

Nouryon

Safe Handling of Metal Alkyls



Our products and services

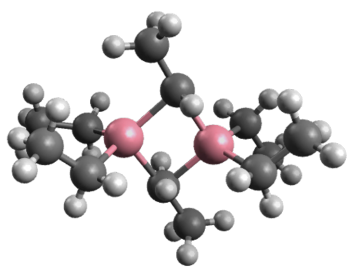


Metal Alkyls

Metal alkyls are chemicals which have carbon bonded directly to metals.

Examples are:

- Triethylaluminum (TEAL)
- Trimethylaluminum (TMAL)
- Tri-isobutylaluminum (TIBAL)
- Diethylaluminum Chloride (DEAC)
- Ethylaluminum Sesquichloride (EASC)
- n-Butylethylaluminum (Magala® BEM)
- Diethylzinc (DEZ)
- Modified methylaluminoxanes (MMAO)

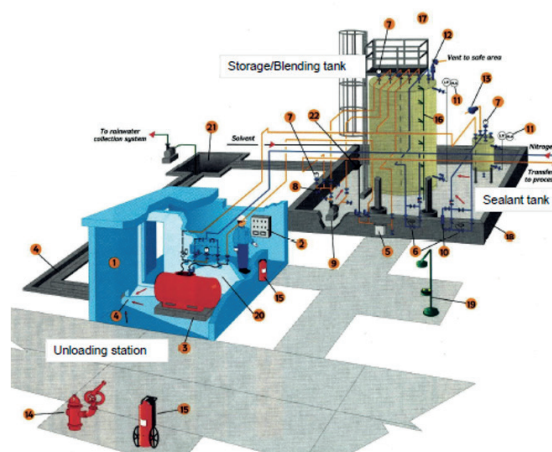


These chemicals are used as catalysts and co-catalysts in olefin polymerization, e.g. production of polyethylene, polypropylene, and polybutadiene rubber. Metal alkyls are also important reagents in pharmaceutical synthesis.

Nouryon has an extensive library of technical bulletins covering safe handling, facility design, properties, applications, and more. Please contact your account manager for more information.

Pyrophoricity and Non-Pyrophoric Limit (NPL)

A special characteristic of metal alkyls is that they ignite spontaneously when exposed to air, i.e. are pyrophoric. Furthermore, they react violently when contacted with water.



Metal alkyls and their solutions must therefore be handled in an inert atmosphere, i.e. nitrogen or argon, and under strictly moisture-free conditions.

The likelihood of hydrocarbon solutions of metal alkyl to self-ignite varies depending on ambient conditions, and therefore is difficult to predict. All spills are best treated as capable of self-igniting.

NPL's of metal alkyl hydrocarbon solutions are determined for the purpose of transportation classification. Determinations are made in controlled laboratory conditions using filter paper and silica.

NPL's are not to be interpreted as the limit below which metal alkyl solutions do not self-ignite.

Facility Design

The Nouryon team is available to provide consultation on a properly designed unloading facility. Being the first commercial scale producer of metals alkyls with over 60 years of experience, we have the most extensive knowledge in handling these inherently hazardous materials. Our team can provide expert recommendations in regards to facility siting, vessels, piping, instruments, pumps, material of construction, and others. A key concept in the design is fail-safe valving arrangement allowing emergency shutdown in case of an incident.

Please consult Nouryon technical staff on specific questions.



Safe Handling and Services

Personal protective equipment (PPE) is the last line of defense against serious injuries that can be caused by exposure to metal alkyls.

PPE's used in handling metal alkyls include:

- Cotton undergarment
- Fire resistant clothing (FRC)
- Aluminized jacket
- Aluminized pants
- Hard hat with face shield over safety glasses
- Aluminized neck shroud
- Leather or PVC gloves.

These PPE's provide momentary protection allowing the worker to escape the fire. Upon escaping the fire, PPE's are to be removed and the affected person placed under a safety shower immediately. PPE's do not provide protection over extended exposure to metal alkyl fire.



Control of Metal Alkyl Fire

With a properly designed facility, spills of metal alkyls can be minimized by activating the fail-safe shutdown system.

Small spills can be put out by smothering it with:

- Dry chemical powder fire extinguisher
- Dry vermiculite
- Dry sand

For large spills of greater than 50 kg, we recommend to consider allowing to burn itself out while protecting surrounding properties with fire water.



Safety Research Laboratory

We continue to invest in a state of the art institute dedicated to safety research in Deventer, the Netherlands. The institute not only conducts research on properties and safe practices related to handling of our products, but also offers extensive training to our customers. We invite you to visit us.

Safety Outreach Services

Our team is available to provide the following safety services. These services can be on-site at customer locations or at Nouryon facilities. It is customary to schedule on-site service to cover multiple shifts. With properly designed facility and thorough training, these inherently hazardous materials can be handled safely and confidently.

Safety training

- With a presentation, videos and question and answer session, operators, engineers and office staff learn safe handling of metal alkyls.

Live fire demonstration

- This demonstration is a spectacular witness of triethylaluminum (TEAL) spilled into a steel bucket, which immediately burns with vigor. Afterward water is sprayed from a distance resulting in violent flare-ups. The live fire demo gives viewers a healthy respect for metal alkyls.

Review of customer facility:

- Unloading facility
- Storage vessels and area
- Piping and instrumentation
- PPE
- Fire control
- First aid

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For product or service inquiry and ordering information, please contact your Nouryon account manager or regional sales office.

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Nouryon

Nouryon is a global, specialty chemicals leader. Markets and consumers worldwide rely on our essential solutions to manufacture everyday products, such as personal care, cleaning goods, paints and coatings, agriculture and food, pharmaceuticals, and building products. Furthermore, the dedication of more than 7,650 employees with a shared commitment to our customers, business growth, safety, sustainability and innovation has resulted in a consistently strong financial performance. We operate in over 80 countries around the world with a portfolio of industry-leading brands. Visit our website and follow us @Nouryon and on LinkedIn.

[nouryon.com](https://www.nouryon.com)