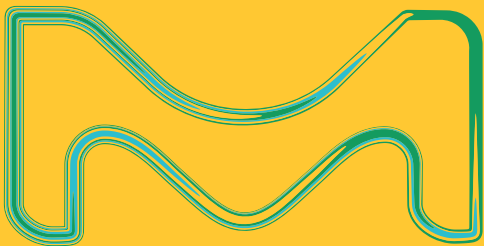


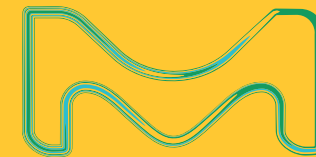
safety inside

How to maximize safety in daily handling of hazardous goods
FHI | Customer Safety seminar | 2020



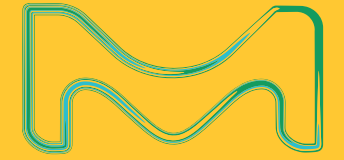
The life science business of Merck KGaA,
Darmstadt, Germany operates as
MilliporeSigma in the U.S. and Canada.

Supelco®
Analytical Products



The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada

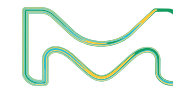
Agenda



- 01** The **role of safety** in the lab
- 02** The **daily challenges**
- 03** **How to handle** daily challenges
- 04** Safety connects: Solvent **basic characteristics**
- 05** How to handle **bigger pack sizes** safely
- 06** How to clear away **chemical spills**: Chemizorb®
- 07** How to find **additional safety info and support**

Unfortunately, accidents happen...

The role of safety in the lab



Three injured after accident in chemical lab

“Feuerwehrmagazin” 30 May, 2011

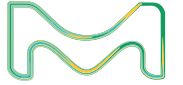
- 3 students burned by a broken 2.5l glass bottle of **Nitric Acid (HNO_3)**
- Lacerations and eye injuries caused by **glass splinters from burst bottle**
- More than **100 emergency personnel** in action



Source: <http://www.feuerwehrmagazin.de/nachrichten/einsatze/drei-verletzte-nach-unfall-in-chemie-labor-19105> 21.05.2012

The role of safety in the lab

Definition: Hazardous substances



Hazardous Substances Ordinance

(GefahrStoffverordnung - GefStoffV)

- Protection of persons and environment from substance-related damage
- Hazardous substances:
 - carry **at least one** of the 15 hazardous substance classes
 - are **explosive**
 - **produce hazardous** substances during their manufacture or use
 - **represent a hazard** due to their properties or use
 - assigned a **workplace limit**



1 physical hazards

Explosive
Oxidizing
Extremely flammable
Highly flammable
Flammable
Highly toxic
Toxic



2 health hazards

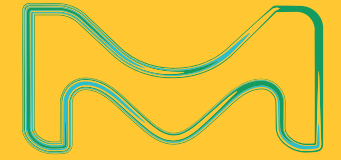
Harmful to health
Corrosive
Irritant
Sensitizing
Carcinogenic
Toxic to reproduction
Mutagenic



3 environmental hazards

Dangerous to the environment

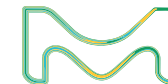
Agenda



- 01 The **role of safety** in the lab
- 02 The **daily challenges**
- 03 **How to handle** daily challenges
- 04 Safety connects: Solvent **basic characteristics**
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- 06 How to clear away **chemical spills**: Chemizorb®
- 07 How to find **additional safety info and support**

Protect yourself: Risk sources

The daily challenges



Substance Hazardous properties



- Explosive
- Corrosive ...

Application Handling efforts for daily volumes

- 1l per week vs. 100l per week
- Handling amount per day
- Special processes & connections



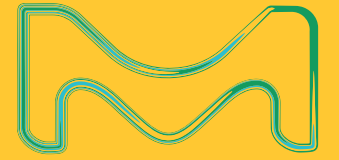
Packaging Material Material properties

- Stability
- Composition / Ingredients
- Weight
- Shape / Design
- Re-use / Disposal

Pack size Filling volume

- 0.5ml vs. 2.5l vs. 1000l
- Dimensions
- Weight

Agenda



- 01 The **role of safety** in the lab
- 02 The **daily challenges**
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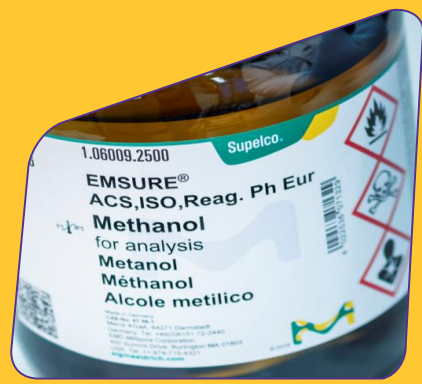


protect yourself:

daily risk sources

Substance

Hazardous properties



Packaging Material

Material properties

Application

Handling efforts for daily volumes



Pack size

Filling volume

Protect yourself against SUBSTANCE SDS: Your most important source for safety information



Supelco® www.sigmaaldrich.com

SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006
Revision Date 19.07.2018 Version 18.0

SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Catalogue No.	100452
Product name	Nitric acid 65% for analysis (max. 0.005ppm Hg) EMSURE® Reag. Ph Eur,ISO
REACH Registration Number	This product is a mixture. REACH Registration Number see section 3.

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Reagent for analysis, Chemical production In compliance with the conditions described in the annex to this safety data sheet.
-----------------	--

1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone: +49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number **Please contact the regional company representation in your country.**

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture
Classification (REGULATION (EC) No 1272/2008)

Oxidizing liquid, Category 3, H272
Corrosive to metals, Category 1, H290
Acute toxicity, Category 3, Inhalation, H331
Skin corrosion, Category 1A, H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements
Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms

Signal word
Danger

Hazard statements

H272 May intensify fire; oxidizer.
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H331 Toxic if inhaled.
EUH071 Corrosive to the respiratory tract.

Precautionary statements

Prevention
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

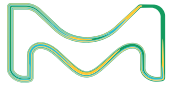


- SECTION 4. First aid measures
- SECTION 7. Handling and storage
- SECTION 8. Exposure controls/ personal protection
- SECTION 13. Disposal considerations



Protect yourself against SUBSTANCE

The label: Important information source



K51089883
Lot:
2019/03/22
min. shelf life (YYYY/MM/DD):

1.00983.1000

Supelco®

EMSURE®
ACS,ISO,Reag. Ph Eur
Ethanol
absolute for analysis
Etanol
Etanolo

11
C₂H₅OH
M 46.07 g/mol

5°C / 30°C

4 022536 013114

Made in Germany
CAS-No: 64-17-5
Merck KGaA, 64271 Darmstadt
Germany, Tel. +49(0)6151 72-2440
EMD Millipore Corporation
400 Summit Drive, Burlington MA 01803
USA, Tel. +1-978-715-4321
sigmaaldrich.com

© 2018

Hazard & precautionary statements

Danger. Highly flammable liquid and vapour. Causes serious eye irritation. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Do not breathe vapour. Rinse immediately with water for several minutes. Remove contaminated clothing. Do not get into eyes. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if available and do not remove if difficult to do. Continue rinsing. Store in a well-ventilated place. Keep container closed. Do not reuse. Do not empty into drains.

Gefahr. Flüssigkeit und Dampf leicht entzündbar. Verursacht schwere Augenreizung. Von Hitze/Funken/offener Flamme/heißen Oberflächen fernhalten. Nicht rauchen. Nicht einatmen. Bei Kontakt mit den Augen: Einige Minuten lang behutsam mit Wasser spülen. Eventuell vorhandene Kontaktlinsen nach Möglichkeit entfernen. Weiter behutsam spülen. Behälter dicht verschlossen halten.

Peligro. Líquido y vapores altamente inflamables. Irritación grave. Mantener alejado de fuentes de calor, chispas, llama abierta y superficies calientes. No fumar. Evitar la inhalación de vapores. Enjuagar con agua cuidadosamente durante varios minutos. Quitar la ropa contaminada. No volver a utilizar el recipiente cerrado herméticamente. Si se entra en contacto con los ojos: Enjuagar con agua cuidadosamente durante varios minutos. Quitar las lentes de contacto si se encuentran disponibles y no se puede hacer con facilidad. Continuar enjuagando con agua. Guardar el recipiente cerrado herméticamente. No reutilizar. No vaciar en los desagües.

Danger. Liquide et vapeur hautement inflammables. Irritation des yeux. Tenir à l'écart de la chaleur, des étincelles/des surfaces chaudes. Ne pas fumer. Éviter l'inhalation de la vapeur. Rincer avec de l'eau pendant plusieurs minutes. Retirer les lentilles de contact si elles sont disponibles et si elles peuvent être facilement retirées. Continuer à l'eau pendant plusieurs minutes. Garder le récipient fermé de manière étanche. Ne pas réutiliser. Ne pas verser dans les égouts.

Perigo. Líquido e vapores altamente inflamáveis. Irritação ocular grave. Manter afastado do calor/faísca/chama aberta e superfícies quentes. Não fumar. Evitar a inalação de vapores. Enxaguar cuidadosamente com água durante vários minutos. Remover a roupa contaminada. Não reutilizar o recipiente fechado. Se houver contato com os olhos: Enxaguar com água com cuidado por um tempo prolongado. Não reutilizar. Não despejar nos esgotos.

Pericolo. Liquido e vapori altamente infiammabili. Irritazione oculare. Tenere lontano da fonti di calore/sintille/ fiamme e superfici calde. Non fumare. Evitare l'inalazione di vapori. Sciacquare accuratamente per parecchi minuti. Togliere le eventuali lenti a contatto se è agevole farlo. Continuare a sciacquare. Non riutilizzare. Non versare nei fognari.

Gevaar. Licht ontvlambare vloeistof en dampen. Oogirritatie. Verwijderd houden van warmte/vonken/opevening. Niet roken. Vermijd inademing van de dampen. Bij contact met de ogen: voorzichtig met water spoelen. Indien mogelijk; blijven spoelen. Niet hergebruiken. Niet in de afvoer gieten.



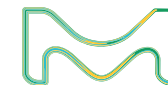
smart label

- Downloadable APP: „My M Safety – SDS & Label“
- Alternative scan via website: www.merckmillipore.com/ScanNow



Protect yourself against SUBSTANCE

BASIC LAB RULES



Always wear **personal protective equipment (PPE)**

Eye protection

Safety goggles

Respiratory devices

for dangerous concentrations
of hazardous substances

Hand protection

Appropriate gloves (see SDS)

Protective clothing

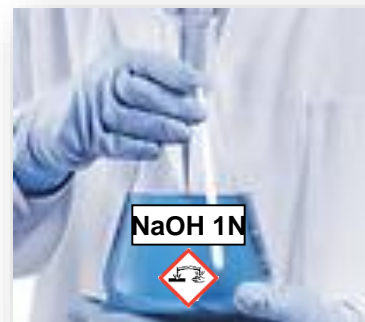
Lab coat

Conductive floor

Conductive safety shoes



Close the lab coat!
(Don't roll up the sleeves!)

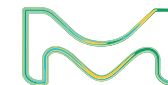


Always **label**
your bottles and beakers!

- Name of the substance
- Correct hazard label

Protect yourself against SUBSTANCE

Safe and complete labelling



- Safe handling of hazardous chemicals
- Label own mixtures acc. to DIN EN ISO guidelines
- Avoiding mismatch of chemicals

ISSUES

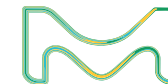
SOLUTIONS

- Always label your bottles and beakers!
 - Name of the substance
 - Correct hazard label
- Use pictograms



Protect yourself against SUBSTANCE

BASIC LAB RULES



Ventilation



Work in a **well ventilated work area** (use respiratory equipment if necessary)

Minimal volumes



Only required volumes at the working place

NO Eating & Drinking



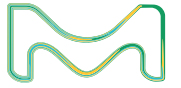
Do **not eat, drink, chew, or apply cosmetics** in a laboratory work area

Proper disposal



Dispose always properly to protect your health and the environment

Protect yourself against SUBSTANCE Safe Cleaning



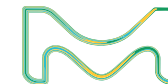
can you rely on your
existing cleaning
procedures?



Infinite variety of
contaminations and
surfaces



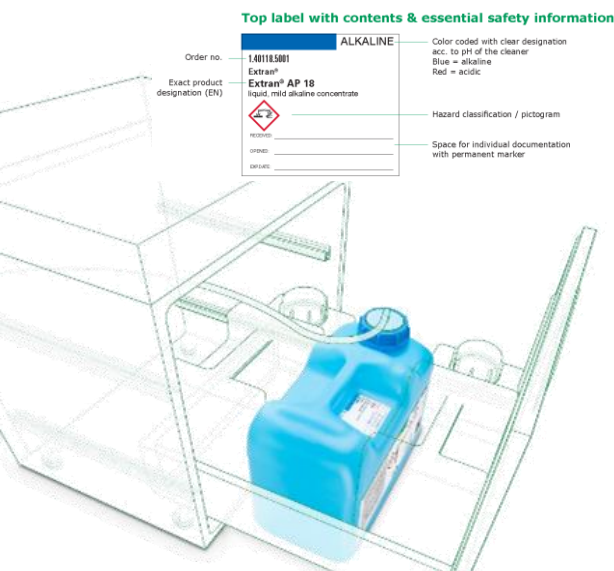
Protect yourself against SUBSTANCE Lab cleaners – Extran®



Reliable application results after cleaning?

Features

- Ideal all-purpose cleaner
- Bottles, canisters, accessories & specialities available
- Several types with dedicated cleaning properties



Extran® MA
for
MAnual cleaning



Extran® AP
for
AParative cleaning
in lab dish washers



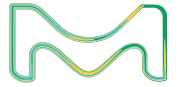
Benefits

- Protects the health of the laboratory staff – **no toxic ingredients**
- Protects the environment - **biodegradable**
- Distinctive cleaning power - **concentrates**
- **Extensive universal effects**
- Residue-free cleaning & reliable processes – **High purity** for scientific work

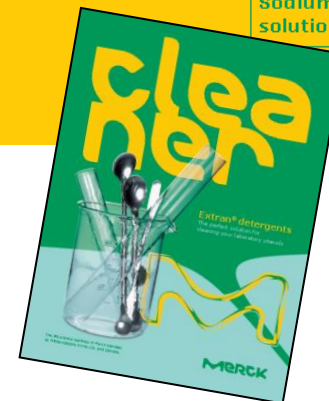
Extran® is important in every laboratory, where impurities have to be removed.

Protect yourself against SUBSTANCE

Lab cleaners

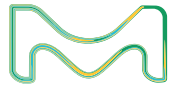


Properties						Cleaning applications						Application	Product information			
Liquid	Pow der	Mildly alkaline	Alkaline	Neutral	Acidic	Food / residues	Fat / wax / silicones (oils, greases, resins)	Organic residues	Inorganic residues	Colours / lacquer pigments	Blood / cells / proteins	Instructions	Concentration	Product	Ordering information	
Manual washing																
•		•				•		•	•	•	•	2-5-20%	Extran® MA 01	107555	Page 06	
•			•				•		•			2-5%	Extran® MA 02	107553	Page 07	
•		•			phosphate-free		•		•			2-5-20%	Extran® MA 05	140000	Page 07	
													Sodium hydroxide solution	105588	Page 08	



...always chose the right detergent for your contamination to be removed

Protect yourself against SUBSTANCE Drying agents



**Drying is a daily
lab process –
but is it always
safe?**



Protect yourself against SUBSTANCE

Drying agents



- Silica Gel – Safe drying with orange gel
- Silica Gel is a favored drying agent
- Suitable for:
 - Drying gaseous, liquid or solid substances
 - Protection against moisture and mold formation
 - Filling for desiccators, drying tubes, columns

Safety information

Dangers of silica gel with blue gel indicator



- cobalt dichloride (CoCl_2) is classified as carcinogenic and toxic for reproduction*
- When working with the desiccant, any dust particles may easily be inhaled

Benefits

- Cost savings through possibility to **regenerate**
- Easy handling and disposal
- **High capacity**
- **Non-toxic** ingredients
- **Wide range** of pack sizes



MERCK offers a broad range of **non-toxic** silica gels which are based on iron-salt indicator

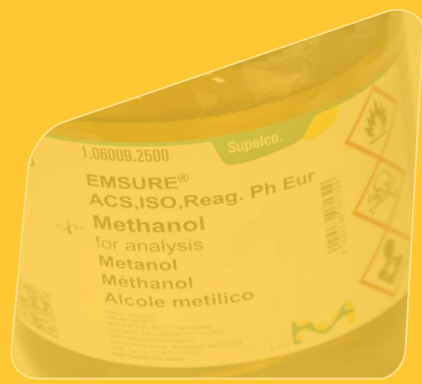


protect yourself:

daily risk sources

Substance

Hazardous properties



Packaging Material

Material properties

Application

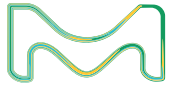
Handling efforts for daily volumes



Pack size

Filling volume

Protect yourself against PACKAGING MATERIAL Closures & Caps



- Open caps & closures safely and easily
 - Flat or unruffled
 - Specially shaped
 - Very tightly closed

Issues

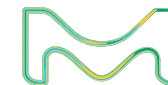
SOLUTION

Always use suitable
& safe tools!
Don't experiment on your own!



Protect yourself against PACKAGING MATERIAL

Transportation of breakable containers



- Safe transportation of breakable containers to
 - the next room / lab
 - the next level e.g. by elevator

ISSUES

SOLUTIONS

“Working Safely in Laboratories”
DGUV Information 213-850
4.10.3 Transport

<http://www.guidelinesforlaboratories.de>
(DGUV - German Social Accident Insurance)



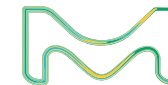
Picture source:
DGUV Information 213-850, 4.10.3 Transport



Supelco®

Protect yourself against PACKAGING MATERIAL

Bottle design - POURING



- Safe pouring of hazardous chemicals
- Avoiding unintended contact with the hazardous chemical

ISSUES

SOLUTIONS

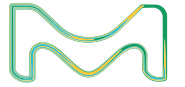
- Always wear appropriate gloves
- Prefer bottles with handle
- Use glass bottles with handle made out of one drop – avoiding risks by predetermined breaking points
- If bottles with handle are not applicable, use helpful tools



Supelco®

Protect yourself against PACKAGING MATERIAL

Glass bottle risks and alternatives



- Protection from glass fracture
- Reduction of daily used weights
- Increasing pressure resistance

ISSUES

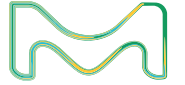
SOLUTIONS

- HPDE-bottles
- Aluminum bottles
- Safebreak bottles



Protect yourself against PACKAGING MATERIAL

Safebreak bottle for acids



Protect yourself by protecting the glass bottle

Features

- Original Merck glass bottle coated with PE (chemical has only contact to the glass)
- In case of glass breakage:
acid and glass splinters are reliably contained inside PE-coating
- Meets all safety requirements
- Easy and ecological disposal (with standard glass)
- Now also available in smaller bottle sizes: 1 l and 0.5 l



Benefits

- Offers **all advantages of glass bottles**
- Additional safety through **PE-coating: best protection** against chemical burns, and cuts from glass splinters
- **Best handling properties** due to non-sticky surface

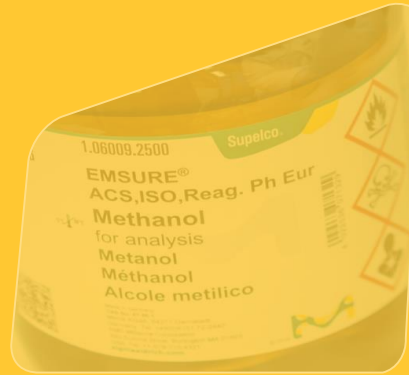


protect yourself:

daily risk sources

Substance

Hazardous properties



Packaging Material

Material properties

Application

Handling efforts for daily volumes

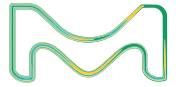


Pack size

Filling volume

Protect yourself against PACK SIZE

The issues



WEIGHT

Maximum lifting loads

- Local regulations for occupational health & safety
- Personal calculation acc. to gender, time frame and frequency

DIMENSION

Valuable lab storage space vs. daily consumption

→ base area of 5x 1l vs. 1x 5l



LIMITATION

Quantities of flammable liquids* (flashpoint < 55°C)

- nominal volume < 1 l
- larger quantities in **non-breakproof** vessels: up to 5 l
- **other** vessels:
up to 10 l at a protected location
(e.g. safety cabinet as specified in DIN EN 14470-1:2004)
- **Plastic containers > 5 l:**
only suitable with sufficient electrostatic discharge capability

*source:
Working Safely in Laboratories, Basic Principles and Guidelines
DGUV Information 213-851
Edition: October 2011 (Reprint with editorial amendments 04/2017)

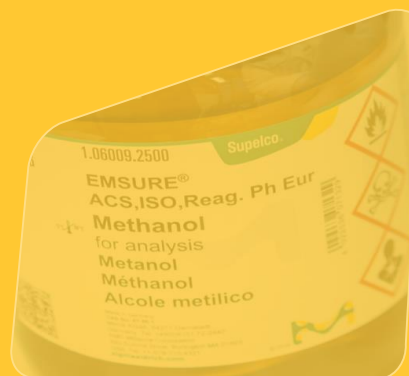


protect
yourself:

daily risk
sources

Substance

Hazardous
properties



Packaging Material

Material
properties

Application

Handling efforts
for daily volumes

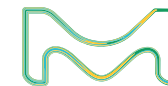


Pack size

Filling volume

Protect yourself against APPLICATION RISKS / DAILY VOLUME

Special handling



- Heavy, big bottles: avoid pouring or carrying
- Safer & easier processes with e.g. 5l bottles

ISSUES

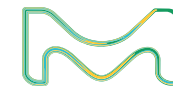
SOLUTIONS

- Use equipment specially developed for bottles
 - Withdrawal systems
 - Safety stand for lightweight HDPE-bottles



Protect yourself against APPLICATION RISKS / DAILY VOLUME

Safe handling: Bottle instrument connections



SOLUTION

- Use equipment specially developed for bottle connections with instruments
- HPLC-adapters

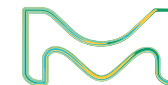
- Safer processes with instruments
- Avoid refilling and ghost peaks
- Avoid health hazards from solvent vapours
- Avoid contaminations
- Avoid unstable mixture ratio
- Automate processes

ISSUES



Protect yourself against APPLICATION RISKS / DAILY VOLUME

Special handling

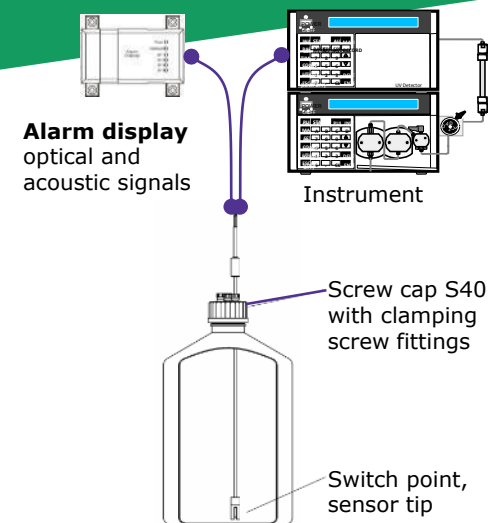


- How many solvent is left my bottle?
- Protection from overtopping disposal bottles
- Prevent from column reconditioning?

ISSUES

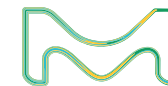
SOLUTIONS

- Use equipment specially developed for bottles
 - Bottle level sensors with display
 - Direct connection to instruments
 - Process automation



Protect yourself against APPLICATION RISKS/DAILY VOLUME

Glass bottle risks



- Protection from glass fracture
- Increasing pressure resistance
- Reducing cost
- Reduce ecological footprint

ISSUES

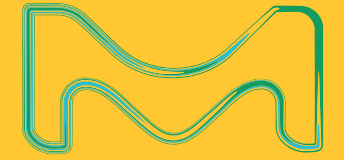
SOLUTIONS

>100 l per year

- Bigger pack sizes made of **unbreakable** material
- Barrels, drums, canisters made of stainless steel, metal, PE etc.



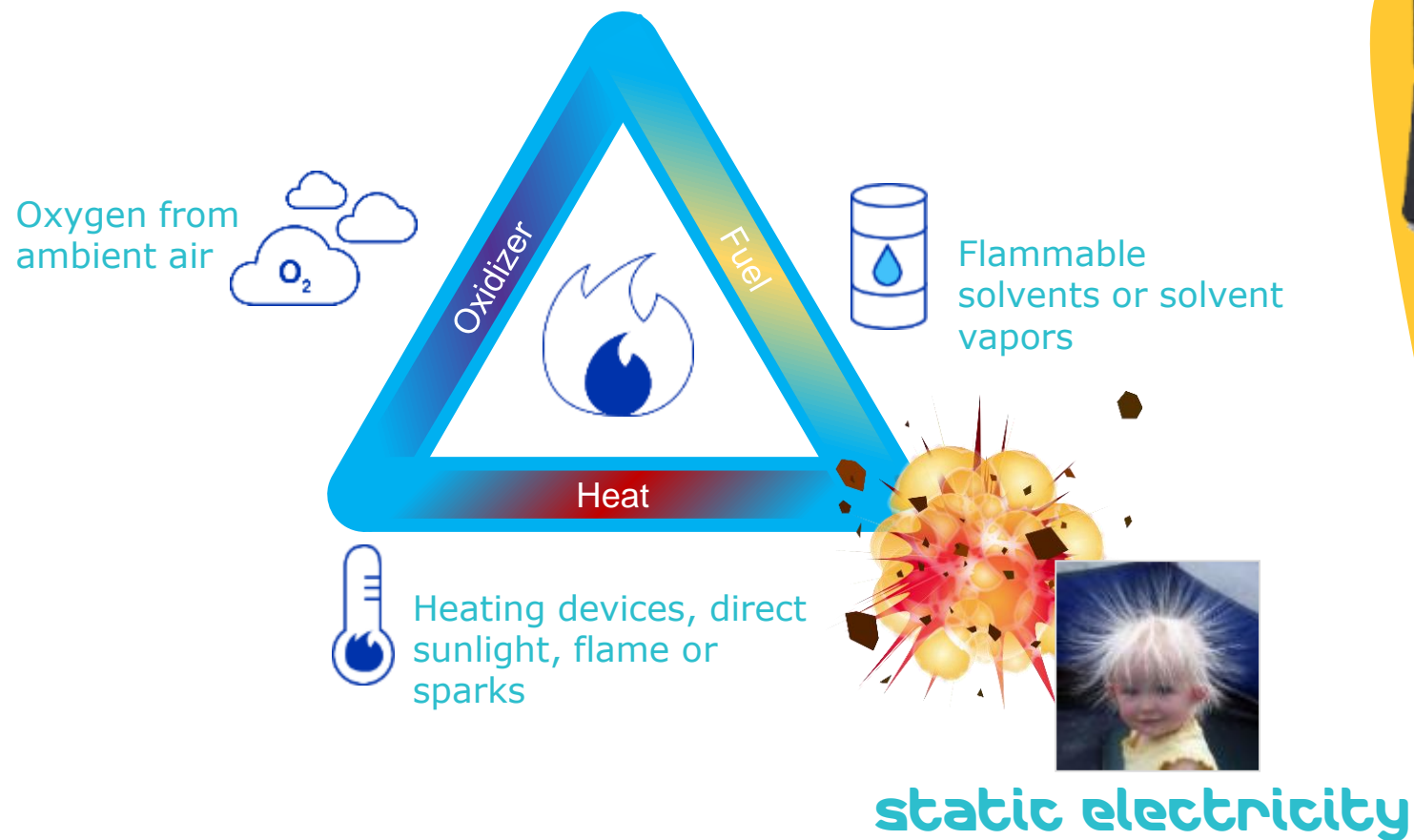
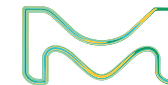
Agenda



- 01 The **role of safety** in the lab
- 02 The **daily challenges**
- 03 **How to handle** daily challenges
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- 06 How to clear away **chemical spills**: Chemizorb®
- 07 How to find **additional safety info and support**

Safe handling

The combustion triangle



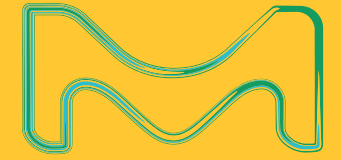
Grounding

is essential for safe solvents handling

Always work in a **well ventilated** environment (e.g. fume hood)

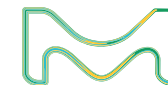


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Ingeniously safe & convenient Withdrawal of solvents & inorganics



solvents

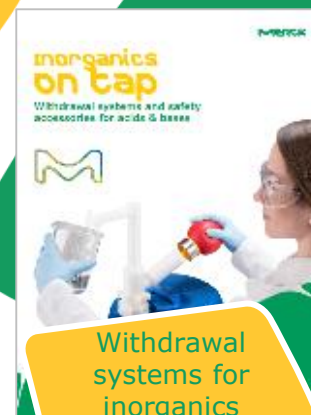


Safety products
for solvents

- Made of **stainless steel & PTFE**
- **Manual system** with hand or foot pump ball also for bottles
- **Inert gas system** for stainless steel packaging
- **Level sensors & individual installations** possible

NEW!

acids & bases

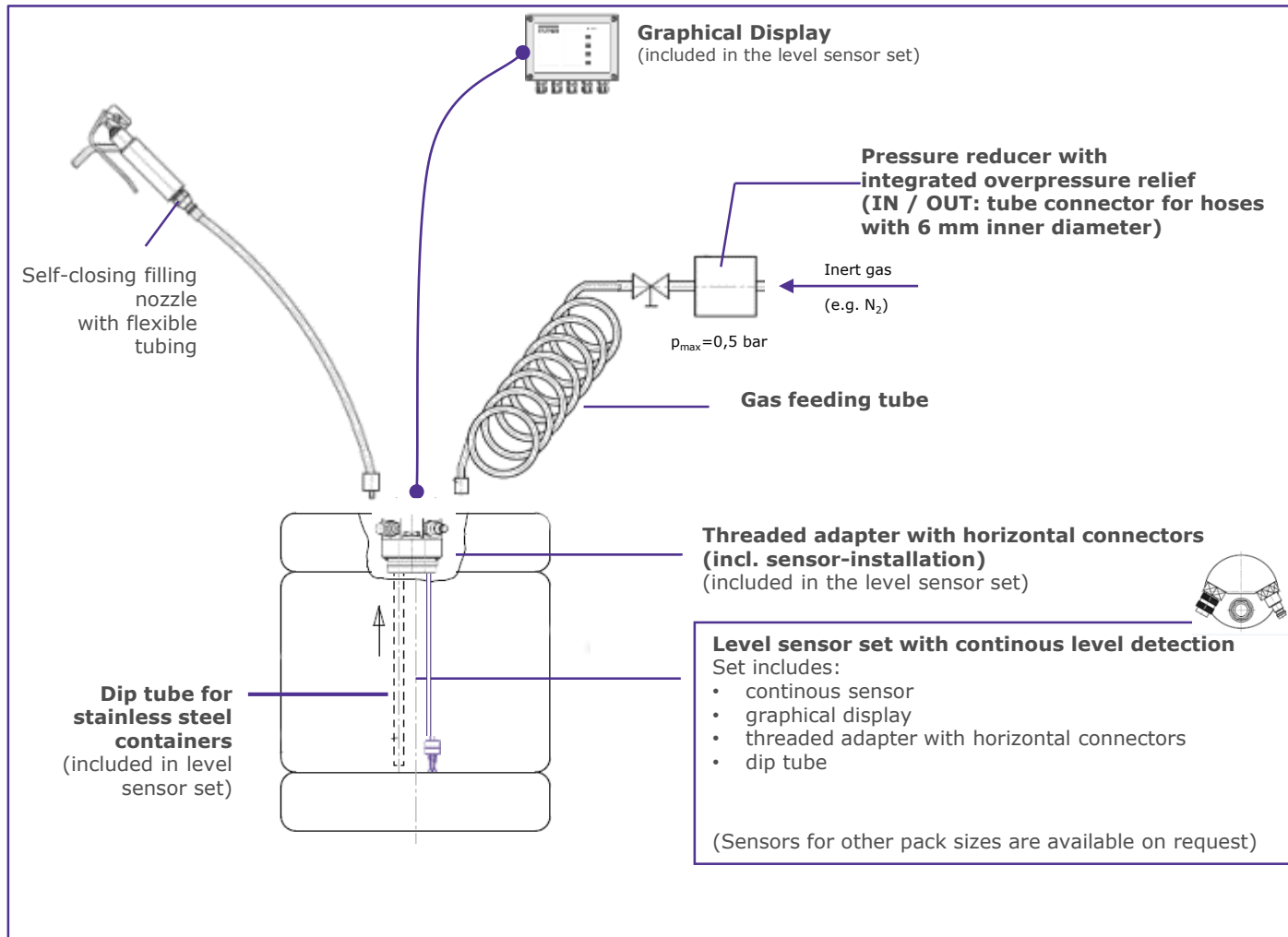
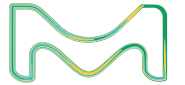


Withdrawal
systems for
inorganics

- Made of **PE or PVDF**
- **Manual system** with hand or foot pump ball for packaging of 25l and more

Safety connects

Automation and control of solvent supply & disposal



- Minimize lab risks and save time with continuous level sensors



Supelco®

Analytical Products



Substance

Hazardous properties



Packaging Material

Material properties

Application

Handling efforts for daily volumes



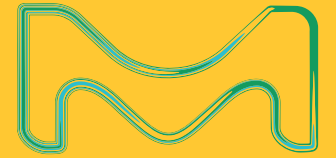
Pack size

Filling volume

Always work safely...

...and protect yourself and the environment from contact with hazardous chemicals!

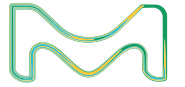
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Chemizorb® absorbents

How to clear up chemical spillages



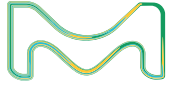
Accidents can happen anytime!

To avoid serious injuries it is important to:

- **React rapidly but not overhasty**
- **Making thoughtful decisions**
- **Know where to find suitable auxiliary agents**
- **Have easy access to working instructions**

Chemizorb® absorbents

How to clear up chemical spillages

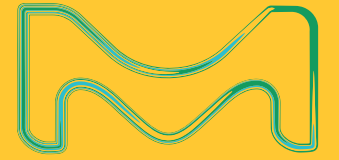


Avoid serious injuries
by using
fast, easy and safe
absorption & neutralization
of unpleasant chemicals
spills



- 1 Multiple types** available to cover nearly all chemical liquids
- 2 bright red bottle** stands out among other HDPE bottles in laboratories
- 3 specific usage instructions** are provided on each product's label
- 4 clear process monitoring** – pH indicator keeps track of neutralization process
- 5 Absorbent and neutralizer** combined in one product

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Are you interested?

Supelco
JUST in case
Acids in safebreak bottles

Safebreak Bottles

Merck
better safe!
Put your hands on the resistant bottles for acids, bases and solvents

HDPE bottles

Merck
Drying Agents
Optimize desiccation with absolute reliability

Drying Agents

clea ner
Extran® detergents
The perfect solution for cleaning your laboratory vessels

Extran® detergents

Merck
fit to clean
New Extran® 5l canisters for lab dishwashers

Extran® 5l canister

Merck
safety connects.
Your direct connection to maximum safety in safe solvent handling

Safety products for solvents

Merck
inorganics on tap
Withdrawal systems and safety accessories for acids & bases

Withdrawal systems for inorganics

Merck
SOAK IT UP
Chemizorb® absorbents
The fast, safe and easy way to clean up chemical spills

Chemizorb® absorbents

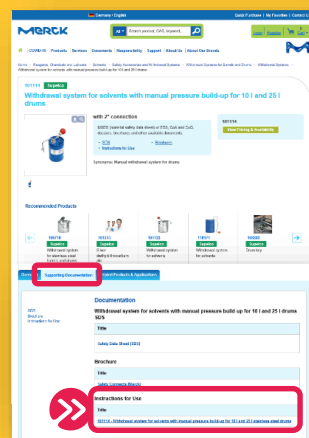
Maximize YOUR safety
and ask for individual support!

Technical support



Printed manual
(included in product packaging)

Comprehensive, illustrated
bilingual manuals (EN/DE)



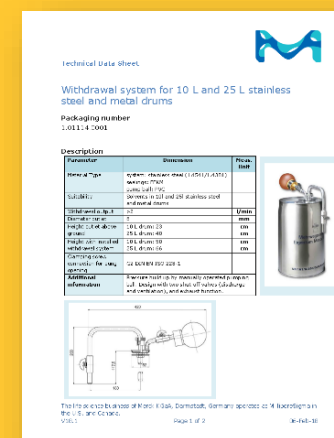
Online manual
(available on demand –
incl. all updates)

www.merckmillipore.com



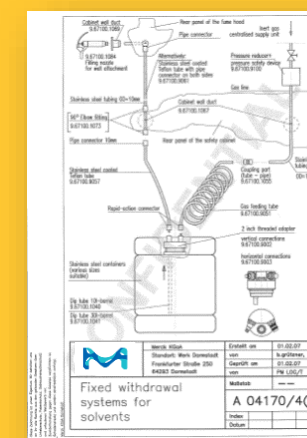
Online
video manuals
(available on demand)

www.sigmaaldrich.com/lab-safety
www.merckmillipore.com/safety-film
www.merckmillipore.com/safety



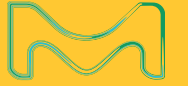
Technical
data sheets
(available on request)

Additional technical
details on materials,
dimensions etc.



Individual
installations
(available on request
for high volume business)

Individual support and
product selection



Thank you very much
for your kind attention!

