLC-adapter with integrated level sensor for Merck Millipore bottles with S40 thread (supply)	9.67100.2001
Display for level sensor	9.67100.2004
Label set for self-labeling lab-mixtures according to GHS, DIN EN ISO & GLP	1.00801.0001
HPLC-S40-adapter (supply) with valve and filter for direct bottle connection to HPLC-tubes	1.03830.0001
HPLC-S40-adapter (disposal) for direct bottle connection to HPLC-tubes	1.03831.0001
Exhaust air filter for 1.03831.0001	1.03833.0001

Safety and the returnable system

Instrumental analysis

Important safety notices

If flammable liquids (e.g. solvents) are to be used, the container (10 l and more) must be properly earthed according to valid safety regulations to avoid explosion and fire risks. Appropriate measures must be taken to discharge static electricity.

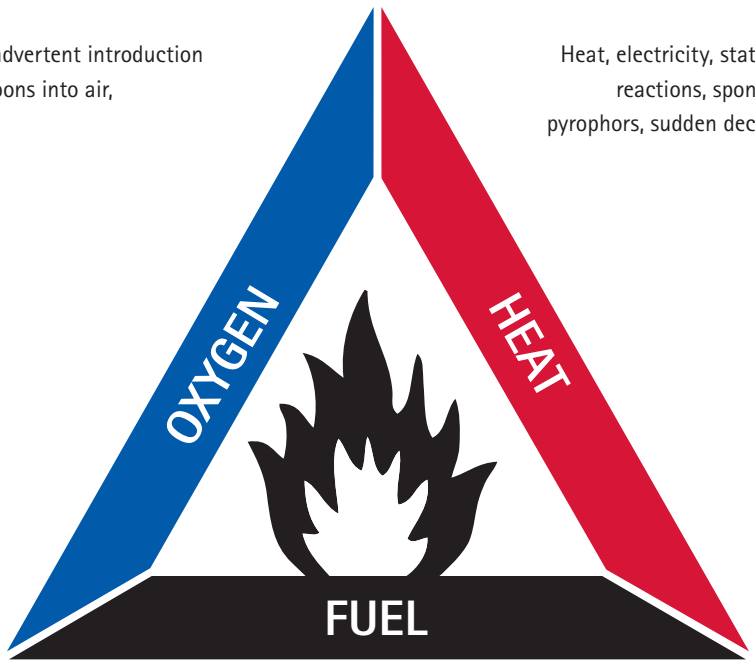
- General warnings and safety instructions must be observed.
- All components (e.g. container and withdrawal system) must be grounded separately in accordance with the applicable safety regulations.
- Grounding clamps must have metallic contact with both the container and the withdrawal system, and a safe ground connection.
- The grounding of the container and the grounding of the withdrawal system must be installed before opening the container.
- The user must always wear conductive personal protective equipment, especially shoes and gloves, to avoid electrostatic charges. Therefore, the user must always wear conductive personal protective equipment, especially shoes and gloves.
- The floor has to be conductive.
- Sampling vessels made of insulating material with a volume greater than 1 liter should not be used.
- Before using organic solvents, the user must ensure that there are no additional ignition hazards caused by process-specific parameters, such as increased ignitability of the substances due to changed environmental conditions or when sampling in combination with highly charge-generating processes.

These measures reduce the risk of electrostatic separation of charges to increase safety in daily solvents handling dramatically.

The fire and explosion triangle

Oxidizer
Planned introduction of air, inadvertent introduction of oxygen, release of hydrocarbons into air, weathered fluids, oxidizers

Ignition source
Heat, electricity, static electricity, friction, chemical reactions, spontaneous combustion, dieseling, pyrophors, sudden decompression, catalytic reactions

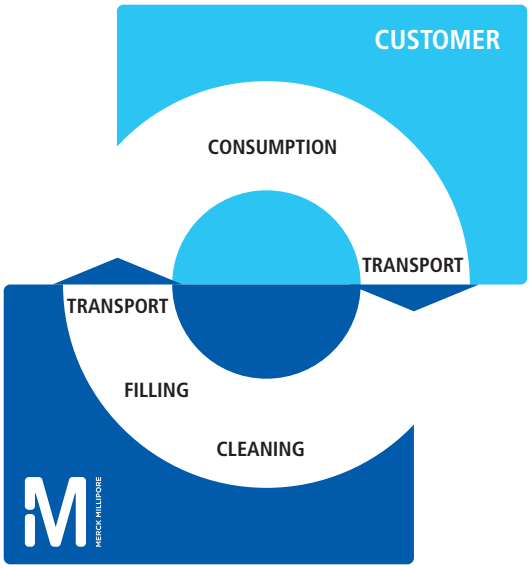


Heavy and light gases, hydrocarbon liquids and vapours, vapours of chemicals / lubricants / solvents, frac oils, flammable materials

Removing at least one of the component avoids the fire / explosion.

Returnable process

The returnable system



Easy detection

Symbols for easy detection which packaging material can be returned:

returnable packaging

Stainless steel barrels and containers are mandatory to return and are coded with a unique ID number – **mandatory returnable packaging**.

returnable packaging

Stainless steel drums are part of a returnable process – optional returnable packaging.

one-way packaging

Metal drums are used as one-way packaging.

Merck Millipore stainless steel barrels and drums are part of a returnable process. Their use means that the user no longer has to cope with the topics of complete emptying, rinsing, disposing of the rinsing liquid and even disposing of the packaging itself in the proper manner.

After consumption of the solvents on user site the empty barrels and drums are returned to Merck Millipore, unrinsed and with their original labels still attached. On their return, we will ensure that they are properly cleaned, checked and refilled. Clear advantages for a time saving and cost effective way of daily solvent handling.

Important safety advice

Our withdrawal systems have been developed and optimized for the use with containers and solvents from Merck Millipore. Merck Millipore therefore disclaims any warranty or liability for the operability of its withdrawal systems in connection with containers or solvents from other manufacturers.

Merck Millipore reserves the right to refrain from the delivery of withdrawal systems if the respective order does not indicate that each withdrawal system will be used in combination with appropriate solvents and containers from Merck Millipore.

We inform and advise our customers to the best of our knowledge and ability but without any engagement or liability on our part. Our customers must obey all existing laws and regulations. This also applies in respect of any protected rights of third parties. Our information and advice does not eliminate the need for our customers to check, on their own responsibility, that our products are suitable for the purpose envisaged.

Packaging details and safety accessories

Instrumental analysis

Stainless steel barrels [available from 10 l up to 185 l]

Protective cap
with originality sealing

Special formed rims
for best stackability

Safe and easy handling due to 2 large handles
(optimal position for grounding clamps)

Standard openings
to ensure highest interoperability

Engraved UN-code
includes important safety information
and provides packaging certificates

High quality stainless steel
with extreme durability, inertness
and shock resistance for highest safety
and product quality

Unique, clear and complete labeling
with product specifications
and all relevant hazard declarations

returnable packaging

Cost effectiveness and environmental protection
by using the barrel returning process

Bottom reservoir
for optimal emptying

Technical data

Parameter	10 l barrel	30 l barrel	185 l barrel
Height	31 cm	44 cm	97 cm
Diameter	28 cm	37 cm	58 cm
Wall thickness	1.5 mm	1.5 mm	1.5 mm
Volume	12 l	33.5 l	206 l
Filling quantity	10 l	30 l	185 l
Weight (empty)	5.5 kg	9.6 kg	31 kg
Number per pallet	11	6	2
Openings	2" centrally and 3/4" decentrally located		
Material	stainless steel 1.4301		

Safety accessories

Antistatic set (3 cables)	1.07070.0001
Barrel opening key	1.08803.0001

▶ **Withdrawal systems see page 52**

Customized containers

Standard openings and connections
to ensure highest interoperability

Engraved UN-code
includes important safety information
and provides packaging certificates

High quality stainless steel
with extreme durability, inertness
and shock resistance for highest safety
and product quality

Unique, clear and complete labeling
with product specifications
and all relevant hazard declarations

returnable packaging

Cost effectiveness and environmental protection
by using the container returning process

Bottom reservoir
for optimal emptying

Retraction shoes
for safe transportation

Technical data

Material:
Stainless steel

Available packaging size:
400 l, 1000 l and 1400 l

Safety accessories

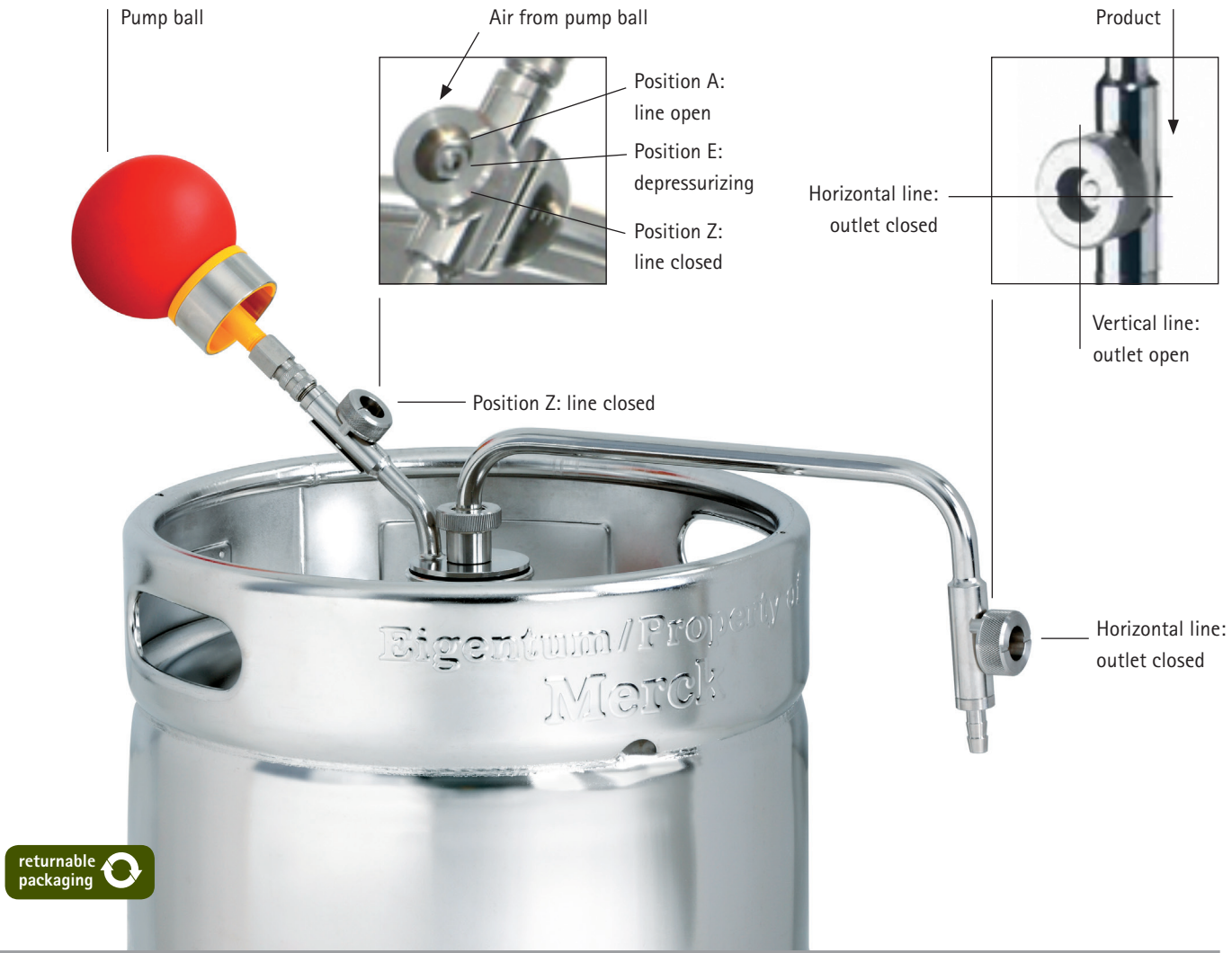
Antistatic set (3 cables)	1.07070.0001
Spiral gas feeding tube for coupling K	9.67100.9051
Adapter for product connection (coupling M, SPM 08) to 1/2 NPT inner thread	9.67100.1086
Sampling unit for coupling M	9.67400.0001
Purging adapter for 9.67400.0001	9.67400.0002

Withdrawal systems for barrels

Instrumental analysis

Manual pressure build-up

- Safe, easy and convenient solvent handling
- Usage of tested high quality materials to ensure a reliable, contamination free and safe handling of Merck Millipore solvents
- No dependence on gas supply
- High flexibilty due to independence on gas supply



System at a glance

Order number	**1.01123.0001**		**Necessary completive products**	-	
Suitability	10 l and 30 l stainless steel barrels		**Recommended safety products**	Antistatic set (3 cables)	1.07070.0001
Operation mode	Manual pressure build-up by pump ball			Barrel opening key	1.08803.0001
Set components	Withdrawal system body with 2" clamp Hand pump ball with rapid action connector 10 l dip tube 30 l dip tube		**Spare parts**	Dip tube for 10 l barrels Dip tube for 30 l barrels Hand pump ball Hand pump ball with quick connector	9.67100.1011 9.67100.1029 9.67114.0000 9.67100.1079

Pressurizing with inert gas

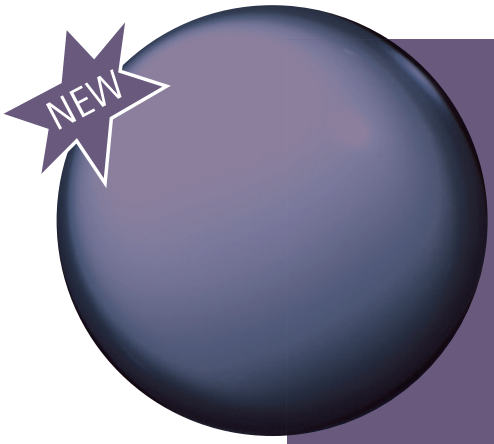
- Safe, easy and convenient solvent handling
- Usage of tested high quality materials to ensure a reliable, contamination free and safe handling of Merck Millipore solvents
- Cost effective solution due to economic concept of returnable container handling
- Construction of a central supply system, direct connection to instruments or individual installations as options

System at a glance

Order number	**1.06710.0001**	
Suitability	10 l, 30 l and 185 l stainless steel barrels 10 l, 25 l and 190 l stainless steel drums	
Operation mode	Pressurizing with inert gas (house gas / gas bottle)	
Set components	Filling nozzle with stainless steel coated, flexible PTFE-tube (80 cm)	9.67100.9090
	Gas feeding tube	9.67100.9051
	Threaded adapter with vertical connections	9.67100.9002

Necessary completive products	Dip tube for 10 l stainless steel barrels	9.67100.1040
	Dip tube for 30 l stainless steel barrels	9.67100.1041
	Dip tube for 185 l stainless steel barrels	9.67100.1185
Recommended safety products	Antistatic set (3 cables)	1.07070.0001
	Barrel opening key	1.08803.0001
Spare parts	Filling nozzle with stainless steel coated, flexible PTFE-tube (80 cm)	9.67100.9090
	Gas feeding tube	9.67100.9051
	Threaded adapter with horizontal connections	9.67100.9003
	Threaded adapter with vertical connections	9.67100.9002

DNA-/RNA synthesis reagents



Additional to our high quality acetonitrile dried with low water content up to 10 ppm, Merck Millipore has now started to provide DNA-/RNA synthesis reagents worldwide – both on a custom basis as well as for the broader market, including core facilities and other commercial companies. As the field expands, we will continue to create new formulations, align with new synthesis instrumentation manufacturers, and broaden our DNA & RNA synthesis portfolio. So if you don't see what you need, talk to us. We would be glad to work with you to develop new custom blended synthesis reagents and delivery mechanisms to meet your specific requirements.

Your benefits

Our DNA-/RNA synthesis reagent portfolio offers:

- A comprehensive range of high quality reagents
- The highest grade of solvents
- Broad range of packaging for specific synthesis instrumentation
- Quantities from bottle to bulk

Our products have the lowest published specifications for:

- Water content
- Acid content
- Particulate levels
- Our product features
  - Give you trust in product quality resulting in a high quality synthesis
  - Support you in running reliable synthesis with reproducible results
  - Help you to deliver a fast and cost-efficient work

All DNA/RNA reagents are available in a wide variety of packaging types, including bottles of up to 4 liters. We also offer customized packaging, delivery, and engineering support that will allow you to make direct connections to your laboratory instruments.

Ordering information
DNA-/RNA synthesis reagents

www.merckmillipore.com/solvents-dna-rna

	Product	Details	Content / Packaging	Ord. No.
A	**Acetonitrile for DNA synthesis** (≤ 10 ppm water content)	Septum bottle	50 ml SB	**1.12636.0050**
		Stand alone from instrument (S40 neck finish)	2.5 l GL	**1.12636.2500**
		Stand alone from instrument (S40 neck finish)	4 l GL	**1.12636.4000**
		Returnable stainless steel container	30 l FST	**1.12636.9033**
		Returnable stainless steel container	185 l ST	**1.12636.9185**
	Acetonitrile for DNA synthesis (≤ 30 ppm water content)	Stand alone from instrument (S40 neck finish)	2.5 l GL	**1.13212.2500**
		Stand alone from instrument (S40 neck finish)	4 l GL	**1.13212.4000**
		Returnable stainless steel container	185 l ST	**1.13212.9185**
	Activator Solution 0.25M Ethylthio-1H-tetrazole in Acetonitrile	Attaches directly to Instrument (28/405 neck finish)	450 ml GL	**8.57000.0450**
		Stand alone from Instrument (GL-45 neck finish)	1 l GL	**8.57000.1000**
		Stand alone from Instrument (GL-45 neck finish)	4 l GL	**8.57000.4000**
	Activator Solution 0.30M 5-Benzylmercatotetrazole in Acetonitrile	Stand alone from Instrument (GL-45 neck finish)	1 l GL	**8.57001.1000**
		Stand alone from Instrument (GL-45 neck finish)	2.5 l GL	**8.57001.2500**
C	**Capping Reagent A Tetrahydrofuran/2,6-Lutidine/Acetic anhydride 8/1/1 v/v/v**	Attaches directly to Instrument (28/405 neck finish)	450 ml GL	**1.18603.0450**
	Capping Reagent A Tetrahydrofuran/Pyridine/Acetic anhydride 8/1/1 v/v/v	Attaches directly to Instrument (28/405 neck finish)	450 ml GL	**8.57011.0450**
	Capping Reagent A Tetrahydrofuran/Acetic anhydride 9/1 v/v	Attaches directly to Instrument (28/405 neck finish)	450 ml GL	**1.18605.0450**
	Capping Reagent A 20 % n-Methylimidazole in Acetonitrile v/v	Attaches directly to Instrument (GL-45 neck finish)	500 ml GL	**8.57002.0500**
		Stand alone from Instrument (GL-45 neck finish)	1 l GL	**8.57002.1000**
		Stand alone from Instrument (38 mm neck finish)	4 l GL	**8.57002.4000**
	Capping Reagent B n-Methylimidazole/Tetrahydrofuran/Pyridine 1/8/1 v/v/v	Attaches directly to Instrument (28/405 neck finish)	450 ml GL	**1.18609.0450**
	Capping Reagent B 16 % n-Methylimidazole in Tetrahydrofuran v/v	Attaches directly to Instrument (28/405 neck finish)	450 ml GL	**8.57012.0450**
		Stand alone from Instrument (38 mm neck finish)	4 l GL	**8.57012.4000**
	Capping Reagent B1 40 % Acetic anhydride in Acetonitrile v/v	Attaches directly to Instrument (28/405 neck finish)	200 ml GL	**8.57005.0200**
		Attaches directly to Instrument (GL45 neck finish)	500 ml GL	**8.57005.0500**
	Capping Reagent B2 60 % 2,6-Lutidine in Acetonitrile v/v	Attaches directly to Instrument (28/405 neck finish)	200 ml GL	**8.57006.0200**
		Attaches directly to Instrument (GL45 neck finish)	500 ml GL	**8.57006.0500**
O	**Oxidizer Reagent 0.02M Iodine in Tetrahydrofuran/Pyridine/H_2O 70/20/10 v/v/v**	Attaches directly to Instrument (28/405 neck finish)	450 ml GL	**8.57013.0450**
		Stand alone from Instrument (38 mm neck finish)	4 l GL	**8.57013.4000**
	Oxidizer Reagent 0.05M Iodine in Pyridine/H_2O 90/10 v/v	Stand alone from Instrument (GL-45 neck finish)	1 l GL	**8.57008.1000**
		Stand alone from Instrument (GL-45 neck finish)	2.5 l GL	**8.57008.2500**
D	**Deblock Reagent 3.0 % Trichloroacetic acid in Dichloromethane w/v**	Stand alone from Instrument (38 mm neck finish)	4 l GL	**8.57014.4000**
	Deblock Reagent 3.0 % Dichloroacetic acid in Toluene v/v	Stand alone from Instrument (GL-45 neck finish)	1 l GL	**8.57007.1000**
		Stand alone from Instrument (GL-45 neck finish)	2.5 l GL	**8.57007.2500**
		Stand alone from Instrument (38 mm neck finish)	4 l GL	**8.57007.4000**
		NOW Pak container	20 l PEC	**8.57007.9020**
	Deblock Reagent 3.0 % Dichloroacetic acid in Dichloromethane v/v	Stand alone from Instrument (38 mm neck finish)	4 l GL	**1.18619.4000**
	DEA Solution 20 % Diethylamine in Acetonitrile	Stand alone from Instrument (GL-45 neck finish)	500 ml GL	**8.57010.0500**

SB = septum bottle | GL = glass bottle | FST = Fully-sealed stainless steel returnable barrel | ST = stainless steel returnable barrel | PEC = NOWPak HDPE drum

SeccoSolv®

Dried solvents | SeccoSept® closure system

Dried solvents of highest purity and with lowest water content are essential for many laboratory applications – and here **SeccoSolv®** ready-to-use solvents fulfill even the most stringent requirements. They are produced using specially selected distillation methods that ensure consistently high dryness and batch-to-batch consistency. **SeccoSolv®** dried solvents are available in 500 ml bottles and also in 1 l and 2.5 l bottles with a standard Merck Millipore S40 cap.

To protect the quality of these products even better from potential contaminants, our new **SeccoSept®** septum seal cap provides multiple layers of protection to keep solvents in flawless condition before, during, and after removal. These innovative caps are available on 150 and 1,000 ml packaging sizes, and complement our existing product line perfectly.

SeccoSolv® dried solvents are also available in returnable stainless steel containers from 10 l up to 1,000 l, and in fully-sealed container systems for extremely water-sensitive applications. Tailor-made solutions are available on request.

Safety – double tamper evidence closure and SeccoSept®, the innovative septum seal cap

A security ring on the screw closure and the seal on the cap opening remove any doubt as to whether the product has been opened previously. The septum is a PTFE-coated silicon sealing disk that fits precisely into the cap, while a safety lip in the cap keeps it securely in place. As a result, the septum can be punctured multiple times without losing stability or becoming porous.

The special silicon has outstanding self-sealing properties that enable rapid sealing of the puncture site. Properties of the septum exclude the possibility of it interacting with the solvent.

Simple handling – five extra-large septum surfaces and rotating cap

Only the septum circle currently in use is exposed to the environment. After removing the solvent, the user turns the cap to the sealing position – now the fresh puncture site is immediately protected from potential contaminants. When needed, the bottle's rotating cap enables one-handed operation for practical and safe handling during your applications.

Flexibility – with and without septum cap

If you need to withdraw larger quantities of solvent, simply take off the septum cap entirely. Or remove the yellow cap for access to all five septum circles.

Your benefits

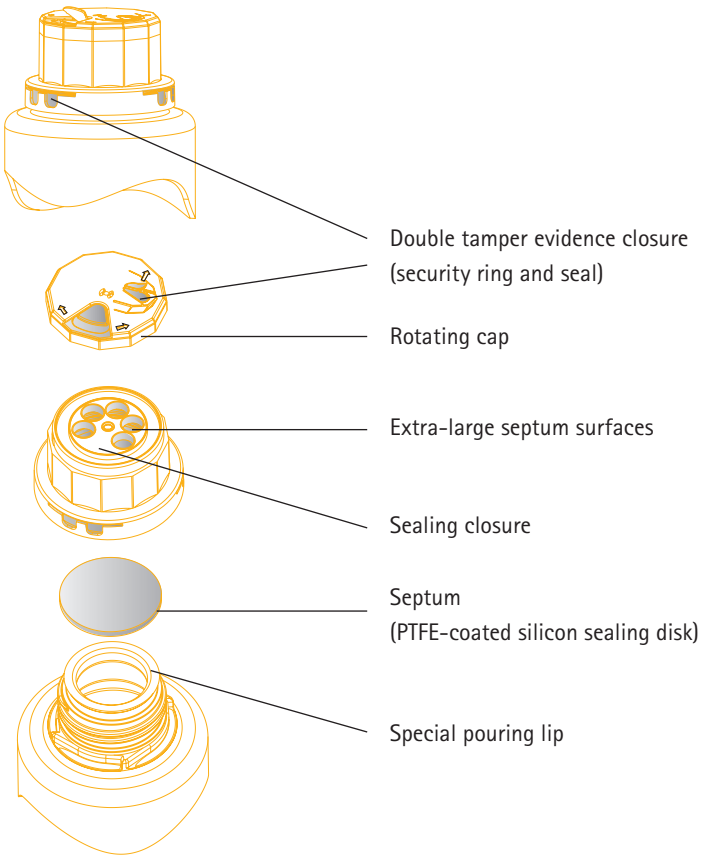
SeccoSolv® | SeccoSept®

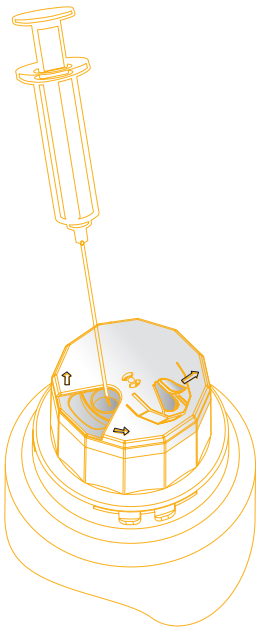
- Reliable results save time and give trust by
  - Highest quality
  - Constant and high level of dryness
  - SeccoSept®, best protection for keeping solvent quality
- Resulting in high reproducibility of the synthesis
- Flexibility through broad packaging variety for less chemical and packaging waste reducing costs
- Time- & cost saving and minimized health & environmental risk compared to self-dried solvents

SeccoSolv®

Dried solvents | SeccoSept® closure system

SeccoSept® the septum-innovation!





More service for your daily lab work

Take advantage of our "Care-Free Service Package" for your solvent needs. In addition to reliable quality, we will provide you with comprehensive technical support, helpful documentation, rapid delivery times, wide variety of packaging and practical withdrawal systems!

Do you need large quantities, different packaging sizes, new products, or modified product specifications? Please contact your local Merck Millipore representative directly for individual inquiries.

▶ **Packaging and withdrawal systems see page 40 and 80**

Ordering information
SeccoSolv® | SeccoSept®

	Product	Purity (GC) min. [%]	Evap. residue max. [mg/l]	Water max. [%]	Content / Packaging	Ord. No.	Content / Packaging	Ord. No. SeccoSept®
A	**Acetone**	99.9	10	0.0075	500 ml GL	**1.00299.0500**	150 ml SB	**1.00299.0161**
							1 l SB	**1.00299.1001**
	Acetonitrile	99.9	10	0.005	500 ml GL	**1.00004.0500**	150 ml SB	**1.00004.0161**
							1 l SB	**1.00004.1001**
	Acetonitrile for DNA synthesis (≤ 10 ppm water content)	99.9	1	0.001	50 ml GL	**1.12636.0050**		
					2.5 l GL	**1.12636.2500**		
					4 l GL	**1.12636.4000**		
					NEW 30 l FST	**1.12636.9033**		
					185 l ST	**1.12636.9185**		
	Acetonitrile for DNA synthesis (≤ 30 ppm water content)	99.9	1	0.003	2.5 l GL	**1.13212.2500**		
					4 l GL	**1.13212.4000**		
					185 l ST	**1.13212.9185**		
C	**Chloroform**	99.9	10	0.003			1 l SB	**1.02395.1001**
NEW	**Cyclopentylmethylether**	99.9	20	0.0075			150 ml SB	**1.08296.0161**
							1 l SB	**1.08296.1001**
D	**Dichloromethane**	99.9	10	0.004	500 ml GL	**1.06051.0500**	150 ml SB	**1.06051.0161**
							1 l SB	**1.06051.1001**
	Diethyl ether	99.9	10	0.005	500 ml GL	**1.00929.0500**	150 ml SB	**1.00929.0161**
					1 l GL	**1.00929.1000**	1 l SB	**1.00929.1001**
	Dimethylformamide	99.9	10	0.003	2.5 l GL	**1.02375.2500**	150 ml SB	**1.02375.0161**
							1 l SB	**1.02375.1001**
NEW	**Dimethylformamide for peptide synthesis** (Free Amines ≤ 10 ppm)	99.9	10	0.03	2.5 l GL	**1.00397.2500**		
					4 x 4 l GL	**1.00397.4004**		
					NEW 25 l STD	**1.00397.6025**		
	Dimethyl sulfoxide	99.9	10	0.025	500 ml GL	**1.02931.0500**	150 ml SB	**1.02931.0161**
					1 l GL	**1.02931.1000**	1 l SB	**1.02931.1001**
					2.5 l GL	**1.02931.2500**		
					NEW 30 l FST	**1.02931.9033**		
	1,4-Dioxane	99.9	10	0.005	500 ml GL	**1.03110.0500**	150 ml SB	**1.03110.0161**
							1 l SB	**1.03110.1001**
E	**Ethanol**	99.9	10	0.01	500 ml GL	**1.00990.0500**	150 ml SB	**1.00990.0161**
							1 l SB	**1.00990.1001**
	Ethyl acetate	99.9	10	0.003			1 l SB	**1.02396.1001**
H	**n-Hexane**	99.0	10	0.004	500 ml GL	**1.04373.0500**		
I	**Isooctane**	99.8	10	0.003	500 ml GL	**1.04715.0500**		
M	**Methanol**	99.9	10	0.003	500 ml GL	**1.06012.0500**	150 ml SB	**1.06012.0161**
					1 l GL	**1.06012.1000**	1 l SB	**1.06012.1001**
					2.5 l GL	**1.06012.2500**		
					10 l STD	**1.06012.6010**		
NEW	**n-Methyl-2-pyrrolidone for peptide synthesis** (Free Amines ≤ 5 ppm)	99.7	–	0.05	2.5 l GL	**1.00574.2500**		
					4 l GL	**1.00574.4000**		
					NEW 25 l STD	**1.00574.6025**		
NEW	**2-Methyltetrahydrofuran**	99.9	10	0.01			150 ml SB	**1.08291.0161**
							1 l SB	**1.08291.1001**
P	**2-Propanol**	99.9	10	0.005	500 ml GL	**1.00994.0500**	150 ml SB	**1.00994.0161**
							1 l SB	**1.00994.1001**
	Pyridine	99.9	10	0.0075	500 ml GL	**1.07463.0500**	150 ml SB	**1.07463.0161**
							1 l SB	**1.07463.1001**
T	**Tetrahydrofuran**	99.9	10	0.005	500 ml GL	**1.08107.0500**	150 ml SB	**1.08107.0161**
					1 l GL	**1.08107.1000**	1 l SB	**1.08107.1001**
					NEW 10 l FST	**1.08107.9013**		
	Toluene	99.9	10	0.005	500 ml GL	**1.08326.0500**	150 ml SB	**1.08326.0161**
							1 l SB	**1.08326.1001**
	Trifluoroacetic acid for protein sequencing	99.7 (acidimetric)	–	0.01	50 ml GL	**1.08178.0050**		
	Trifluoroacetic acid (25 % solution in water) **for protein sequencing**	24.5 - 25.5 (acidimetric)	–	74.5 - 75.5	50 ml GL	**1.08218.0050**		

All solvents filtered through 0.2 µm. | GL = glass bottle | FST = Fully-sealed stainless steel returnable barrel | SB = septum seal bottle | ST = stainless steel returnable barrel | STD = stainless steel drum

EMSURE®

Solvents for analysis | ACS, ISO, Reag. Ph Eur

EMSURE® for analysis
Our premium grade for all regulated and highly demanding lab applications

The highest purity, consistent product quality and proven safety. These are the hallmarks of all **EMSURE®** products. Whether for complex applications, or routine analysis, our premium grade **EMSURE®** provide an extra level of quality and consistency thanks to their unmatched specifications. Not only are these premium reagents optimized for highly demanding analysis, but also fully compliant with international standards.

Laboratory use

EMSURE® – EMPARTA® – EMPLURA® | The three quality grades of Merck Millipore classical solvents

Whenever you want to use a solvent, you have to consider your requirements, your application and of course your budget. Each application is different and the range of solvents you choose should be perfectly adapted to your application. No matter what your application is (cleaning, product synthesis, sample preparation or highly critical analysis) – no matter if you have to follow international norms, ensure safety regulations or require both bulk and small quantities – the classical solvents product range has the product that perfectly fits to your needs.

Laboratory use	Cleaning	Synthesis R&D	Analysis QC	Other critical or demanding lab applications with specific requirements
Pharma industry and regulated applications				
Less-regulated applications				
Science, research, contract labs				
Schools, education				

EMPLURA® ▸ page 74

EMPARTA® ▸ page 70

EMSURE® ▸ page 60

Compliant

EMSURE® specifications not only fulfill ACS, Reag. Ph Eur and ISO guidelines – but surpass them. That's because we are regularly adding new parameters required by our customers.

This is essential as it enables the use of the latest technologies, such as the concentration of metals, e.g. for use in combination with AAS.

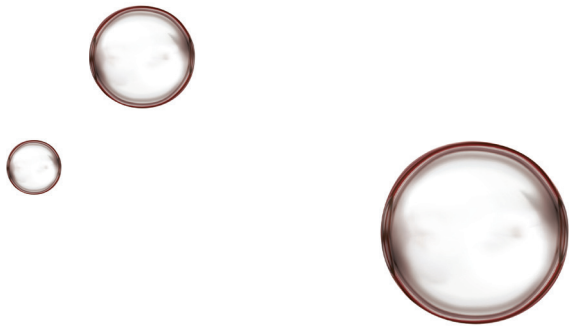
Universal

Our solvents have no boundaries. Due to their multi-standard compliance, they can be used across the globe for almost all applications.

This is a great advantage for our global customers as it allows them to work with the same standard operating procedures (SOPs), and export to countries with different regulations.

Requirements

Nowadays, the requirements made of a solvent are much higher than its actual product characteristics. In addition to analytical purity, factors such handling, safety and documentation all play an increasingly role. An unparalleled range of packaging, withdrawal systems and services adds the finishing touch to what we have to offer: an all-inclusive package in which components are finely tuned down to the vary last detail.



Your benefits

EMSURE®

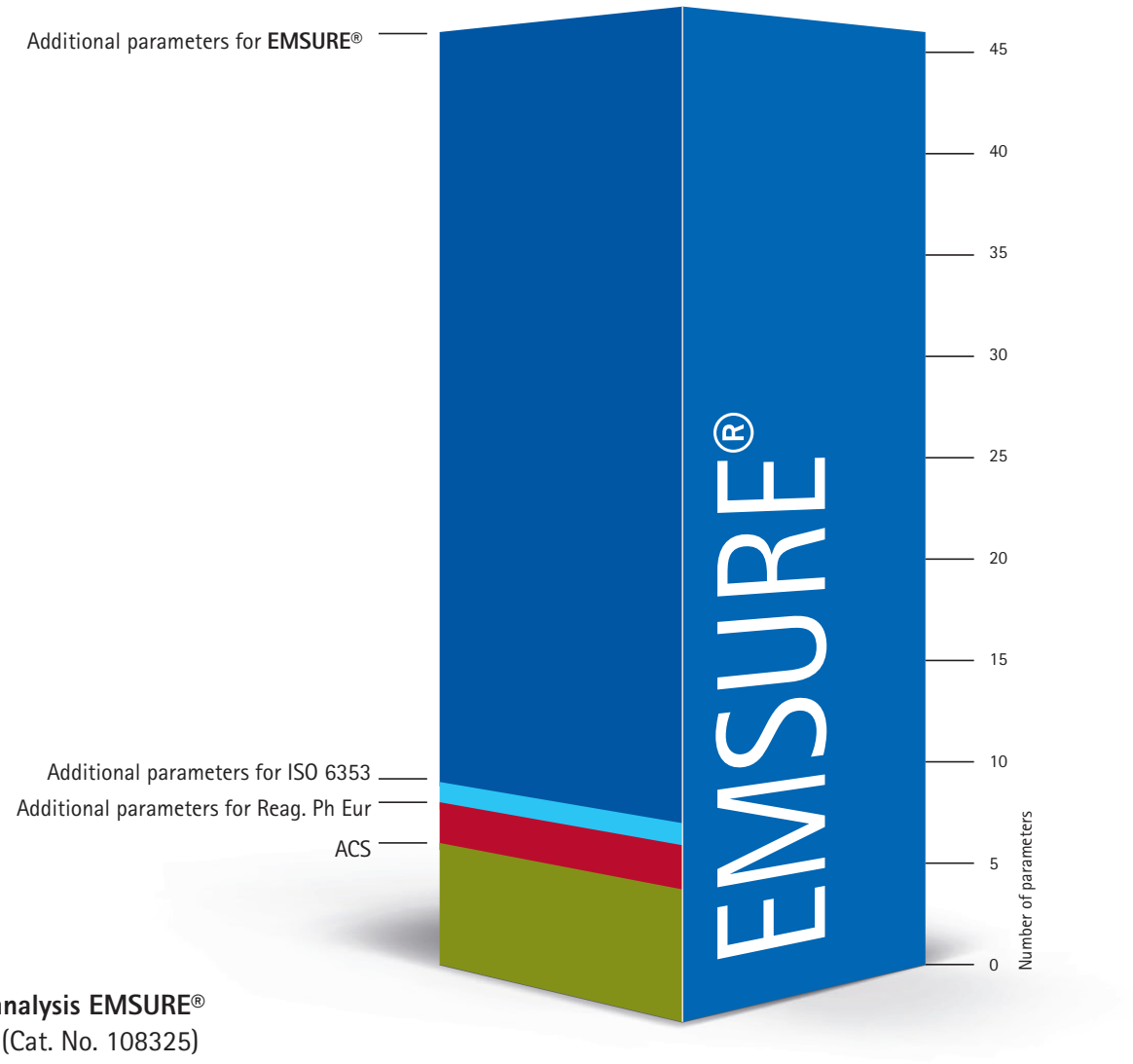
- Premium grade for regulated and highly demanding lab applications
- Worldwide best and most extensive product specification with up to 70 parameters
- Full compliance with ACS, ISO and Reag. Ph Eur
- Widest range of pack sizes and packaging materials

EMSURE®

Solvents for analysis | ACS, ISO, Reag. Ph Eur

What makes EMSURE® reagents special?

Their unrivaled specifications.
Tested for up to 70 parameters, EMSURE® products offer the best and most extensive specifications – worldwide!
This, combined with lower impurity levels, gives you greater control of your analysis, and helps you avoid wrong analytical results, especially when developing new applications.



Solvents
Toluene chloride for analysis EMSURE®
ACS, ISO, Reag. Ph Eur (Cat. No. 108325)

The graph demonstrates the typical number of parameters specified by EMSURE® products versus those required by regulatory organizations (ACS, ISO and Reag. Ph Eur). Clearly, EMSURE® not only fulfills international guidelines,but surpasses them by far.

Ordering information
EMSURE® | Solvents for analysis A-B

	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]	Content / Packaging	Ord. No.
A	**Acetone for analysis EMSURE®** **ACS, ISO, Reag. Ph Eur**	99.8	0.0005	0.05	1 l GL	**1.00014.1000**
					1 l PE	**1.00014.1011**
					2.5 l GL	**1.00014.2500**
					2.5 l PE	**1.00014.2511**
					4 l GL	**1.00014.4000**
					5 l PE	**1.00014.5000**
					10 l ST	**1.00014.6010**
					25 l ST	**1.00014.6025**
					25 l ME	**1.00014.9025**
					180 l ME	**1.00014.9180**
					190 l ME	**1.00014.6190**
	Acetonitrile for analysis EMSURE® **ACS, Reag. Ph Eur**	99.5	0.001	0.1	1 l GL	**1.00003.1000**
					2.5 l GL	**1.00003.2500**
					4 l GL	**1.00003.4000**
					10 l ST	**1.00003.6010**
					25 l ST	**1.00003.6025**
					25 l ME	**1.00003.9025**
	Acetylacetone for analysis EMSURE®	99.0	-	0.3	100 ml GL	**1.09600.0100**
					500 ml GL	**1.09600.0500**
	n-Amyl alcohol (Pentan-1-ol) for analysis EMSURE®	98.5	0.005	0.1	1 l GL	**1.00975.1000**
					2.5 l GL	**1.00975.2500**
	Aniline for analysis EMSURE®	99.5	-	0.1	1 l GL	**1.01261.1000**
B	**Benzene for analysis EMSURE®** **ACS, ISO, Reag. Ph Eur**	99.7	0.001	0.03	1 l GL	**1.01783.1000**
					2.5 l GL	**1.01783.2500**
				NEW	4 l GL	**1.01783.4000**
	Benzyl alcohol for analysis EMSURE®	99.5	-	0.1	1 l GL	**1.09626.1000**
					2.5 l GL	**1.09626.2500**
				NEW	4 l GL	**1.09626.4000**
					25 l ST	**1.09626.6025**
	1-Butanol for analysis EMSURE® **ACS, ISO, Reag. Ph Eur**	99.5	0.001	0.1	1 l GL	**1.01990.1000**
				NEW	2.5 l GL	**1.01990.2500**
					4 l GL	**1.01990.4000**
					10 l ST	**1.01990.6010**
					25 l ST	**1.01990.6025**
	2-Butanol for analysis EMSURE®	99.0	0.001	0.2	1 l GL	**1.09630.1000**
					2.5 l GL	**1.09630.2500**
					25 l ME	**1.09630.9025**
	tert-Butanol for analysis EMSURE® **ACS, Reag. Ph Eur**	99.5	0.001	0.1	500 ml GL	**1.09629.0500**
					5 l AL	**1.09629.5000**
					25 l ME	**1.09629.9025**
	n-Butyl acetate for analysis EMSURE®	99.5	0.001	0.1	1 l GL	**1.09652.1000**
					2.5 l GL	**1.09652.2500**
				NEW	4 l GL	**1.09652.4000**
					10 l ST	**1.09652.6010**
	tert-Butyl methyl ether for analysis EMSURE® **ACS**	99.5	0.001	0.03	1 l GL	**1.01849.1000**
					2.5 l GL	**1.01849.2500**
				NEW	4 l GL	**1.01849.4000**
					190 l ME	**1.01849.9180**

GL = glass bottle | PE = polyethylene bottle | AL = aluminum bottle | ST = stainless steel drum | ME = one-way vessel

Ordering information
EMSURE® | Solvents for analysis C-D

	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]		Content / Packaging	Ord. No.
C	Carbon disulfide for analysis EMSURE® ACS, Reag. Ph Eur	99.9	0.001	0.01		1 l GL	1.02214.1000
	Chloroform for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.0 - 99.4	0.001	0.01		1 l GL	1.02445.1000
						2.5 l GL	1.02445.2500
					NEW	4 l GL	1.02445.4000
						10 l ST	1.02445.6010
						25 l ST	1.02445.6025
						190 l ME	1.02445.9190
	Cyclohexane for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.5	0.001	0.01		1 l GL	1.09666.1000
						2.5 l GL	1.09666.2500
						2.5 l PE	1.09666.2511
						10 l ST	1.09666.6010
						25 l ST	1.09666.6025
						190 l ME	1.09666.9190
D	1,2-Dichlorobenzene for extraction analysis EMSURE®	99.0	-	0.01		1 l GL	1.02930.1000
						2.5 l GL	1.02930.2500
	Dichloromethane for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.8	0.001	0.01		1 l GL	1.06050.1000
						2.5 l GL	1.06050.2500
					NEW	4 l GL	1.06050.4000
						10 l ST	1.06050.6010
						25 l ST	1.06050.6025
						25 l ME	1.06050.9025
						190 l ST	1.06050.6190
						190 l ME	1.06050.9190
	Diethanolamine for analysis EMSURE®	99.5	-	0.25		1 l PE	1.16205.1000
	Diethyl ether for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.7	0.0005	0.03		1 l GL	1.00921.1000
						2.5 l GL	1.00921.2500
					NEW	4 l GL	1.00921.4000
						5 l AL	1.00921.5000
						10 l ST	1.00921.6010
						25 l ST	1.00921.6025
						25 l ME	1.00921.9025
						190 l ST	1.00921.6190
						190 l ME	1.00921.9190
	Diisopropyl ether for analysis EMSURE® ACS, Reag. Ph Eur	99.0	0.005	0.05		1 l GL	1.00867.1000
						2.5 l GL	1.00867.2500
					NEW	4 l GL	1.00867.4000
						10 l ST	1.00867.6010
						190 l ST	1.00867.6190
	N,N-Dimethylformamide for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.8	0.001	0.1		1 l GL	1.03053.1000
						1 l PE	1.03053.1011
						2.5 l GL	1.03053.2500
						2.5 l PE	1.03053.2511
					NEW	4 l GL	1.03053.4000
						10 l ST	1.03053.6010
						25 l ST	1.03053.6025

GL = glass bottle | PE = polyethylene bottle | AL = aluminum bottle | ST = stainless steel drum | ME = one-way vessel

Ordering information
EMSURE® | Solvents for analysis D-E

	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]	Content / Packaging	Ord. No.
D	Dimethyl sulfoxide for analysis EMSURE® ACS	99.9	0.001	0.1	1 l GL	1.02952.1000
					1 l PE	1.02952.1011
					2.5 l GL	1.02952.2500
					2.5 l PE	1.02952.2511
					4 l GL	1.02952.4000
					25 l ME	1.02952.9025
	1,4-Dioxane for analysis EMSURE® ACS, ISO	99.5	0.001	0.05	250 ml GL	1.09671.0250
					1 l GL	1.09671.1000
					2.5 l GL	1.09671.2500
					25 l ST	1.09671.6025
E	Ethanol 96 % EMSURE® Reag. PhEur	95.1-96.9	0.0025	-	500 ml GL	1.59010.0500
					2.5 l GL	1.59010.2500
	Ethanol absolute for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.9	0.0005	0.1	1 l GL	1.00983.1000
					1 l PE	1.00983.1011
					2.5 l GL	1.00983.2500
					2.5 l PE	1.00983.2511
					4 l GL	1.00983.4000
					5 l PE	1.00983.5000
					10 l ST	1.00983.6010
					25 l ST	1.00983.6025
					25 l ME	1.00983.9025
					180 l ME	1.00983.9180
					190 l ST	1.00983.6190
	Ethanol denatured with about 1 % Methyl ethyl ketone for analysis EMSURE®	99.5	0.001	0.1	1 l PE	1.00974.1011
					2.5 l PE	1.00974.2511
					4 l GL	1.00974.4000
					25 l ST	1.00974.6025
					25 l ME	1.00974.9025
					180 l ME	1.00974.9180
	Ethanolamine for analysis EMSURE®	99.5	-	0.2	1 l PE	1.00845.1000
					2.5 l PE	1.00845.2500
	Ethyl acetate for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.5	0.001	0.05	1 l PE	1.09623.1000
					2.5 l GL	1.09623.2500
					2.5 l PE	1.09623.2511
					4 l GL	1.09623.4000
					10 l ST	1.09623.6010
					25 l ST	1.09623.6025
					25 l ME	1.09623.9026
					180 l ME	1.09623.9181
	Ethylene glycol for analysis EMSURE® Reag. Ph Eur, Reag. USP	99.5	-	0.1	1 l PE	1.09621.1000
					2.5 l PE	1.09621.2500
					4 l GL	1.09621.4000
					10 l ST	1.09621.6010
					25 l ST	1.09621.6025
					180 l ME	1.09621.9180
	Ethylene glycol monomethyl ether for analysis EMSURE® ACS, Reag. Ph Eur	99.5	0.003	0.1	1 l GL	1.00859.1000
					2.5 l GL	1.00859.2500
					25 l ST	1.00859.9025

GL = glass bottle | PE = polyethylene bottle | ST = stainless steel drum | ME = one-way vessel

Ordering information
EMSURE® | Solvents for analysis E-I

	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]	Content / Packaging	Ord. No.
E	Ethyl methyl ketone for analysis EMSURE® ACS, Reag. Ph Eur	99.5	0.001	0.05	1 l GL	1.09708.1000
					2.5 l GL	1.09708.2500
					4 l GL	1.09708.4000
					25 l ST	1.09708.6025
					190 l ME	1.09708.9190
F	Formamide for analysis EMSURE® ACS, Reag. Ph Eur	99.5	-	0.1	1 l GL	1.09684.1000
					2.5 l GL	1.09684.2500
G	Glycerol 85 % for analysis EMSURE® Reag. Ph Eur	84.5 - 85.5	-	14.5 - 15.5	500 ml PE	1.04094.0500
					1 l PE	1.04094.1000
					2.5 l PE	1.04094.2500
					25 l PE	1.04094.9026
	Glycerol for analysis EMSURE® ACS, Reag. Ph Eur	99.5	-	0.5	1 l PE	1.04092.1000
					2.5 l PE	1.04092.2511
					10 l PE	1.04092.9010
H	n-Heptane for analysis EMSURE® Reag. Ph Eur	99.0	0.001	0.01	1 l GL	1.04379.1000
					2.5 l GL	1.04379.2500
					2.5 l PE	1.04379.2511
					NEW 4 l GL	1.04379.4000
					10 l ST	1.04379.6010
					25 l ST	1.04379.6025
					190 l ME	1.04379.9190
	n-Hexane for analysis EMSURE® ACS	99.0	0.001	0.005	1 l GL	1.04367.1000
					2.5 l GL	1.04367.2500
					2.5 l PE	1.04367.2511
					10 l ST	1.04367.6010
					25 l ST	1.04367.6025
					190 l ST	1.04367.6190
					190 l ME	1.04367.9190
	n-Hexane for analysis EMSURE® ACS, Reag. Ph Eur	96.0	0.001	0.01	1 l GL	1.04374.1000
					2.5 l GL	1.04374.2500
					2.5 l PE	1.04374.2511
					4 l GL	1.04374.4000
					10 l ST	1.04374.6010
					25 l ST	1.04374.6025
I	Isoamyl alcohol for analysis EMSURE® ACS, Reag. Ph Eur	99.0	0.002	0.2	1 l GL	1.00979.1000
					2.5 l GL	1.00979.2500
					NEW 4 l GL	1.00979.4000
					25 l ME	1.00979.9025
	Isobutanol for analysis EMSURE® ACS, Reag. Ph Eur	99.0	0.001	0.05	1 l GL	1.00984.1000
					2.5 l GL	1.00984.2500
	Isobutyl methyl ketone for extraction analysis EMSURE® ACS, Reag. Ph Eur	99.0	0.001	0.1	1 l GL	1.06146.1000
					2.5 l GL	1.06146.2500
					NEW 4 l GL	1.06146.4000
					25 l ST	1.06146.6025
	Isohexane for analysis EMSURE®	95.0	0.001	0.01	1 l GL	1.04333.1000
					2.5 l GL	1.04333.2500
					190 l ME	1.04333.9190

GL = glass bottle | PE = polyethylene bottle | ST = stainless steel drum | ME = one-way vessel

Ordering information
EMSURE® | Solvents for analysis I-P

	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]	Content / Packaging	Ord. No.
I	Isooctane for analysis EMSURE® ACS, Reag. Ph Eur	99.5	0.001	0.01	1 l GL	1.04727.1000
					2.5 l GL	1.04727.2500
					NEW 4 l GL	1.04727.4000
					10 l ST	1.04727.6010
					25 l ST	1.04727.6025
					190 l ST	1.04727.6190
M	Methanol for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.9	0.0005	0.05	1 l GL	1.06009.1000
					1 l PE	1.06009.1011
					2.5 l GL	1.06009.2500
					2.5 l PE	1.06009.2511
					NEW 4 l GL	1.06009.4000
					5 l PE	1.06009.5000
					10 l ST	1.06009.6010
					25 l ST	1.06009.6025
					25 l ME	1.06009.9025
					180 l ME	1.06009.9180
					190 l ST	1.06009.6190
P	n-Pentane for analysis EMSURE®	99.0	0.001	0.01	1 l GL	1.07177.1000
					2.5 l GL	1.07177.2500
					NEW 4 l GL	1.07177.4000
					10 l ST	1.07177.6010
					190 l ME	1.07177.9190
	Petroleum benzine boiling range 30 – 50°C for analysis EMSURE®	-	0.003	0.01	1 l GL	1.01786.1000
					2.5 l GL	1.01786.2500
	Petroleum benzine boiling range 40 – 60°C for analysis EMSURE® ACS, ISO	-	0.001	0.01	1 l GL	1.01775.1000
					2.5 l GL	1.01775.2500
					NEW 4 l GL	1.01775.4000
					5 l AL	1.01775.5000
					10 l ST	1.01775.6010
					25 l ST	1.01775.6025
					25 l ME	1.01775.9025
					190 l ME	1.01775.9190
	Petroleum benzine boiling range 60 – 80°C for analysis EMSURE®	-	0.001	0.01	1 l GL	1.01774.1000
					2.5 l GL	1.01774.2500
					5 l AL	1.01774.5000
					10 l ST	1.01774.6010
					25 l ST	1.01774.6025
	Petroleum benzine boiling range 80 – 100°C for analysis EMSURE®	–	0.001	0.01	1 l GL	1.01777.1000
	Petroleum benzine boiling range 100 – 120°C for analysis EMSURE® Reag. Ph Eur	-	0.001	0.01	1 l GL	1.01781.1000
NEW	Petroleumether boiling range 35 – 60°C for analysis EMSURE® ACS		0.001	0.01	4 l GL	1.07927.4000
	Petroleum for analysis EMSURE®	-	-	0.01	1 l GL	1.09718.1000
					2.5 l GL	1.09718.2500
					25 l ST	1.09718.6025
	Piperidine for analysis EMSURE®	99.0	0.01	0.3	500 ml GL	1.09724.0500

GL = glass bottle | PE = polyethylene bottle | ST = stainless steel drum | ME = one-way vessel

Ordering information
EMSURE® | Solvents for analysis P-W

	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]		Content / Packaging	Ord. No.
P	1-Propanol for analysis EMSURE® ACS, Reag. Ph Eur	99.5	0.001	0.05		1 l GL	1.00997.1000
						2.5 l GL	1.00997.2500
					NEW	4 l GL	1.00997.4000
						25 l ST	1.00997.6025
	2-Propanol for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.8	0.001	0.05		1 l GL	1.09634.1000
						1 l PE	1.09634.1011
						2.5 l GL	1.09634.2500
						2.5 l PE	1.09634.2511
					NEW	4 l GL	1.09634.4000
						5 l PE	1.09634.5000
						10 l ST	1.09634.6010
						25 l ST	1.09634.6025
						25 l ME	1.09634.9025
						180 l ME	1.09634.9180
						190 l ST	1.09634.6190
	Pyridine for analysis EMSURE® ACS, Reag. Ph Eur	99.5	0.002	0.1		500 ml GL	1.09728.0500
						1 l GL	1.09728.1000
						2.5 l GL	1.09728.2500
					NEW	4 l GL	1.09728.4000
						25 l ST	1.09728.6025
						190 l ME	1.09728.9190
T	Tetrahydrofuran for analysis EMSURE® ACS, Reag. Ph Eur	99.8	0.0005	0.03		1 l GL	1.09731.1000
						2.5 l GL	1.09731.2500
					NEW	4 l GL	1.09731.4000
						10 l ST	1.09731.6010
						25 l ST	1.09731.6025
						190 l ME	1.09731.9190
						190 l ST	1.09731.6190
	Toluene for analysis EMSURE® ACS, ISO, Reag. Ph Eur	99.9	0.0005	0.03		1 l GL	1.08325.1000
						2.5 l GL	1.08325.2500
						2.5 l PE	1.08325.2511
						4 l GL	1.08325.4000
						10 l ST	1.08325.6010
						25 l ST	1.08325.6025
						190 l ME	1.08325.9190
	Trichloroethylene for analysis EMSURE® ACS, Reag. Ph Eur	99.5	0.001	0.01		1 l GL	1.11872.1000
						2.5 l GL	1.11872.2500
	1,1,2-Trichlorotrifluoroethane for analysis EMSURE® Reag. Ph Eur	99.8	0.0005	0.005		2.5 l GL	1.08440.2500
U	n-Undecane for analysis EMSURE®	99.0	-	0.01		100 ml GL	1.09795.0100
W	Water for analysis EMSURE®	-	0.0001	-	NEW	4 l GL	1.16754.4000
						5 l PE	1.16754.5000
						10 l PE	1.16754.9010

GL = glass bottle | PE = polyethylene bottle | AL = aluminum bottle | ST = stainless steel drum | ME = one-way vessel

Ordering information
EMSURE® | Solvents for analysis X-Z

	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]	Content / Packaging	Ord. No.
X	**Xylene for analysis EMSURE® ACS, ISO, Reag. Ph Eur**	99.8	0.001	0.03	1 l GL	**1.08661.1000**
					2.5 l GL	**1.08661.2500**
					2.5 l PE	**1.08661.2511**
				NEW	4 l GL	**1.08661.4000**
					10 l ST	**1.08661.6010**
					25 l ST	**1.08661.6025**
					25 l ME	**1.08661.9025**
					190 l ME	**1.08661.9190**
	p-Xylene for analysis EMSURE® ISO	99.0	0.001	0.01	1 l GL	**1.08684.1000**
					2.5 l GL	**1.08684.2500**
					25 l ME	**1.08684.9025**

GL = glass bottle | PE = polyethylene bottle | ST = stainless steel drum | ME = one-way vessel

▶ **Packaging and withdrawal systems see page 80**

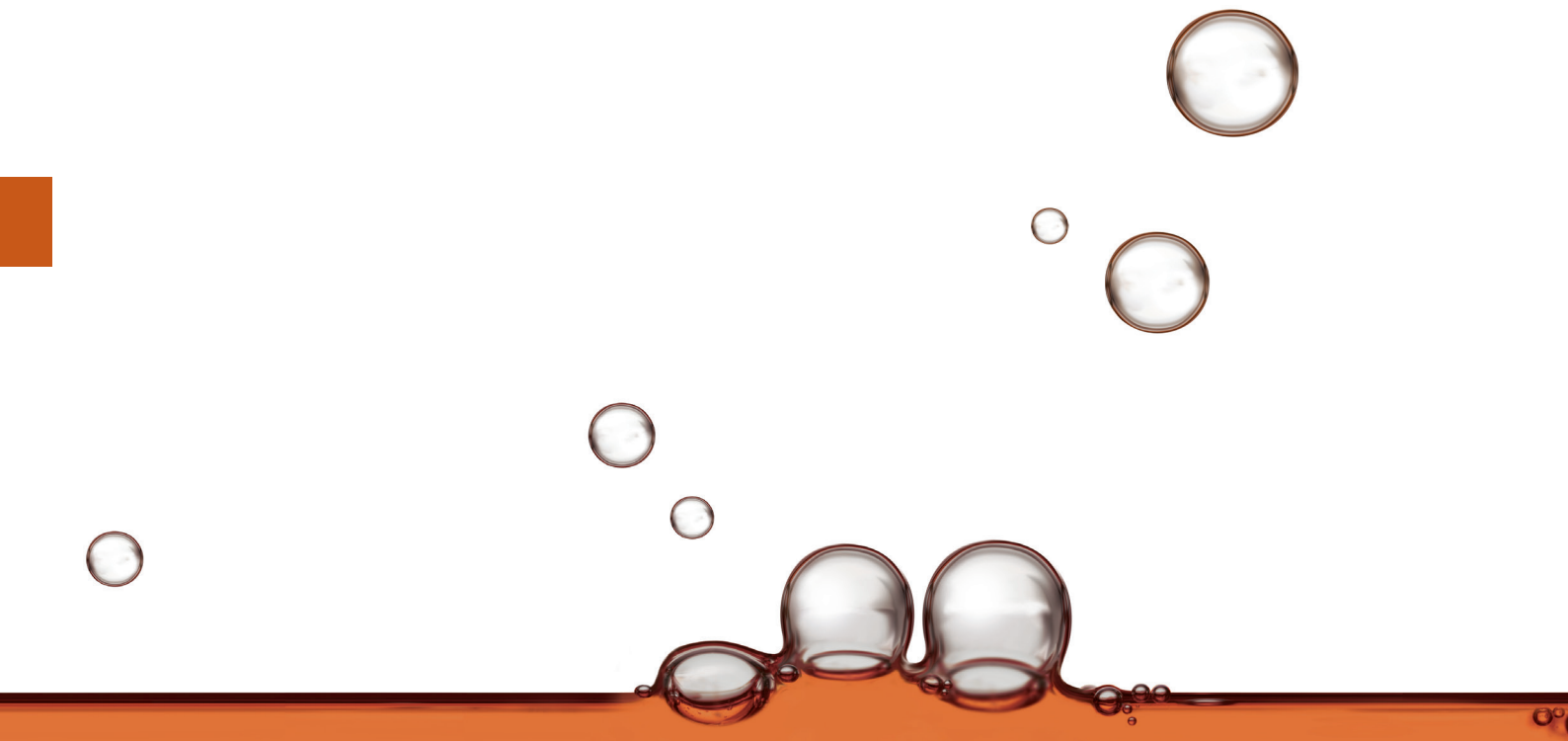
EMPARTA®

EMPARTA® for analysis ACS

High-quality solvents for routine tasks in analytical laboratories

Routine labs have other requirements than laboratories that perform pharmaceutical quality control. With **EMPARTA®**, Merck Millipore offers high-quality lab grade solvents for routine tasks in analytical laboratories. Compared to **EMSURE®**, **EMPARTA®** grade solvents come with fewer test parameters. Still, their specifications cover all important parameters, ensuring reliable and reproducible results. **EMPARTA®** solvents meet the requirements of the American Chemical Society (ACS) which makes them ideal for a wide range of analytical applications.

From raw materials to packaging and certification, every aspect of **EMPARTA®** solvents is designed to make analytical lab applications efficient and cost effective.



Laboratory use

EMSURE® – EMPARTA® – EMPLURA® | The three quality grades of Merck Millipore classical solvents

Whenever you want to use a solvent, you have to consider your requirements, your application and of course your budget. Each application is different and the range of solvents you choose should be perfectly adapted to your application. No matter what your application is (cleaning, product synthesis, sample preparation or highly critical analysis) – no matter if you have to follow international norms, ensure safety regulations or require both bulk and small quantities – the classical solvents product range has the product that perfectly fits to your needs.

Laboratory use	Cleaning	Synthesis R&D	Analysis QC	Other critical or demanding lab applications with specific requirements
Pharma industry and regulated applications				
Less-regulated applications				
Science, research, contract labs				
Schools, education				

EMPLURA®
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EMPARTA®
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EMSURE®
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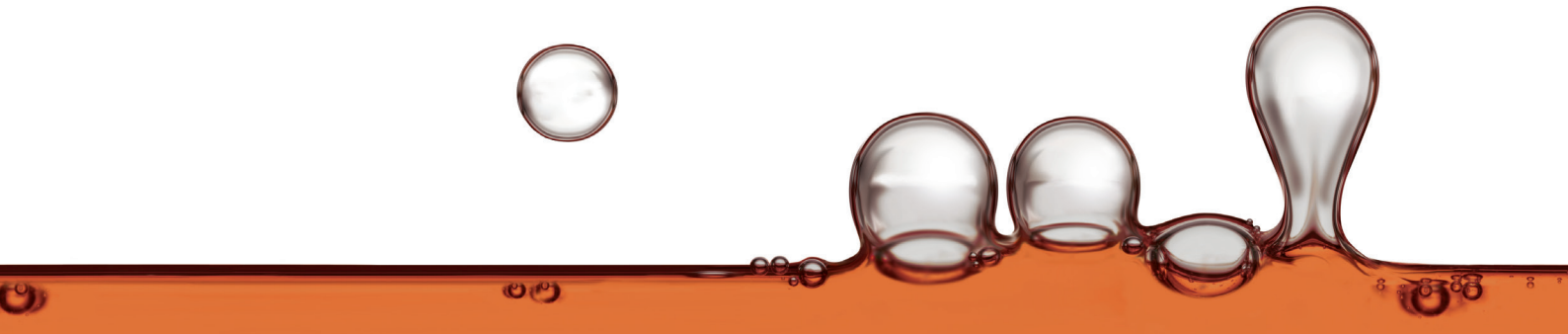
Your benefits

EMPARTA®

- High-quality solvents suitable for your analytical lab applications
- Specifications according to ACS
- More than 10 specification parameters
- Packaged in 2.5 liter bottles and 25 liter drums



Ordering information
EMPARTA® | Solvents for analysis

	Product	Purity (GC) min. [%]	Evap. residue max. [%]	Water max. [%]		Content / Packaging	Ord. No.
A	Acetone for analysis EMPARTA® ACS	99.5	0.001	0.5		2.5 l PE	1.07021.2511
					NEW	4 l GL	1.07021.4000
						25 l ME	1.07021.9026
C	Chloroform for analysis EMPARTA® ACS	99.0 - 99.4	0.001	0.01		2.5 l GL	1.07024.2500
					NEW	4 l GL	1.07024.4000
NEW	Cyclohexanone for analysis EMPARTA® ACS	99.0	0.05	0.05		4 l GL	1.07061.4000
D	1,2 Dichloroethane for analysis EMPARTA® ACS	99.0	0.002	0.03		4 l GL	1.07058.4000
NEW	Dichloromethane for analysis EMPARTA® ACS	99.5	0.002	0.02		2.5 l GL	1.07020.2500
					NEW	4 l GL	1.07020.4000
						10 l ST	1.07020.6010
	Diethyl ether for analysis EMPARTA® ACS	99.5	0.001	0.01		2.5 l GL	1.07026.2500
					NEW	4 l GL	1.07026.4000
					NEW	5 l AL	1.07026.5000
	N,N-Dimethylformamide for analysis EMPARTA® ACS	99.5	0.001	0.1		1 l GL	1.03034.1000
						1 l PE	1.03034.1011
						2.5 l GL	1.03034.2500
						2.5 l PE	1.03034.2511
					NEW	4 l GL	1.03034.4000
						25 l ST	1.03034.6025
E	Ethanol absolute for analysis EMPARTA® ACS	99.5	0.001	0.2		2.5 l PE	1.07017.2511
					NEW	4 l GL	1.07017.4000
						25 l ME	1.07017.9026
H	n-Hexane for analysis EMPARTA® ACS	98.5	0.001	0.02		2.5 l PE	1.07023.2511
					NEW	4 l GL	1.07023.4000
						25 l ST	1.07023.6025
NEW	Hexanes for analysis EMPARTA® ACS	98.5	0.001	–		1 l GL	1.07060.1000
						4 l GL	1.07060.4000
M	Methanol for analysis EMPARTA® ACS	99.8	0.001	0.1		2.5 l ME	1.07018.2511
					NEW	4 l GL	1.07018.4000
						25 l ME	1.07018.9026
NEW	1-Methyl-2-pyrrolidone for analysis EMPARTA® ACS	99.0	–	0.05		4 l GL	1.07063.4000
P	2-Propanol for analysis EMPARTA® ACS	99.5	0.001	0.2		2.5 l PE	1.07022.2511
					NEW	4 l GL	1.07022.4000
						25 l ME	1.07022.9026
T	Tetrahydrofuran for analysis EMPARTA® ACS	99.5	0.03	0.05		2.5 l GL	1.07025.2500
						4 l GL	1.07025.4000
	Toluene for analysis EMPARTA® ACS	99.5	0.001	0.03		2.5 l GL	1.07019.2500
						2.5 l PE	1.07019.2511
					NEW	4 l GL	1.07019.4000
X	Xylenes (isomeric mixture) for analysis EMPARTA® ACS	98.5	0.002	0.05		2.5 l GL	1.08633.2500
NEW						4 l GL	1.08633.4000

GL =glass bottle | PE = polyethylene bottle | AL = aluminum bottle | ST = stainless steel drum | ME = one-way vessel

► Packaging and withdrawal systems see page 80

Detailed information
EMPARTA® | Solvents for analysis

Acetone for analysis EMPARTA® ACS	Cat. No. 107021 Spec. values
Purity (GC)	≥ 99.5 %
Identity (IR)	conforms
Solubility in water	conforms
Colour	≤ 10 Hazen
Titrable acid	≤ 0.0003 meq/g
Titrable base	≤ 0.0006 meq/g
Methanol (GC)	≤ 0.05 %
2-Propanol (GC)	≤ 0.05 %
Aldehydes (as formaldehyde)	≤ 0.002 %
Substances reducing potassium permanganate (as O)	≤ 0.0003 %
Evaporation residue	≤ 0.001 %
Water	≤ 0.5 %

Chloroform for analysis EMPARTA® ACS	Cat. No. 107024 Spec. values
Purity (GC)	99.0 - 99.4 %
Assay (according to ACS)	≥ 99.8 %
Identity (IR)	conforms
Appearance	clear
Colour	≤ 10 Hazen
Acid and chloride	conforms
Free chlorine	≤ 0.00003 %
Carbonyl compounds (as CO)	≤ 0.005 %
Readily carbonizable substances	conforms
Aldehydes and ketones (C_3H_6O)	≤ 0.001 %
Suitability for determination with dithizone	conforms
Pb	≤ 0.000005 %
Evaporation residue	≤ 0.001 %
Water	≤ 0.01 %

Ethanol absolute for analysis EMPARTA® ACS	Cat. No. 107017 Spec. values
Purity (GC)	≥ 99.5 %
Identity (IR)	conforms
Colour	≤ 10 Hazen
Solubility in water	conforms
Titrable acid	≤ 0.0005 meq/g
Titrable base	≤ 0.0002 meq/g
Acetone (GC)	≤ 0.001 %
Methanol (GC)	≤ 0.1 %
2-Propanol (GC)	≤ 0.003 %
Substances reducing potassium permanganate (as O)	≤ 0.0002 %
Readily carbonizable substances	conforms
Evaporation residue	≤ 0.001 %
Water	≤ 0.2 %

n-Hexane for analysis EMPARTA® ACS	Cat. No. 107023 Spec. values
Purity ∑ hexane isomers + methylcyclopentane (GC)	≥ 98.5 %
Identity (IR)	conforms
Colour	≤ 10 Hazen
Water-soluble titrable acid	≤ 0.0003 meq/g
Thiophene	conforms
Sulfur compounds (as S)	≤ 0.005 %
Evaporation residue	≤ 0.001 %
Water	≤ 0.02 %

Tetrahydrofuran for analysis EMPARTA® ACS	Cat. No. 107025 Spec. values
Purity (GC)	≥ 99.5 %
Identity (IR)	conforms
Appearance	clear
Colour	≤ 10 Hazen
Peroxide (as H_2O_2)	≤ 0.01 %
Evaporation residue	≤ 0.03 %
Water	≤ 0.05 %

EMPLURA®

Solvents for lab-applications

EMPLURA®

The cost-efficient solution for preparative lab applications and chemical production

For many applications, you don't need solvents with highest purity – you need a cost-efficient solution with reliable quality and available in high quantities. **EMPLURA®** is Merck Millipore's low-cost alternative to high-purity qualities. **EMPLURA®** solvents are tested mainly for preparative purposes or for standard production processes.

Laboratory use

EMSURE® – EMPARTA® – EMPLURA® | The three quality grades of Merck Millipore classical solvents

Whenever you want to use a solvent, you have to consider your requirements, your application and of course your budget. Each application is different and the range of solvents you choose should be perfectly adapted to your application. No matter what your application is (cleaning, product synthesis, sample preparation or highly critical analysis) – no matter if you have to follow international norms, ensure safety regulations or require both bulk and small quantities – the classical solvents product range has the product that perfectly fits to your needs.

Laboratory use	Cleaning	Synthesis R&D	Analysis QC	Other critical or demanding lab applications with specific requirements
Pharma industry and regulated applications				
Less-regulated applications				
Science, research, contract labs				
Schools, education				

EMPLURA® ▸ page 74
EMPARTA® ▸ page 70
EMSURE® ▸ page 60

Parameters

We check only for those parameters which are important in the described application, i.e. the minimum assay, the identity using IR-spectroscopy, the density, many times the water content and for ethers also the content of peroxides.

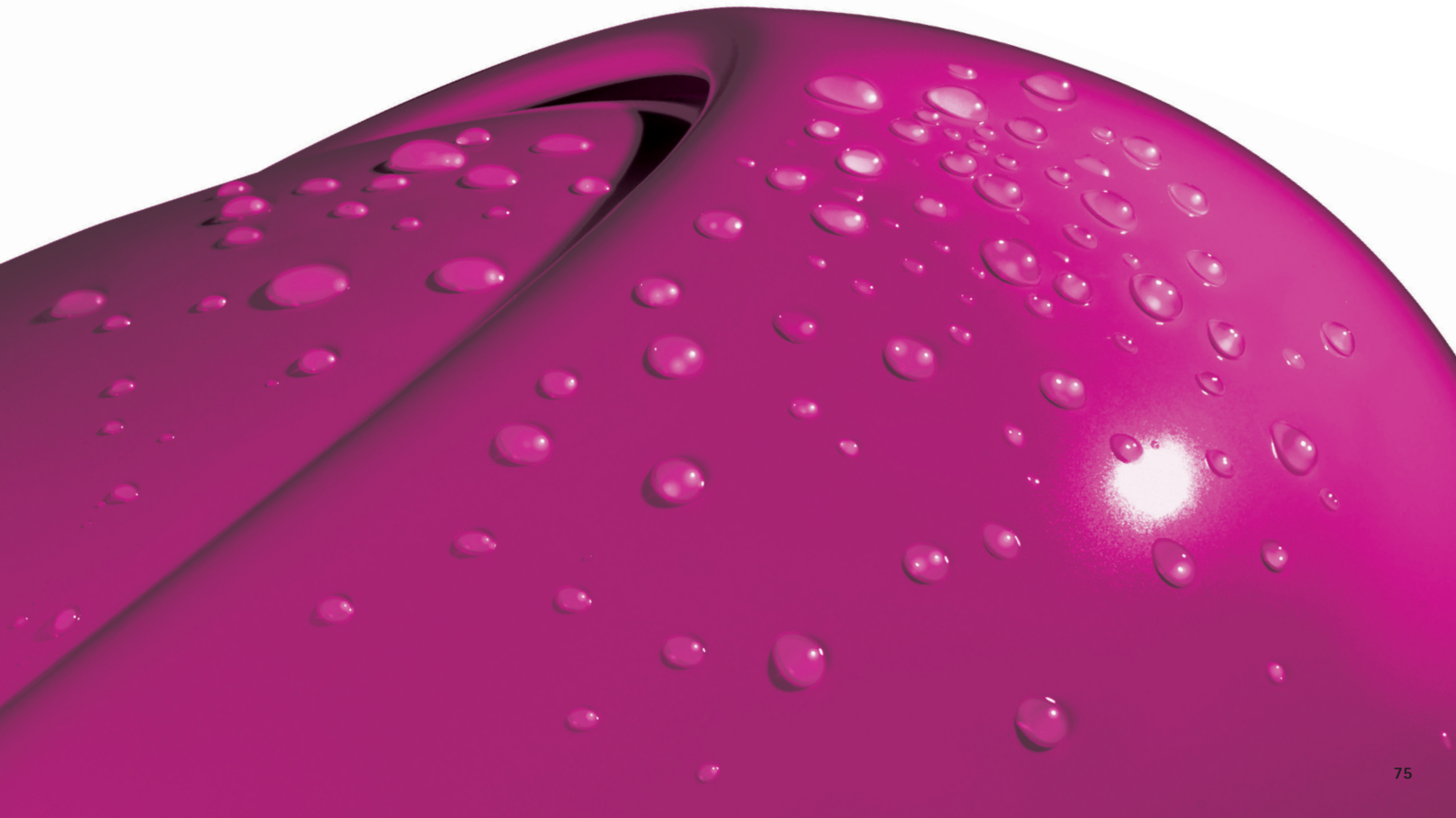
Packaging

The pack sizes vary from 1 liter up to 190 liter drums. Bulk-quantities and packaging on request.

Your benefits

EMPLURA®

- The right solvent for all non-regulated applications
- Adequate specifications with the most important parameters
- Available in small packs as well as in bulk quantities



Ordering information
EMPLURA® | Solvents for lab-applications A-D

	Product	Purity (GC) min. [%]	Content / Packaging	Ord. No.
A	Acetone EMPLURA®	99.0	1 l PE	8.22251.1000
			2.5 l PE	8.22251.2500
			25 l ME	8.22251.9025
	Acetonitrile EMPLURA®	99.0	1 l GL	1.15500.1000
			2.5 l GL	1.15500.2500
			25 l ST	1.15500.6025
			190 l ME	1.15500.9190
	n-Amyl acetate EMPLURA®	98.0	1 l GL	8.18700.1000
			5 l PE	8.18700.5000
	tert-Amyl alcohol EMPLURA®	99.0	1 l GL	8.06193.1000
B	Benzene EMPLURA®	99.5	1 l GL	1.01782.1000
			2.5 l GL	1.01782.2500
	1-Butanol EMPLURA®	99.0	2.5 l PE	8.22262.2500
			5 l PE	8.22262.5000
			25 l ME	8.22262.9025
	2-Butanol EMPLURA®	99.0	2.5 l PE	8.22263.2500
	tert-Butanol EMPLURA®	99.0	1 l PE	8.22264.1000
			5 l PE	8.22264.5000
			25 l ME	8.22264.9025
	n-Butyl acetate EMPLURA®	99.0	2.5 l GL	1.01974.2500
			25 l ST	1.01974.6025
			190 l ME	1.01974.9190
	tert-Butyl methyl ether EMPLURA®	99.0	2.5 l GL	1.01843.2500
			NEW 10 l ME	1.01843.9011
			25 l ST	1.01843.6025
			190 l ST	1.01843.6190
			200 l ME	1.01843.9200

GL = glass bottle | PE = polyethylene bottle | AL = aluminum bottle | ST = stainless steel drum | ME = one-way vessel

	Product	Purity (GC) min. [%]	Content / Packaging	Ord. No.
C	Carbon disulfide EMPLURA®	99.5	1 l GL	1.02211.1000
	Chloroform EMPLURA®	99.0	1 l GL	8.22265.1000
			2.5 l GL	8.22265.2500
			25 l ME	8.22265.9025
	Cyclohexane EMPLURA®	99.0	1 l GL	1.02832.1000
			2.5 l GL	1.02832.2500
			25 l ST	1.02832.6025
			190 l ST	1.02832.6190
			190 l ME	1.02832.9190
	Cyclohexanone EMPLURA®	99.0	1 l GL	1.02888.1000
			2.5 l GL	1.02888.2500
			10 l ST	1.02888.6010
			25 l ST	1.02888.6025
			190 l ME	1.02888.9191
	NEW Cyclopentyl methyl ether EMPLURA®	99.0	1 l GL	1.08293.1000
			2.5 l GL	1.08293.2500
			4 l GL	1.08293.4000
D	1,2-Dichloroethane EMPLURA®	99.5	1 l GL	1.00955.1000
			2.5 l GL	1.00955.2500
			25 l ST	1.00955.6025
			190 l ME	1.00995.9190
	Dichloromethane EMPLURA®	99.0	1 l GL	8.22271.1000
			2.5 l GL	8.22271.2500
			25 l ME	8.22271.9025
			190 l ME	8.22271.9190
	Diethyl ether EMPLURA®	99.0	1 l GL	1.00923.1000
			5 l AL	1.00923.5000
			25 l ST	1.00923.6025
	N,N-Dimethylformamide EMPLURA®	99.0	1 l PE	8.22275.1000
			2.5 l PE	8.22275.2500
			25 l ST	8.22275.6025
	Dimethyl sulfoxide EMPLURA®	99.0	1 l GL	1.16743.1000
			25 l ST	1.16743.6025
			190 l ME	1.16743.9210
	1,4-Dioxane EMPLURA®	99.0	1 l GL	1.03115.1000
			2.5 l GL	1.03115.2500
			25 l ST	1.03155.6025
			190 l ME	1.03155.9191

Ordering information
EMPLURA® | Solvents for lab-applications E-O

	Product	Purity (GC) min. [%]	Content / Packaging	Ord. No.
E	Ethanol absolute EMPLURA®	99.5	1 l GL	8.18760.1000
			2.5 l GL	8.18760.2500
			25 l ME	8.18760.9025
			180 l ME	8.18760.9180
	Ethyl acetate EMPLURA®	99.5	2.5 l PE	8.22277.2500
			5 l PE	8.22277.5000
NEW	Ethyl lactate EMPLURA®	99.0	1 l GL	1.09639.1000
			2.5 l GL	1.09639.2500
			4 l GL	1.09639.4000
	Ethyl methyl ketone (2-Butanone) EMPLURA®	99.0	1 l GL	1.06014.1000
			2.5 l GL	1.06014.2500
NEW			10 l ME	1.06014.9011
			25 l ST	1.06014.6025
			190 l ME	1.06014.9190
	Ethylene glycol EMPLURA®	99.0	1 l GL	1.00949.1000
			2.5 l GL	1.00949.2500
			25 l ST	1.00949.6025
			190 l ST	1.00949.6190
F	Formamide EMPLURA®	99.0	1 l GL	1.04008.1000
			2.5 l GL	1.04008.2500
			25 l ME	1.04008.9025
NEW	H n-Heptane about 85 % EMPLURA®	85.0	1 l GL	1.04307.1000
			2.5 l GL	1.04307.2500
			4 l GL	1.04307.4000
	n-Heptane EMPLURA®	99.0	1 l GL	1.04365.1000
			2.5 l GL	1.04365.2500
			2.5 l PE	1.04365.2511
NEW			10 l ME	1.04365.9011
			25 l ST	1.04365.6025
			190 l ST	1.04365.6190
NEW	n-Hexane about 85 % EMPLURA®	85.0	1 l GL	1.04306.1000
			2.5 l GL	1.04306.2500
			4 l GL	1.04306.4000
	n-Hexane EMPLURA®	95.0	1 l GL	1.04368.1000
			2.5 l GL	1.04368.2500
			2.5 l PE	1.04368.2511
NEW			10 l ME	1.04368.9011
			25 l ST	1.04368.6025
			190 l ST	1.04368.6190
			190 l ME	1.04368.9190

GL = glass bottle | PE = polyethylene bottle | ST = stainless steel drum | ME = one-way vessel

	Product	Purity (GC) min. [%]	Content / Packaging	Ord. No.
I	Isoamyl acetate EMPLURA®	99.0	1 l GL	1.01231.1000
			25 l ST	1.01231.6025
	Isoamyl alcohol (mixture of isomers) EMPLURA®	99.0	1 l PE	8.22255.1000
			2.5 l PE	8.22255.2500
	Isobutanol (isobutyl alcohol) EMPLURA®	98.5	2.5 l GL	1.00985.2500
			25 l ST	1.00985.6025
			190 l ME	1.00985.9190
	Isobutyl methyl ketone EMPLURA®	99.0	2.5 l GL	8.20820.2500
			10 l ST	8.20820.6010
			25 l ST	8.20820.6025
			190 l ME	8.20820.9190
M	Methanol EMPLURA®	99.5	1 l PE	8.22283.1000
			2.5 l PE	8.22283.2500
			5 l PE	8.22283.5000
NEW			10 l ME	8.22283.9011
			25 l ME	8.22283.9025
			180 l ME	8.22283.9180
	1-Methoxy-2-propanol EMPLURA®	99.5	1 l GL	1.16738.1000
			25 l ST	1.16738.6025
			190 l ME	1.16738.9190
NEW	2-Methyltetrahydro-furan EMPLURA®	99.0	1 l GL	1.08292.1000
			2.5 l GL	1.08292.2500
			4 l GL	1.08292.4000
	Methyl benzoat EMPLURA®	99.0	1 l GL	1.06059.1000
			2.5 l GL	1.06059.2500
			25 l ST	1.06059.6025
	1-Methyl-2-pyrrol-idone EMPLURA®	99.5	1 l GL	8.06072.1000
			2.5 l GL	8.06072.2500
			10 l ST	8.06072.6010
NEW			10 l ME	8.06072.9011
			25 l ME	8.06072.9025
			210 kg ME	8.06072.9210
O	1-Octanol EMPLURA®	99.0	1 l GL	1.00991.1000
			25 l ST	1.00991.6025

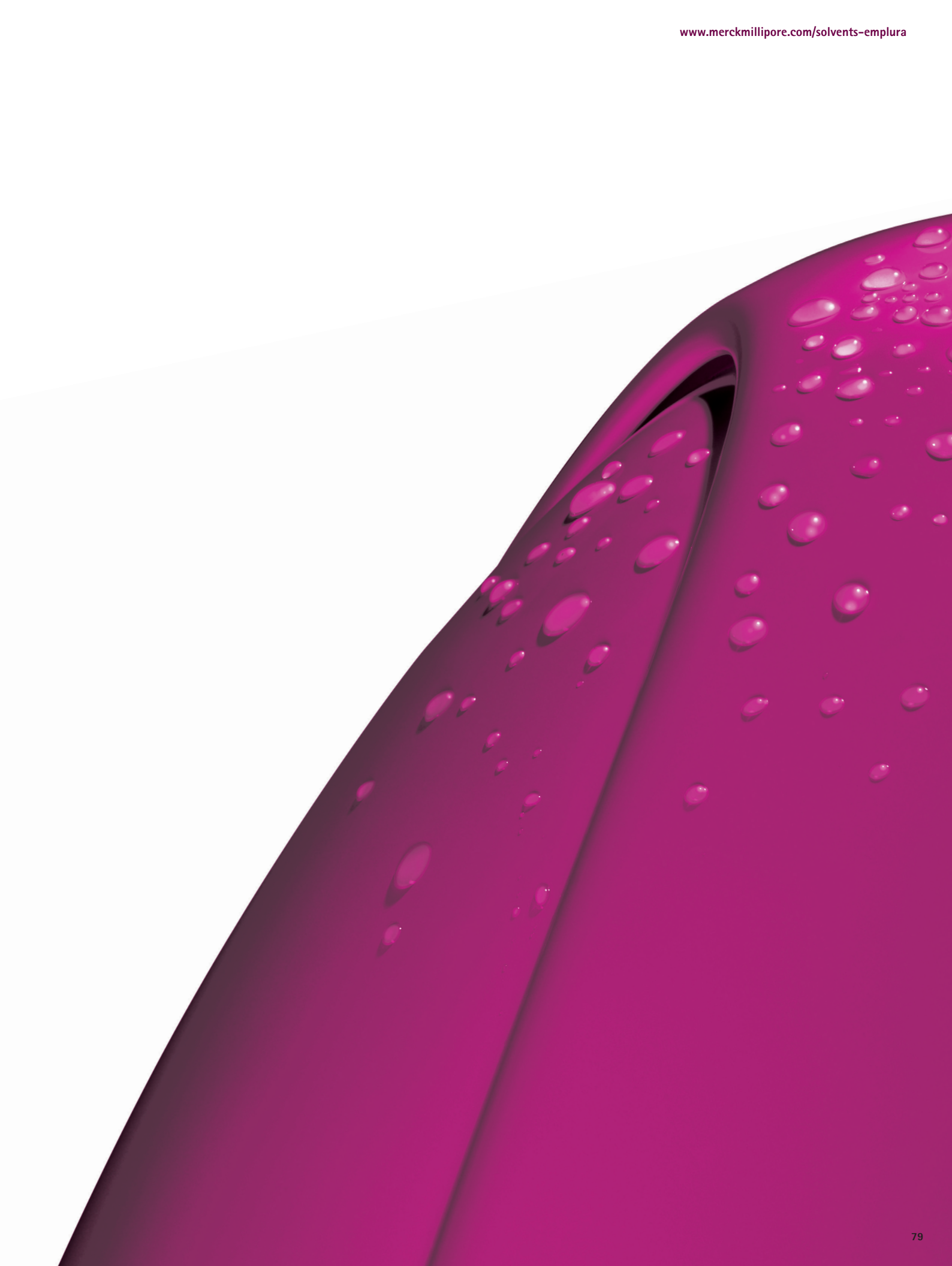
Ordering information
EMPLURA® | Solvents for lab-applications P-Z

	Product	Purity (GC) min. [%]	Content / Packaging	Ord. No.
P	n-Pentane about 95 % EMPLURA®	95.0	1 l GL	1.07176.1000
			5 l AL	1.07176.5000
			25 l ST	1.07176.6025
			190 l ME	1.07176.9190
	n-Pentane EMPLURA®	99.0	1 l GL	8.20957.1000
			2.5 l GL	8.20957.2500
			25 l ME	8.20957.9025
	Petroleum benzine boiling range to about 40°C EMPLURA®	-	1 l GL	1.00915.1000
			5 l AL	1.00915.5000
			25 l ST	1.00915.6025
	Petroleum benzine boiling range 40 - 80°C EMPLURA®	-	1 l GL	1.01773.1000
			5 l AL	1.01773.5000
	Petroleum benzine boiling range 50 - 70°C EMPLURA®	-	1 l GL	1.00910.1000
			5 l AL	1.00910.5000
			25 l ST	1.00910.6025
	Petroleum benzine boiling range 100 - 140°C (Naphtha Benzine) EMPLURA®	-	1 l GL	1.01770.1000
			5 l AL	1.01770.5000
			25 l ST	1.01770.6025
	Petroleum benzine boiling range 140 - 180°C EMPLURA®	-	1 l GL	8.14563.1000
	1,2-Propanediol EMPLURA®	99.0	1 l PE	8.22324.1000
			5 l PE	8.22324.5000
	1-Propanol EMPLURA®	99.0	1 l GL	1.00996.1000
			2.5 l GL	1.00996.2500
			25 l ST	1.00996.6025
			190 l ME	1.00996.9190
NEW	2-Propanol 70 % EMPLURA®	-	4 l GL	1.09636.4000
	2-Propanol EMPLURA®	99.5	1 l PE	8.18766.1000
			2.5 l PE	8.18766.2500
NEW			10 l ME	8.18766.9011
			25 l ME	8.18766.9025
			180 l ME	8.18766.9180
	Pyridine EMPLURA®	99.0	1 l GL	1.07462.1000
			2.5 l GL	1.07462.2500
			25 l ST	1.07462.6026
			190 l ME	1.07462.9190

GL = glass bottle | PE = polyethylene bottle | AL = aluminum bottle | ST = stainless steel drum | ME = one-way vessel

	Product	Purity (GC) min. [%]	Content / Packaging	Ord. No.
T	Tetrachloroethylene EMPLURA®	99.0	1 l GL	1.00964.1000
			2.5 l GL	1.00964.2500
			25 l ST	1.00964.6025
			190 l ME	1.00964.9190
	Tetrahydrofuran EMPLURA®	99.0	1 l GL	1.08114.1000
			2.5 l GL	1.08114.2500
			25 l ST	1.08114.6025
			190 l ST	1.08114.6190
			190 l ME	1.08114.9190
	Toluene EMPLURA®	99.0	1 l GL	1.08323.1000
			2.5 l GL	1.08323.2500
NEW			10 l ME	1.08323.9011
			25 l ST	1.08323.6025
			190 l ME	1.08323.9190
	Trichloroethylene EMPLURA®	99.5	1 l GL	1.00958.1000
			2.5 l GL	1.00958.2500
			25 l ST	1.00958.6025
	Triethanolamine EMPLURA®	99.0	5 l PE	8.22341.5000
			25 l PE	8.22341.9026
X	Xylenes (isomeric mixture) EMPLURA®	-	2.5 l GL	1.08634.2500
NEW			4 l GL	1.08634.4000

► Packaging and withdrawal systems see page 80



Packaging and withdrawal systems

Merck Millipore has a strong track record in developing practical packaging concepts and chemical packaging that preserve the high quality of our solvents. We have been authorized as an official inspection authority by the Federal Institute for Material Research and Testing of Germany (BAM).

Merck Millipore offers a unique variety of packaging sizes and types for solvents **EMSURE®, EMPARTA®, EMPLURA®** and **SeccoSolv®**:

- Glass bottles
- HDPE bottles
- Aluminum bottles
- Septum seal bottles (see page 56)
- Stainless steel drums
- Other drums and containers

For many years, Merck Millipore has worked closely with customers to develop solvent withdrawal systems that are tailor-made for our packaging types. Today, our broad range of withdrawal systems and containers is unrivalled in the industry. As a result, customers can rest assured that whatever the application, we can always supply the right container and the right withdrawal system. And since we provide a fully integrated system that includes solvent, container and withdrawal equipment, all components are perfectly matched for optimal results.

Your benefits

Packaging and withdrawal systems

- Application and demand orientated packaging sizes
- Easy, safe and contamination-free solvent handling
- Maximum safety due to an extensive portfolio of safety accessories
- Ecological and economical benefit by using returnable containers
- Individual user installation or other customized solutions possible
- High lab safety with process automation by level sensor technology

Quantity guideline

Classical analysis and systhesis

Merck Millipore's demanding quality standards apply not only to the reagents themselves but also to the packaging they are supplied in; each material being carefully developed and matched to its product specification. Our extensive variety of packaging types and sizes is unrivaled in the industry. Each of your individual demands can be covered with pack sizes from 0.5 l to 20,000 l and materials from glass and HDPE to metal and stainless steel.

Please select the size and material that suits your application best.

	Bottles	Metal drums	Stainless steel drums
			
Pack sizes	0.5 l – 5 l	10 l – 190 l	
Annual consumption	0.5 l – 100 l	100 l – 1000 l	
	Standard packaging	Standard packaging range one-way packaging Stainless steel drums optional returnable packaging • Advantage: no rinsing / cleaning / disposing • Return unrinsed with original labels and tightly closed	

Tank trucks

190 l – 20,000 l

> 1000 l

- Customized products and containers
- Individual processes with rental agreements

Safety & environment

- Each packaging material is strictly safety tested by the Federal Institute for Material Research and Testing of Germany (BAM) and designated as suitable for the transport of hazardous materials.
- Design improvements combined with Merck Millipore withdrawal systems and safety accessories allow optimal removal of any residual quantities – minimization of the environmental pollution risk.
- The usage of Merck Millipore withdrawal systems (e.g. direct connections to instruments, central lab supply) reduce the solvent vapors emitted to the environment during solvent usage.
- Unbreakable properties of e.g. Aluminum bottles or stainless steel barrels minimize the environmental pollution risks.
- Returnable stainless steel barrels reduce the packaging waste and save raw materials.

Packaging overview

Classical analysis

Glass bottles


500 ml


1 liter


2.5 liter


4 liter

- **Optimum characteristics for handling, storage and transport**
- **Safe footprint**
- **Low center of gravity**
- **Optimum emptying**
- **Safety screw cap S40 (Polypropylene) with a circlip as an originality device and a PTFE-insert for highest closeness**
- **High pressure resistance**
- **Special pouring lip for non-drip pouring**
- **Level sensors available**

To comply with transport regulations the glass bottles must be protected by pads of polystyrene. Such polystyrene packages are dispatched as packages of 6 x 1 l or 4 x 2.5 l in a special folding corrugated cardboard box that has been approved for transport purposes. For daily lab handling of glass bottles we recommend to use the safety carriers 9.20078.0001 for 0.5 l to 2.5 l or 1.20080.0001 for 4 l glass bottles.

HDPE bottle


1 liter


2.5 liter


5 liter

- **Made from HDPE (no risk of fracture), outstanding handling characteristics due to integrated handle for 2.5 and 5 liter bottles**
- **Small footprint (optimum for storage) and low weight (easy to handle and low transport costs)**
- **Tested for blisters and particles**
- **UN certification to be sent without polystyrene outer packaging**
- **Safety screw cap S40 (Polypropylene) with a circlip as an originality device and a PTFE-insert for highest closeness**
- **High pressure resistance**
- **Level sensors available**

Aluminum bottle

5 liter

- Optimum characteristics for handling, storage and transport
- Optimum material characteristics (avoidance of interactions between solvents and packaging material)
- Safety screw cap S40 with a circlip as an originality device and a PTFE-insert for highest closeness
- UN certification to be sent without polystyrene outer packaging
- Low weight (easy handling and low transport costs)
- No risk of fracture
- Level sensors available

▶ For more details please have a look on page 47

Stainless steel drums

10 liter

25 liter

190 liter

- Optimum material characteristics (avoidance of interactions between solvents and packaging material)
- Use as returnable drums
- Can be combined with a variety of withdrawal systems and level sensors
- Optimum emptying
- Stackable

▶ For more details please have a look on page 91

Other drums and containers

10 liter

25 liter

180/190 liter

In addition to conventional packaging we also implement quite specific solutions especially for production use. This range includes steel drums (25 and 180/190 liter – depending on the solvent with a PE-inliner), 1,000 liter Intermediate Bulk Container (IBCs) and up to tank container or tank trucks. If technical possible and allowed, we also fill other packaging that you provide.

Packaging details and safety accessories

Classical analysis and synthesis

Glass bottles [available from 0.5 l up to 4 l]

Specially developed S40 thread
withstands higher contact pressure and ensures tighter seals

Specially formed, sharp thread lip
for safe drip free pouring

Specially treated high quality glass
with extreme durability due to constant wall thickness for highest safety and product quality

New S40 screw cap
Tamper proof closure will remain as ring on the bottle neck

Pour ring for safe and ergonomic withdraw
New tension-free manufacturing technology: "bottle out of one drop" to avoid any predetermined breaking point

Unique, clear and complete labeling
with product specifications and all relevant hazard declarations

Broad and stable base
for safe stand with low point of gravity

Technical data

Material:
Moulded amber glass, hydrolytic class 3

Available packaging size:
0.5 l, 1 l, 2.5 l and 4 l

Height, diameter and net weight (bottle size):
180 mm, ø 83 mm, approx. 450 g (0.5 l)
222 mm, ø 101 mm, approx. 600 g (1 l)
258 mm, ø 151 mm, approx. 1140 g (2.5 l)
350 mm, ø 162 mm, approx. 1525 g (4 l)

Safety accessories

Bottle opening key S40 / S28	1.08801.0001
Safety carrier for bottles up to 2.5 l	9.20078.0001
Safety carrier for 4 l bottles	1.40140.0001
Adapter with integrated level sensor for Merck Millipore bottles with S40 thread (supply)	9.67100.2001
Display for level sensor	9.67100.2004
Label set for self-labeling lab-mixtures according to GHS, DIN EN ISO & GLP	1.00801.0001

HDPE bottles [available from 1 l up to 5 l]

Specially developed S40 thread
withstands higher contact pressure and ensures tighter seals

Specially formed, sharp thread lip
for safe drip free pouring

Specially treated high quality HDPE
with extreme durability, inertness and shock resistance for highest safety and product quality

Reduced packaging waste (no additional protection material neccessary inside card boxes)
to protect the environment and to benefit from economical advantages

New S40 screw cap
Tamper proof closure will remain as ring on the bottle neck

Integrated handle
for best pouring properties

Unique, clear and complete labeling
with product specifications and all relevant hazard declarations

Low bottle weight
for easy, safe and economic solvents handling

Technical data

Material:
HD-PE

Available packaging size:
1 l, 2.5 l and 5 l

Height, diameter and net weight (bottle size):
206 mm, ø 101 mm, approx. 66 g (1 l)
322 mm, ø 125 mm, approx. 145 g (2.5 l)
330 mm, ø 178 mm, approx. 335 g (5 l)

Safety accessories

Bottle opening key S40 / S28	1.08801.0001
Adapter with integrated level sensor for Merck Millipore bottles with S40 thread (supply)	9.67100.2001
Display for level sensor	9.67100.2004
Label set for self-labeling lab-mixtures according to GHS, DIN EN ISO & GLP	1.00801.0001

Safety and the returnable system

Classical analysis and synthesis

Important safety notices

If flammable liquids (e.g. solvents) are to be used, the container (10l and more) must be properly earthed according to valid safety regulations to avoid explosion and fire risks. Appropriate measures must be taken to discharge static electricity.

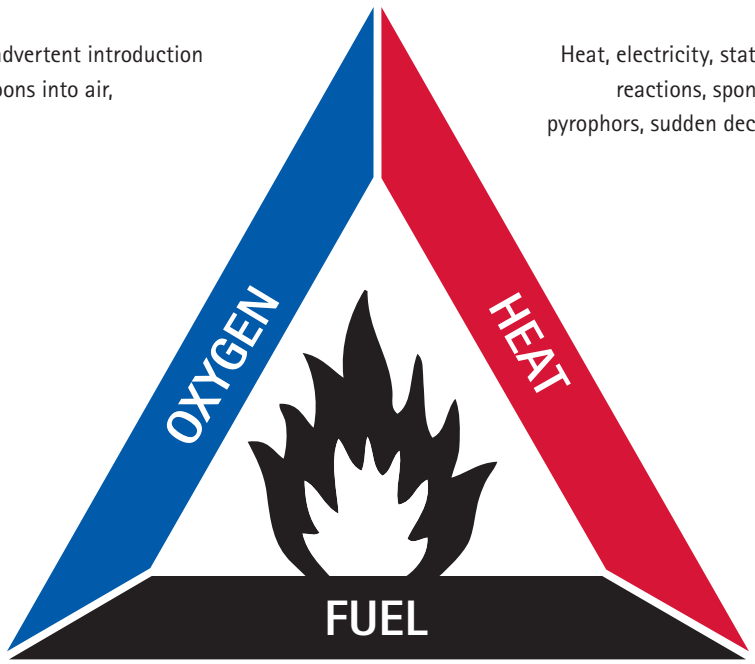
- General warnings and safety instructions must be observed.
- All components (e.g. container and withdrawal system) must be grounded separately in accordance with the applicable safety regulations.
- Grounding clamps must have metallic contact with both the container and the withdrawal system, and a safe ground connection.
- The grounding of the container and the grounding of the withdrawal system must be installed before opening the container.
- The user must always wear conductive personal protective equipment, especially shoes and gloves, to avoid electrostatic charges. Therefore, the user must always wear conductive personal protective equipment, especially shoes and gloves.
- The floor has to be conductive.
- Sampling vessels made of insulating material with a volume greater than 1 liter should not be used.
- Before using organic solvents, the user must ensure that there are no additional ignition hazards caused by process-specific parameters, such as increased ignitability of the substances due to changed environmental conditions or when sampling in combination with highly charge-generating processes.

These measures reduce the risk of electrostatic separation of charges to increase safety in daily solvents handling dramatically.

The fire and explosion triangle

Oxidizer
Planned introduction of air, inadvertent introduction of oxygen, release of hydrocarbons into air, weathered fluids, oxidizers

Ignition source
Heat, electricity, static electricity, friction, chemical reactions, spontaneous combustion, dieseling, pyrophors, sudden decompression, catalytic reactions

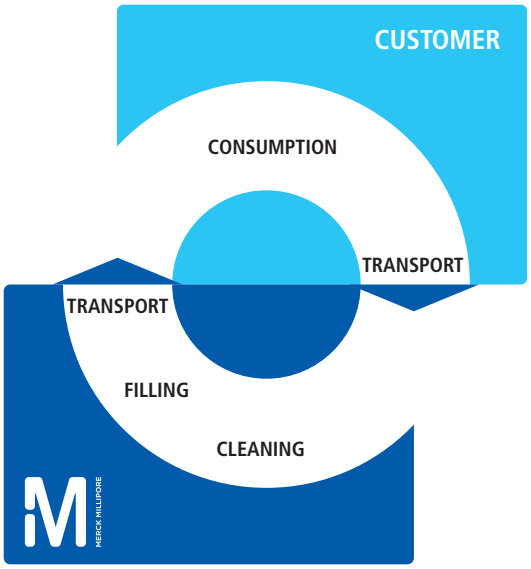


Heavy and light gases, hydrocarbon liquids and vapours, vapours of chemicals / lubricants / solvents, frac oils, flammable materials

Removing at least one of the component avoids the fire / explosion.

Returnable process

The returnable system



Easy detection

Symbols for easy detection which packaging material can be returned:

returnable packaging

Stainless steel barrels and containers are mandatory to return and are coded with a unique ID number – **mandatory returnable packaging**.

returnable packaging

Stainless steel drums are part of a returnable process – optional returnable packaging.

one-way packaging

Metal drums are used as one-way packaging.

Merck Millipore stainless steel barrels and drums are part of a returnable process. Their use means that the user no longer has to cope with the topics of complete emptying, rinsing, disposing of the rinsing liquid and even disposing of the packaging itself in the proper manner.

After consumption of the solvents on user site the empty barrels and drums are returned to Merck Millipore, unrinsed and with their original labels still attached. On their return, we will ensure that they are properly cleaned, checked and refilled. Clear advantages for a time saving and cost effective way of daily solvent handling.

Important safety advice

Our withdrawal systems have been developed and optimized for the use with containers and solvents from Merck Millipore. Merck Millipore therefore disclaims any warranty or liability for the operability of its withdrawal systems in connection with containers or solvents from other manufacturers.

Merck Millipore reserves the right to refrain from the delivery of withdrawal systems if the respective order does not indicate that each withdrawal system will be used in combination with appropriate solvents and containers from Merck Millipore.

We inform and advise our customers to the best of our knowledge and ability but without any engagement or liability on our part. Our customers must obey all existing laws and regulations. This also applies in respect of any protected rights of third parties. Our information and advice does not eliminate the need for our customers to check, on their own responsibility, that our products are suitable for the purpose envisaged.

Packaging details and safety accessories

Classical analysis and synthesis

Metal drums [available from 10 l up to 180 l]

Protective cap
with originality sealing

Special formed rims
for best stackability

Standard openings
to ensure highest interoperability

Printed / engraved UN-code
includes important safety information
and provides packaging certificates

Safe and easy handling
due to 2 large handles

High quality metal
with extreme durability, inertness
and shock resistance for highest safety
and product quality

one-way packaging

Metal drums are used as
one-way packaging

Bottom reservoir
for optimal emptying

Technical data

Parameter	10 l	25 l	25 l with PE	180 l	180 l with PE
Height	34 cm	52 cm	52 cm	88 cm	88.5 cm
Diameter	24.5 cm	29 cm	29 cm	59.5 cm	60 cm
Volume	13.5 l	28 l	28 l	216.5 l	203 l
Filling quantity	10 l	25 l	25 l	180 l	180 l
Weight (empty)	1.8 kg	3.6 kg	3.4 kg	21.3 kg	21.5 kg
Number per pallet	13	11	11	2	2
Openings [located]	2" [decentr.]	2" [centr.] and 3/4" [decentr.]	S56x4 (PP)	2" [centr.] and 3/4" [decentr.] (steel, galvanized)	2" with 3/4" (PP)
Material	steel	steel	steel with PE	steel	steel with PE

Safety accessories

Antistatic set (3 cables)	1.07070.0001
Drum opening key	1.08803.0001

Important notice:
Must not be pressurized with inert gas!

▶ **Withdrawal systems see page 92**

Stainless steel drums [available from 10 l up to 190 l]

Protective cap
with originality sealing

Special formed rims
for best stackability

Standard openings
to ensure highest interoperability

Printed / engraved UN-code
includes important safety information
and provides packaging certificates

Safe and easy handling
due to 2 large handles

Unique, clear and complete labeling
with product specifications
and all relevant hazard declarations

High quality stainless steel
with extreme durability, inertness
and shock resistance for highest safety
and product quality

Cost effectiveness and
environmental protection
by using the drum returning process

Bottom reservoir
for optimal emptying

Technical data

Parameter	10 l	30 l	190 l
Height	35 cm	52 cm	88 cm
Diameter	24 cm	29 cm	59.5 cm
Volume	13 l	28 l	215 l
Filling quantity	10 l	25 l	190 l
Weight (empty)	1.9 kg	3.8 kg	18 kg
Number per pallet	15	11	2
Openings	2" centrally and 3/4" decentrally located		
Material	stainless steel 1.4301		

Safety accessories

Antistatic set (3 cables)	1.07070.0001
Drum opening key	1.08803.0001

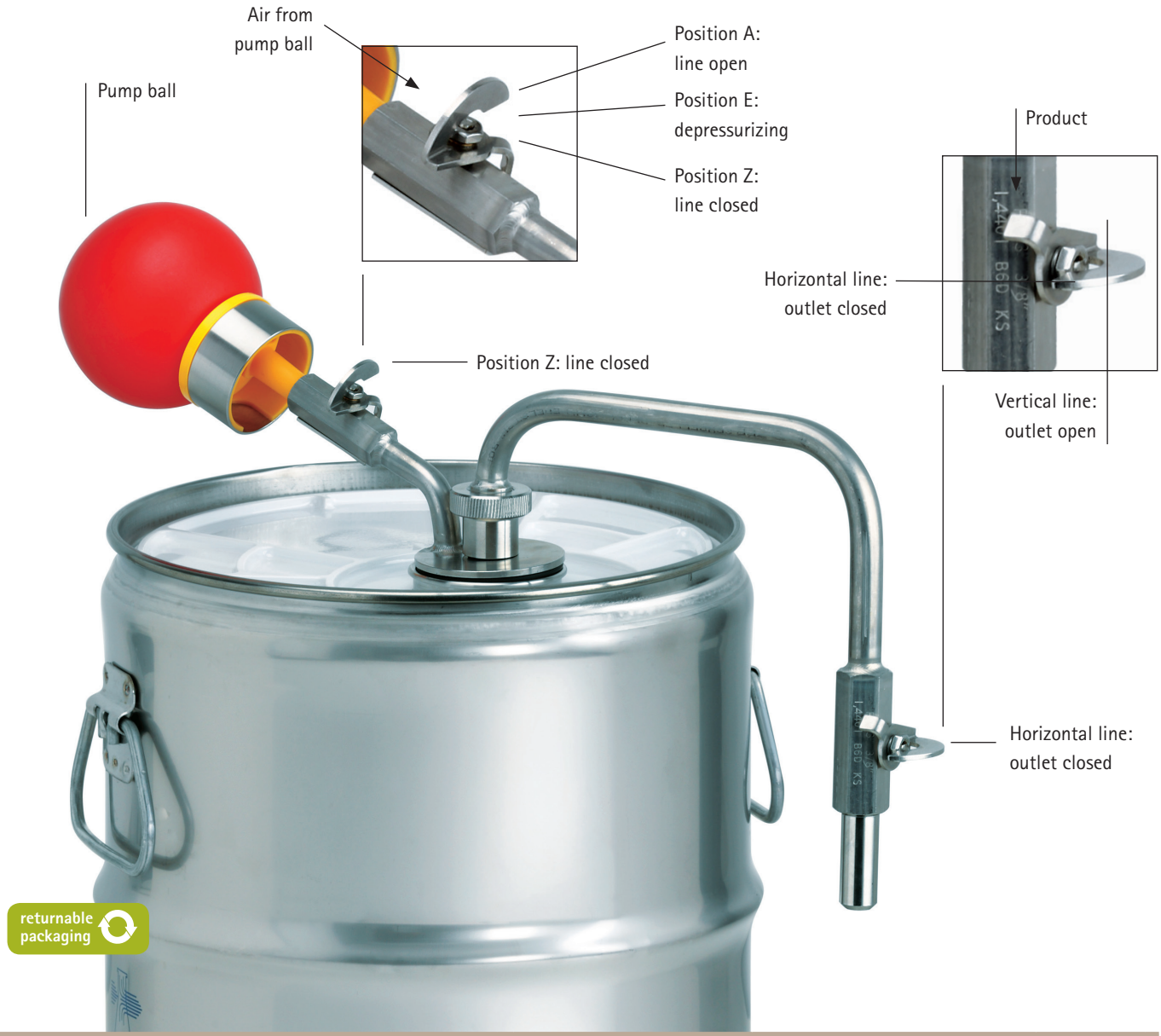
► **Withdrawal systems see page 92**

Withdrawal systems for drums

Classical analysis and synthesis

Manual pressure build-up

- Safe, easy and convenient solvent handling
- Usage of tested high quality materials to ensure a reliable, contamination free and safe handling of Merck Millipore solvents
- High flexibilty due to independence on gas supply



System at a glance

Order number	**1.01114.0001**		
Suitability	10 l and 25 l metal and stainless steel drums		
Operation mode	Manual pressure build-up by pump ball		
Set components	Withdrawal system body with 2" clamp Hand pump ball with rapid action connector 10 l dip tube 25 l dip tube		
Necessary completive products	9.67100.1026 Dip tube for 25 l composite drum (steel/PE)		
Recommended safety products	Antistatic set (3 cables)		1.07070.0001
	Drum opening key		1.08803.0001
Spare parts	Dip tube for 10 l drums		9.67100.1012
	Dip tube for 30 l drums		9.67100.1028
	Hand pump ball		9.67114.0000

Manual pressure build-up for high volumes

- Safe, easy and convenient solvent handling
- Usage of tested high quality materials to ensure a reliable, contamination free and safe handling of Merck Millipore solvents
- High flexibilty due to independence on gas supply

System at a glance

Order number	**1.19171.0001**
Suitability	180 l / 190 l / 200 l metal and stainless steel drums
Operation mode	Manual pressure build-up by foot pump ball
Set components	Withdrawal system body with 2" thread Foot pump ball with flexible tube and rapid action connector Adjustable dip tube

Necessary completive products	–	
Recommended safety products	Antistatic set (3 cables)	1.07070.0001
	Drum opening key	1.08803.0001
Spare parts	–	

Withdrawal systems for drums

Classical analysis and synthesis

Pressurizing with inert gas [only for stainless steel drums]

- Safe, easy and convenient solvent handling
- Usage of tested high quality materials to ensure a reliable, contamination free and safe handling of Merck Millipore solvents
- Cost effective solution due to economic concept of returnable container handling
- Construction of a central supply system, direct connection to instruments or individual installations as options

Self closing tear off connections
for quick connection and disconnection

9.67100.9051
Spiral gas feeding tube

9.67100.9002
Threaded adapter with vertical connections

Two different connectors for avoiding mismatch of gas and product

9.67106.0001
Stainless steel clamp

Nozzle can be hanged directly on the drum with the clamp

Safety hook to avoid unintended solvent supply
(push safety hook first to unblock the supply handle)

9.67100.9090
Filling nozzle with stainless steel coated PTFE-tube

Integrated swivel joints
to avoid tube tensions

System at a glance

Order number	**1.06710.0001**	
Suitability	10 l, 25 l and 190 l stainless steel drums 10 l, 30 l and 185 l stainless steel barrels	
Operation mode	Pressurizing with inert gas (house gas / gas bottle)	
Set components	Filling nozzle with stainless steel coated, flexible PTFE-tube (80 cm)	9.67100.9090
	Gas feeding tube	9.67100.9051
	Threaded adapter with vertical connections	9.67100.9002

Necessary completive products	Dip tube for 10 l stainless steel drums	9.67100.1010
	Dip tube for 35 l stainless steel drums	9.67100.1025
	Dip tube for 190 l stainless steel drums	9.67100.1190
	Stainless steel clamp for filling nozzle attachment to drums	9.67106.0001
Recommended safety products	Antistatic set (3 cables)	1.07070.0001
	Drum opening key	1.08803.0001
Spare parts	Filling nozzle with stainless steel coated, flexible PTFE-tube (80 cm)	9.67100.9090
	Gas feeding tube	9.67100.9051
	Threaded adapter with horizontal connections	9.67100.9003
	Threaded adapter with vertical connections	9.67100.9002

Service & Support

Merck Millipore provides numerous ways for getting information, handling instructions, technical data or individual consultation. Please do not hesitate to use all of them:

- **Online services**
  Solvents website www.merckmillipore.com/**solvents**
  Website "Solvent Manangement System" www.merckmillipore.com/**solvents-withdrawal**
  Safety film & Handling video manuals www.merckmillipore.com/**safety-film**
  Safety & Regulations www.merckmillipore.com/**safety**
- **Merck Millipore Catalog with separate section and product pictures**
- **Handling manuals with extensive information and step-by-step pictures**
- **Technical drawings and product details on request**
- **Individual consulting and technical drawings for customized installations**
- **On-the-spot consultancy**

Accessories

Our wide range of withdrawal accessories includes all the safety items you need for maximum withdrawal safety – for example, gas reducing valve or anti-static device. All components and accessories are easily interconnectable, thanks to a comprehensive selection of reducers, adapters and couplings that covers virtually all application scenarios.

When large amounts of solvents are used regularly in the lab, we recommend installing a complete supply system. This can be fitted in the lab safety cabinet, and provides a convenient, highly efficient system where solvent withdrawal takes place directly in the fume hood. We also offer accessories for connecting barrels in series to ensure uninterrupted solvent delivery (please contact us for details). When withdrawing high purity solvents from horizontal vessels, self-closing stainless steel nozzles must be specified.

Safe and easy handling

In close consultation with our customers for many years now, we have been engaged in a development program for withdrawal systems that are tailor-made for our solvents containers with main focus on customer's safety. Merck Millipore withdrawal systems include all the relevant safety features, e.g. self-closing nozzles, pressure relief mechanisms and anti-static devices.

For easy handling the withdrawal system components are ergonomically shaped (e.g. filling nozzle) and easily interconnectable by a broad range of connectors (e.g. quick connectors) and adapters.

Contamination free withdrawal

The way in which the withdrawal systems are perfectly matched to the various containers and to the special needs of certain grades of solvent, ensures that withdrawal occurs without solvent contamination for safe and reproducible customer results.

Application orientated material developments as well as the optimally match of solvent, container and withdrawal system to one another provide perfect suitability to a contamination free solvents handling.

By using e.g. 10-l-barrels with the appropriate withdrawal system, the customer is able to minimize the solvents contamination with air humidity. The customer just needs to open the 10-l-barrel once in comparison to 4 times opening a 2.5 l glass bottle for 10-l-needs.

Special system for dried solvents

For maximum dryness of our SeccoSolv® range we provide these solvents in special designed stainless steel barrels with integrated dip tube. By using the appropriate withdrawal system, it is possible to prevent the solvent from becoming contaminated with moisture from the atmosphere. These specially tailored systems safeguard solvent quality and keep your analyses safe and dependable.

Your benefits

Accessories

- Application and demand orientated packaging sizes
- Easy, safe and contamination-free solvent handling
- Maximum safety due to an extensive portfolio of safety accessories
- Direct connection to laboratory equipment possible (e.g. HPLC-instruments)
- Ecological and economical benefit by using returnable containers
- Individual user installation or other customized solutions possible
- High lab safety with process automation by level sensor technology

Safety accessories for bottles

Accessories

Handling hazardous goods daily demand highest health protection. Specially for solvents in glass bottles there are several additional safety products available that increases your lab safety dramatically.

Bottle key

Bottle key for safe and convenient bottle opening
[1.08801.0001]

- Bottle key for opening and closing Merck Millipore bottles with S40 and S28 screw cap
- Perfectly adapted to Merck Millipore bottles
- Maximum user safety
- User-friendly and convenient

Safety carrier for glass bottles

Safety carrier for glass bottles
[9.20078.0001 (up to 2.5 l) and 1.40140.0001 (up to 4 l)]

Maximum safety in case of accident:

- Optimal bottle protection due to very effective PE-foam buffer
- Additional time buffer for disposal due to solvent resistant materials
- No risk of laceration by glass splinters and no contact with solvents and vapours due to leak proof top cover
- Convenient handling due to stable and broad handle

HPLC-Adapter

Adapter for solvent supply
(Ord. No. 1.03830.0001)

Adapter for solvent disposal
(Ord. No. 1.03831.0001)

HPLC-Adapter for direct instrument connection
[1.03830.0001 (supply) and 1.03831.0001 + 1.03833.0001 (disposal)]

- Direct instrument adapter for S40-threaded Merck Millipore bottles
- No harmful evaporations
- Contamination-free solvent handling
- Stable eluent mixture ratio without contamination
- Easy exchange of bottles
- Multiple connection possibilities

Label set

Label set acc. to GHS, DIN EN ISO and GLP
[1.00801.0001]

Safe and convenient:

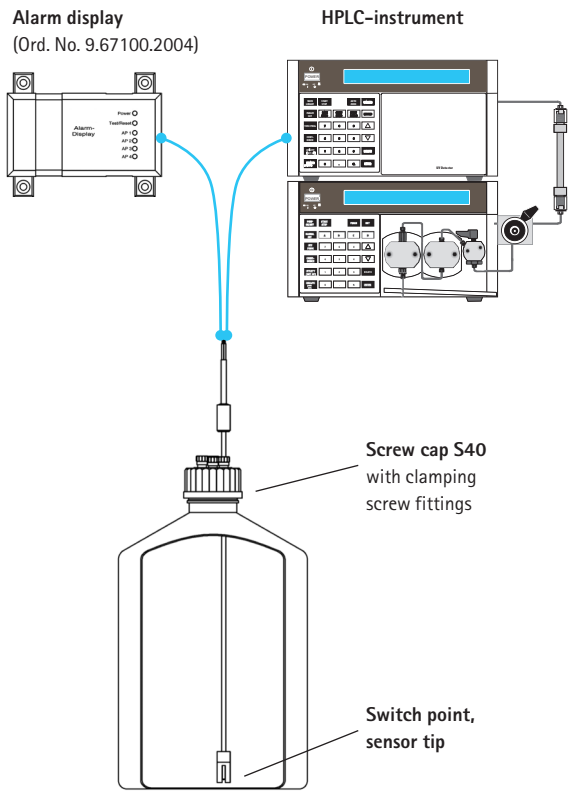
- Comprehensive label for complete information
  at a glance acc. to GHS, DIN EN ISO and GLP including adhesive pictograms and signal words
- Easy to remove due to non-permanent adhesive for residue-free removal
- Label made of chemical resistant plastic

Process automation by level sensor technology

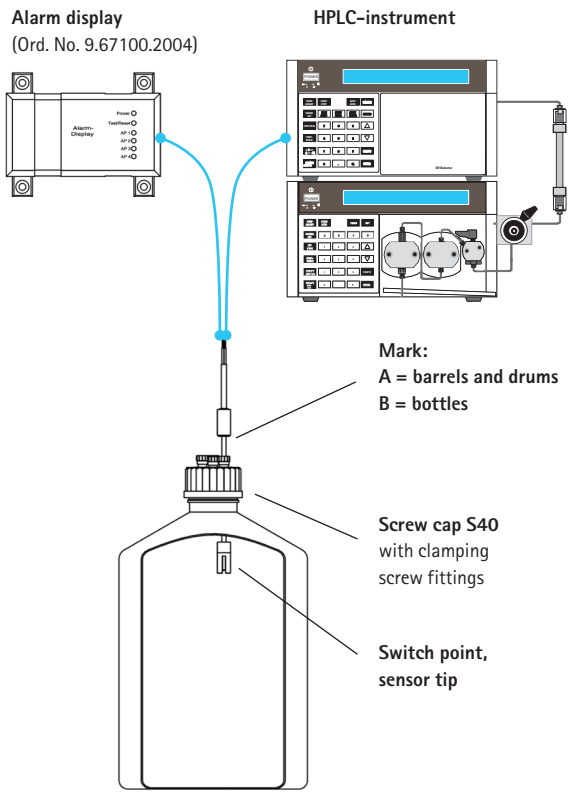
Accessories

NEW

Level sensors for bottles



Bottle level sensor for solvent supply
(Ord. No. 9.67100.2001)

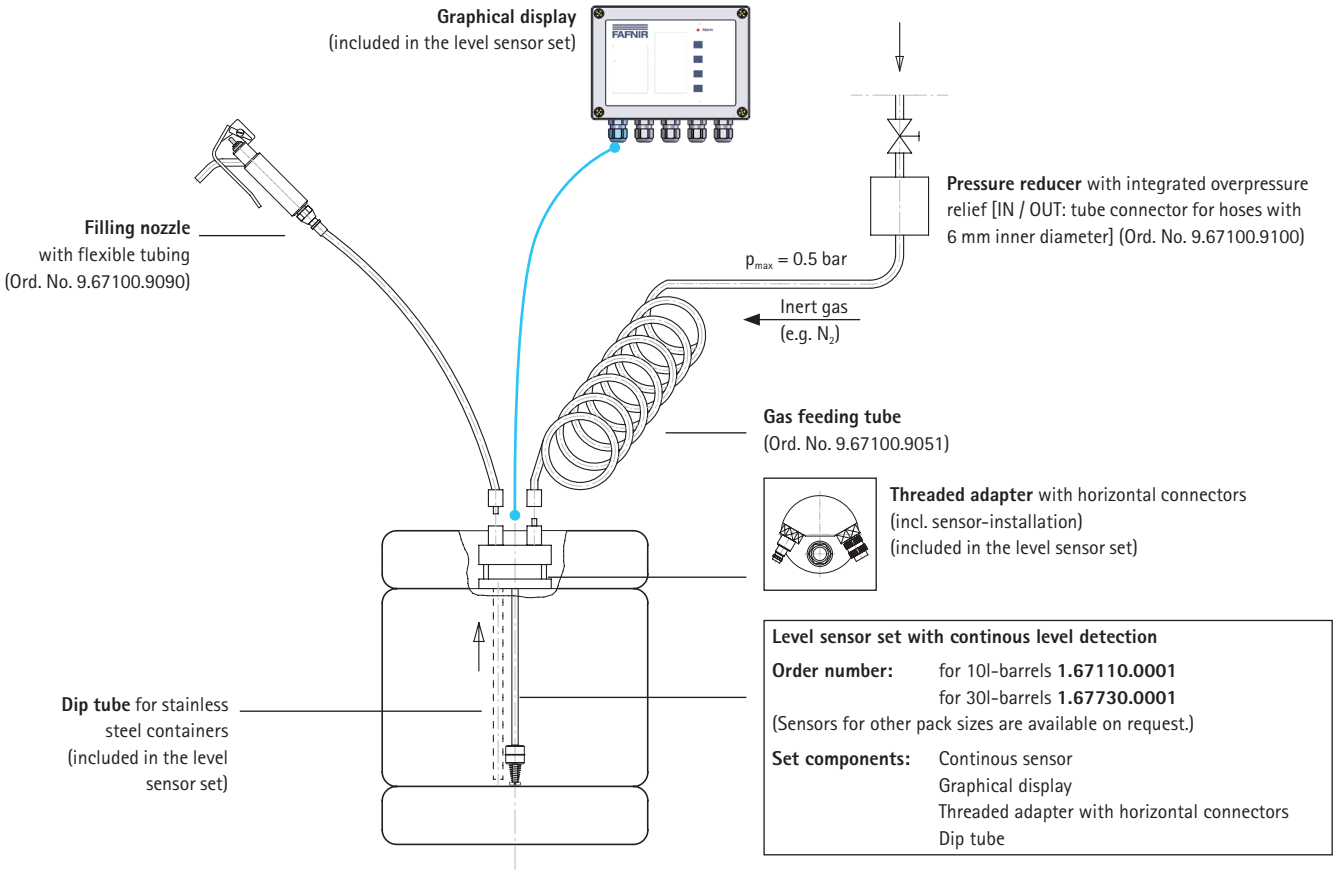


Bottle level sensor for solvent disposal
(Ord. No. 9.67100.2002)

As the pioneer in lab scale level sensoring Merck Millipore provides now a safe and convenient solution for process automation in laboratories. Primary for aluminum bottles but also for all other Merck Millipore solvent bottles with S40 thread the sensor is pre-assembled in a screw cap with 3 connection positions to connect e.g. HPLC tubes of 3 mm directly to the bottle. The S40-screw cap is screwed onto the top of the bottle. With a clamping screw the sensor can be adjusted to several bottle sizes or also to the desired level.

- **Connecting the sensor to an alarm display for optical and acoustic signalling** purposes at the workplace with a built-in acknowledgement function.
- **Connecting the bottle sensor signal directly to an HPLC-instrument** it stops the HPLC-run automatically to ensure a consistent supply of mobile phase and thus avoiding any reconditioning of the column. For disposal side the sensor prevents from overfilling and from the occurrence of harmful situations.

Level sensors for barrels and drums



Level sensor set with continous level detection

Order number:	for 10l-barrels **1.67110.0001**
	for 30l-barrels **1.67730.0001**

(Sensors for other pack sizes are available on request.)

Set components:	Continous sensor
	Graphical display
	Threaded adapter with horizontal connectors
	Dip tube

Maximum safety and reliability for your daily work

Continuous level sensor technology with ATEX approval provides maximum safety and reliability for your daily work. The graphical display shows always the exact solvent level inside the container. With adjustable alarm points an individual management, measurement and control of solvents supply and disposal is now available and automatized, e.g. visible control alarms or automatically control of e.g. HPLC-instruments.

The new Merck Millipore sensor set adds the easy aspect to this complex functionality: Pre-assembled for each pack size and convenient to install. By using the filling nozzle and the gas feeding tube the direct withdrawal can immediately start. For customized installations please contact your local supplier to get direct and individual support.

Ordering information
Accessories | Safety accessories for bottles

Categories	Products	Ord. No.
Connection screw caps	Adapter S40 for the direct aspiration of solvents through tubes of 3 mm O.D. from bottles with S40 thread	**1.09996.0001**
	HPLC bottle adapter with 3 tube connections ID 3.2 mm, solvents supply by Merck Millipore bottles	**1.03830.0001**
	HPLC bottle adapter S40 with 3 tube connections and 1 connection for exhaust air filter, solvents disposal	**1.03831.0001**
	Air valve for HPLC bottle adapter S40	**1.03832.0001**
	Exhaust air filter for HPLC bottle adapter S40, disposal	**1.03833.0001**
	Fittings for capillaries with 3.2 mm O.D., for HPLC bottle adapter S40 (pack of 10)	**1.03834.0001**
	PTFE-ferrule for capillaries with 3.2 mm A.D., for HPLC bottle adapter S40 (pack of 10)	**1.03835.0001**
	Blanking plug for capillariy connections with 3.2 mm I.D., for HPLC bottle adapter S40	**1.03836.0001**
	Bottle adapter (PTFE), S40 (bottle thread) to GL45 (outer thread)	**1.67206.0001**
	Reducer (PE) from S40 to GL45	**9.67206.0001**
	Reducer (PTFE) from S40 to S38	**1.67207.0001**
Labels	Label set acc. to GHS	**1.00801.0001**
	Labels Geöffnet am / verw. bis (only German text) 100 adhesive labels	**1.08899.0001**
Level sensors	Adapter with S40 thread with level sensor for emptying Merck Millipore solvents in bottles (pack of 10)	**9.67100.2001**
	Adapter with S40 thread with sensor for filling Merck Millipore bottles (waste solvent)	**9.67100.2002**
	Display and alarm device for bottle level sensor	**9.67100.2004**
Opening tools	Bottle key for opening an closing bottles with S40 and S28 screw caps	**1.08801.0001**
Safety carrier	Safety carrier for Merck Millipore 2.5 l glass bottles	**9.20078.0001**
	Safety carrier for Merck Millipore 4 l glass bottles	**1.40140.0001**

HPLC-Adapter for bottles with S40 thread

Ordering information
Accessories | Safety accessories for barrels and drums

Categories	Products	Ord. No.
Essential safety equipment	Antistatic device for earthing metal containers when dispensing and filling with flammable solvents (set of 3 cables)	**1.07070.0001**
	Pressure safety device 0.5 bar with 2 tube connections (6 x 8 mm)	**9.67100.9004**
	Reducing valve 0.2 bar with integrated excess pressure safety device 0.5 bar	**9.67100.9100**
Filling nozzle clamps	Stainless steel clamp for filling nozzles for drums	**9.67106.0001**
	Stainless steel clamp for filling nozzles for wall attachment	**9.67107.0001**
Labels	Label set acc. to GHS	**1.00801.0001**
	Labels Geöffnet am / verw. bis (only German text) 100 adhesive labels	**1.08899.0001**
Level sensors	Continuous level sensor for solvents in 10 l stainless steel barrels	**1.67710.0001**
	Continuous level sensor for solvents in 30 l stainless steel barrels	**1.67730.0001**
Opening tools	Drum key for opening and closing containers with 2" and 3/4" screw caps	**1.08803.0001**

Accessories | Withdrawal systems for barrels and drums

Categories	Products	Ord. No.
Withdrawal systems	Withdrawal system for solvents with manual pressure build-up for 10 l and 30 l stainless steel barrels	**1.01123.0001**
	Withdrawal system for solvents with manual pressure build-up for 10 l and 25 l metal and stainless steel drums	**1.01114.0001**
	Withdrawal system for solvents with manual pressure build-up for 200 l barrels and drums	**1.19171.0001**
	Withdrawal system for stainless steel barrels and drums with threaded adapter, gas feeding tube and filling nozzle with flexible line (necessary in addition: dip tube suit the particular type of container)	**1.06710.0001**
Spare parts and optional products for withdrawal systems	Dip tube for 10 l stainless steel drum for withdrawal system Ord. No. 1.01114.0001	**9.67100.1012**
	Dip tube for 25 l stainless steel drum for withdrawal system Ord. No. 1.01114.0001	**9.67100.1028**
	Dip tube for 10 l stainless steel barrel for withdrawal system Ord. No. 1.01123.0001	**9.67100.1011**
	Hand pump ball for withdrawal system Ord. No. 1.01114.0001 and 1.01123.0001	**9.67114.0000**
	Hand pump with rapid-action connector	**9.67100.1079**
	Seal (O-Ring, 14 x 2.5 mm) for withdrawal systems Ord. No. 1.01114.0001 and 1.01123.0001	**9.67100.1048**
	Seal (O-Ring, 56 x 3.6 mm) for withdrawal systems Ord. No. 1.01114.0001 and 1.01123.0001 and threaded adapter	**9.67100.1047**

Ordering information
Accessories | Withdrawal components for individual installations

Categories	Products	Ord. No.
Adapters and reducers	Coupling part between tube (6 x 8 mm) and pipe (O.D. 10 mm)	**9.67100.1055**
	Rapid-action connection nipple (product side) with G3/8 thread	**9.67100.1051**
	Rapid-action connector for gas feed tube (8 x 6 mm) or for system venting	**9.67100.1052**
	Rapid-action connector for product tube 3 x 1.5 mm	**9.67100.1076**
	Rapid-action connector (gas side) with G3/8 thread	**9.67100.1050**
	Rapid-action nipple for product tube 8 x 6 mm	**9.67100.1061**
	Rapid-action nipple with tube connection 6 x 4 mm	**9.67100.1064**
	Reducer (PE) from S56 x 4 to 2" thread (2" coarse to 2" fine thread)	**9.67202.0000**
	Reducer (stainless steel) from 2" to 3/4" thread	**9.67204.0000**
	Reducer (stainless steel) from 2" to S40 thread	**1.01111.0001**
Filling nozzles and taps	Filling nozzle (stainless steel) self-closing, with stainless steel-coated PTFE-tube (80 cm) with rapid-action connector	**9.67100.9090**
	Filling nozzle (stainless steel) with stainless steel-coated PTFE-tube with larger rapid-action connector (type 25) for threaded adapter 9.67100.9006	**9.67100.9065**
	Filling nozzle (tap), self closing, with G3/8 thread	**9.67100.1090**
	Filling nozzle (tap), self closing, with G3/8 thread for wall attachment	**9.67100.1084**
	Tap (stainless steel) attachable, self closing, for vessels with 3/4" internal thread	**1.09070.0001**
Dip tubes	Dip tube for 10 l stainless steel drum for withdrawal system with 2" threaded adapter	**9.67100.1010**
	Dip tube for 25 l stainless steel drum for withdrawal system with 2" threaded adapter	**9.67100.1025**
	Dip tube for 190 l stainless steel drum for withdrawal system with 2" threaded adapter	**9.67100.1190**
	Dip tube for 10 l stainless steel barrel for withdrawal system with 2" threaded adapter	**9.67100.1040**
	Dip tube for 30 l stainless steel barrel for withdrawal system with 2" threaded adapter	**9.67100.1041**
	Dip tube for 185 l stainless steel barrel for withdrawal system with 2" threaded adapter	**9.67100.1185**
	Dip tube for 25 l combi container for withdrawal system Ord. No. 1.01114.0001	**9.67100.1026**
Threaded adapters	Threaded adapter 2" (stainless steel) with 2 vertical rapid-action connectors	**9.67100.9002**
	Threaded adapter 2" (stainless steel) with 2 horizontal rapid-action connectors	**9.67100.9003**
Tubings	Spiral gas feeding tube (Nylon) with rapid-action connector (length: 180 cm)	**9.67100.9051**
	Stainless steel-coated PTFE-tube (80 cm) with rapid action nipple and threaded connector G3/8	**9.67100.9052**
	Stainless steel-coated PTFE-tube (80 cm) with 2 rapid action connectors	**9.67100.9058**
	Stainless steel-coated PTFE-tube (80 cm) with rapid action connector and pipe connector (O.D. 10 mm)	**9.67100.9062**
	Stainless steel-coated PTFE-tube (80 cm) with rapid action nipple and pipe connector (O.D. 10 mm)	**9.67100.9057**
	Stainless steel-coated PTFE-tube (100 cm) with pipe connector (O.D. 10 mm) on both sides	**9.67100.9061**

Overview
Packaging and withdrawal systems

Withdrawal system	Stainless steel barrels			Stainless steel drums			Metal drums		Combi drums with PE-Inliner		Accessories	Ord. No.
	10 l	30 l	185 l	10 l	25 l	190 l	25 l	190 l	25 l	180 l		
Withdrawal system for solvents with manual pressure build-up for 10 l and 30 l returnable barrels	■	■									–	**1.01123.0001**
Withdrawal system for solvents with manual pressure build-up for 10 l and 25 l returnable drums				■	■		■		□		–	**1.01114.0001**
											Dip tube for 25 l combi drum	**9.67100.1026**
Withdrawal system for inert gas pressurizing	□	□	□	□	□	□					Dip tube required:	**1.06710.0001**
											Dip tube for 10 l barrel	**9.67100.1040**
											Dip tube for 30 l barrel	**9.67100.1041**
											Dip tube for 185 l barrel	**9.67100.1185**
											Dip tube for 10 l drum	**9.67100.1010**
											Dip tube for 25 l drum	**9.67100.1025**
											Dip tube for 190 l drum	**9.67100.1190**
Withdrawal system for solvents with manual pressure build-up for 200 l barrels and drums			■			■		■		■	–	**1.19171.0001**
											Adapter 2" coarse to 2" fine thread for combi drum (drum with PE-inliner)	**9.67202.0000**

■ **suitability** | □ **installation possible, the appropriate dip tube has to be ordered separately**

Please contact your local agent for further information for your individual installation.

Stainless steel clamp (9.67106.0001) for filling nozzles for drums.

Important safety advice

Our withdrawal systems have been developed and optimized for the use with containers and solvents from Merck Millipore. Merck Millipore therefore disclaims any warranty or liability for the operability of its withdrawal systems in connection with containers or solvents from other manufacturers.

Merck Millipore reserves the right to refrain from the delivery of withdrawal systems if the respective order does not indicate that each withdrawal system will be used in combination with appropriate solvents and containers from Merck Millipore.

We inform and advise our customers to the best of our knowledge and ability but without any engagement or liability on our part. Our customers must obey all existing laws and regulations. This also applies in respect of any protected rights of third parties. Our information and advice does not eliminate the need for our customers to check, on their own responsibility, that our products are suitable for the purpose envisaged.

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