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OIL INDUSTRY 2020

FOREWORD

The nature and ecological balance must be taken into account if we want to establish a safe future for ourselves and for our children. The fate and future of mankind depends on the state of the Earth, so the forthcoming new and more beautiful word order can only be born in light of green way of thinking, sustainable development and considering ecosystems.

Without mineral oil derivatives, we cannot even imagine our daily life. There is no doubt that without mineral oil, mankind could not have achieved its current level of technical development. On the other hand, hydrocarbons do not only make our lives easier, but, in some cases, they can cause a lot of annoyance or even catastrophe. Unfortunately, the human error factor cannot be excluded, but the adverse effects of the consequences can be minimized; what's more, in some cases, they can be reduced to zero.

Mineral oil and its derivatives, furthermore, vegetable oils play an important role in our everyday life. Whether it is about fuels, lubricants or oils for consumption purposes. The problem begins when the oil spills.

Nowadays the catastrophes – both the natural and civilizational – and the environmental pollution more and more jeopardize the whole biosphere (hence the existence of humanity).

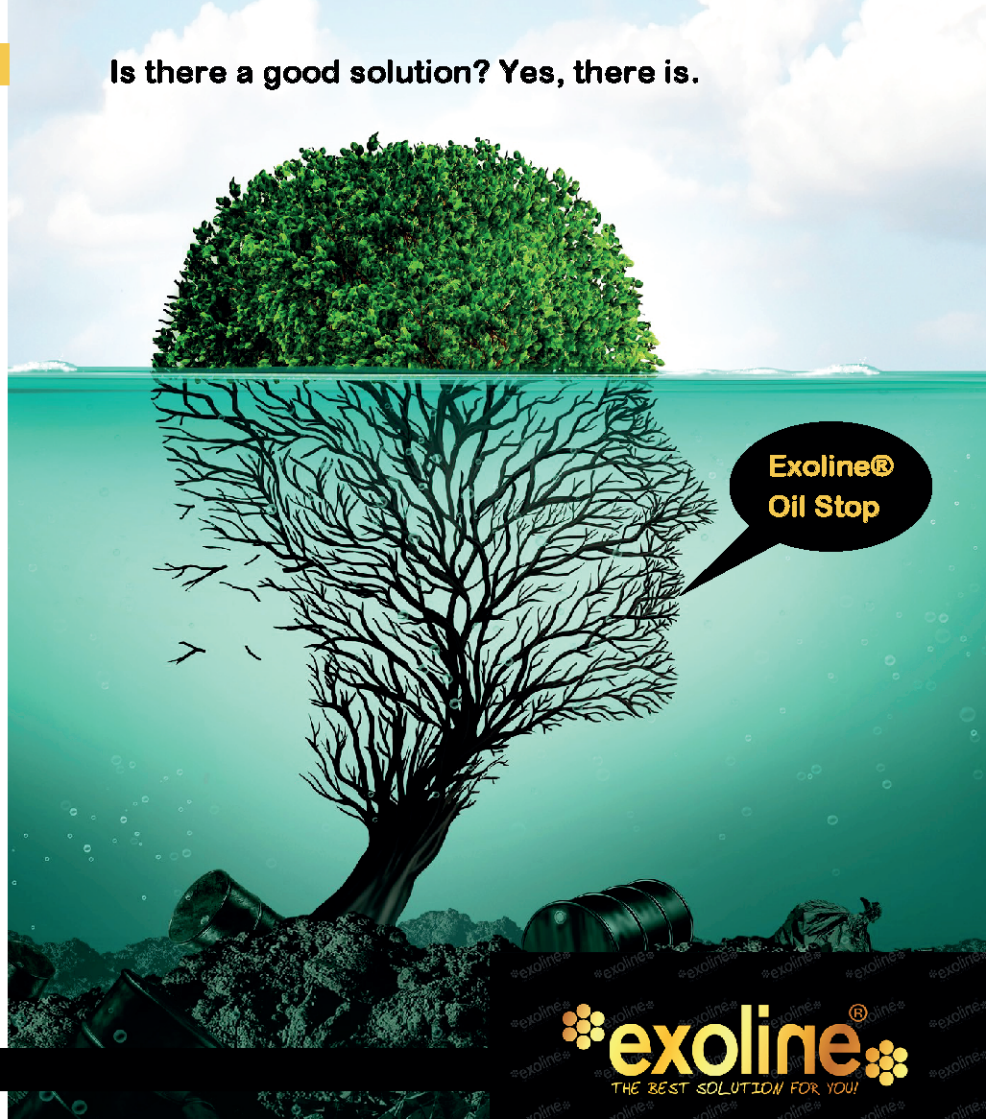
If the oil spills ...

First of all, take a look at the procedures that have been used so far. Oil getting into the water – if it does not meet any obstacle – spreads quickly, forming a thin, film-like layer, and then a millimetre - thick oil coverage emerges. A single liter of oil may contaminate up to 600,000 liters of seawater. In the European Union, sand, perlite and zeolite, furthermore, solid perlite and perlite hydrophobized on water surface, furthermore, oilclean minerals are used on solid surfaces to remove oil spills. However, these are either not suitable for absorption or are expensive, uneconomical and irritate the human body, and may have harmful side effects if inhaled. Mainly sand is used to remedy oil contamination worldwide. However, sand is not suitable for this purpose as this material does not have any absorbing effect. Spilled oil is "picked up" as the oil adheres to the surface of its particles. For this purpose, even a well-sucking piece of textile is more efficient.

What do we use?

- **SAND** – On solid surfaces. It is not suitable for absorption, but for collection only. It is an obsolete, outdated technology. A large quantity of it is necessary, it requires a lot of physical work and its storage and destruction is costly and cumbersome. (Its use is not permitted in the EU!)
- **PERLITE** – On solid surfaces. It is not suitable for absorption, only for collection. It is better than sand because it has a larger surface, but it also has a great physical work requirement, and its use and destruction is costly. (Its use is not permitted in the EU!)

- **HYDROPHOBIZED PERLITE** – It can be used on solid and water surfaces, it is made up of hydrophobized perlite particles which have hydrophobic properties. On water surfaces, its use is difficult, and it is uneconomic due to its price and shipping costs (2.5-3 kg of perlite is required for 1 kg of oil). Due to its silicon content, it has a highly irritating effect and may have harmful side effects if inhaled.
- **ZEOLITE** – On solid surfaces. It is not suitable for absorption, but for collection only. It is better than sand because it has a larger surface, but it also has a great physical work requirement. Its use is uneconomic due to its price and shipping costs (3-5 kg of perlite is required for 1 kg of oil). Its disposal is difficult.)
- **OILCLEAN MINERAL** - It can be used on solid and water surfaces; its active substance is a special combination of an enzyme system and 12 oil-degrading microbial stains. It is available in liquid and powder form. It can be used well, especially in case of solid oil contamination; it is efficient but very expensive (kg / l = EUR 15).



EXOLINE® Oil Stop

What is Exoline® Technology?

Exoline® Oil Stop, the revolutionary innovation developed by our company is a powdery substance (of a size between 2 and 18 µm) that encapsulates hydrocarbon molecules and enters into a direct chemical reaction with oil. During the reaction, a primary chemical bond is formed (adsorbent) – the concept of an adsorbent is: (unlike absorbents, it encapsulates oil and does not let it out anymore) The oil separates from the contaminated surface and the compound solidifies, then granules are formed that can easily be removed from the water.

Thanks to its unique chemical properties, its high surface tension and its (alkaline) pH value of 12-13, Exoline® Oil Stop is the best and most effective tool to encapsulate and clean up spilled oil from any surface. Exoline® Oil Stop lets oxygen pass through the water and it enables the gaseous metabolism products - emerging in water during the photosynthesis - leave into the atmosphere through the adsorbent. Oil that has sunk into the water and that is bound with this substance no longer contaminates its environment. Oil absorbed by using **Exoline®** Oil Stop becomes decomposed into water and carbon in 60-80 days, while not creating gases harmful for living organisms and the environment. The oil absorbed with the sunk **Exoline®** Oil Stop can even serve as food for the wildlife. This is thanks to its composition based on natural raw materials, an important element of which is calcium oxid. It is mainly the **Exoline®** technology that currently represents the cost-efficient, efficient and easy-to-use mechanism that helps to remove environmental pollution caused by petroleum derivatives.

It is user-friendly, as it does not require to use or operate any special clothing or equipment (this behaves like cement and can be used with bare hands). The oil bound in the powder can be removed mechanically from the cleaned medium. The mixture of oil and dust can be burned as a secondary energy source, the combustion product of which – with the exception of combustion products originating from the combustion of oil – is completely environmentally friendly. It is also suitable for the removal-free binding of oil contamination located in the soil or sand. Mixing it with these, **Exoline®** Oil Stop encapsulates the oil or its derivatives, it binds them, and they will not dissolve thereafter, thereby stabilizing oil or hydrocarbon contamination.

Properties of the Exoline® additive

- size: > 2-18 µm (produced with a nanotechnological procedure)
- pH: 11.5 - 12.5
- Hydrophobic
- density: 0.67 kg / dm^3
- colour: white
- physical state: powder
- recommended use: a maximum of 1 kg Exoline® powder to 1 litre of oil
- specific surface area > 25 m^2 / gr
- usage temperature: from -20 °C to +370 °C
- work safety classification: Xi (i.e. irritant)
- status: it preserves its quality for an unlimited period of time, it has a long lifetime and shelf-life, made of natural materials that provide ample supply, and its key ingredients are unlimitedly available.

In which fields can Exoline® Oil Stop be used?

- Remediation of oil spills resulting from accidents involving oil contamination, natural catastrophes – oil drilling towers, oil transporting tankers.
- Elimination of oil spills in our living waters – rivers and lakes.
- Extraction of the oil content and fat from wastewater.
- Deodorisation of livestock farms by spilling the substance on manure of animals.
- Deoiling and cleaning of ports and tankers, furthermore, tanks.
- Deoiling of the environment of defective machinery and equipment.
- Deoiling of roads, racetracks, railways, parking lots and airports.
- Deoiling and cleaning of the floor of workshops and factories.
- Binding and stabilization of oil pollution in the soil or sand.

The benefits of using Exoline® Oil Stop.

- Compared to the mass of contaminated material, no large amount of **Exoline®** Oil Stop is required.
- It removes the entire contamination, leaving no harmful substance.

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- It does not require strong physical work, as the substance carries out its suction effect also without human intervention, after spilling. To accelerate the process, there is a possibility for human intervention, which is considerably lower than the sandblasting technology discussed in the previous chapter.

- The used – and already contaminated – adsorbent can be disposed of by incineration. In case of a large quantity, we can also talk about recycling – as we produce heat by combustion, the further use of which is economical.

- It is very important that Exoline® Oil Stop can be used well also on water surfaces and wet roads, because it has strong hydrophobic properties.

At home and abroad, the use of Exoline® Oil Stop in the unified fire brigade, disaster management and environmental protection under state control serves to help the work of these organisations and increase their efficiency, while reducing the expenditures of

What are the benefits of using Exoline® Oil Stop?

It can be widely used because:

- it binds hydrocarbons, oils, oil derivatives, crude oil, refined petroleum, glycols, any kind of engine lubricants and hydraulic oils, gasoline, petrol, all vegetable oils or any mixture thereof.

It is fast and efficient, as

- it binds the oil in a short time. The required binding time, even with a mechanical movement of 1-2 minutes will remove 100% of the oil, both from a wet or dry environment.

It can be used wherever as

- it binds oils from solid surfaces and (sweet and salty) aqueous media
- the application of the powder to the contaminated surface is simple and fast under all circumstances.
- the method can be used even under very extreme environmental conditions (e.g. on a stormy sea).

It is environmentally friendly, because

- the raw materials of **Exoline®** Oil Stop are of 100% natural origin.
- the manufacturing technology of the substance has a low energy requirement and is free from harmful by-products.

To whom do we recommend this product?

- Those who think about their environment responsibly
- For whom it matters what kind of a world will our children inherit
- Those who are not satisfied with half-solutions
- Those who want real quality for their money.

What else is not Exoline® Oil Stop

On land and on water

There have been many solutions to remove oil and oil derivatives from wet and dry media, but these methods have never been able to fully meet the target system, which would mean a compromise-free solution to effectively address the consequences of a possible oil catastrophe.

In contrast with the traditional technologies, an important difference is that oil binding is immediately realized by applying **Exoline®** Oil Stop.

- Practically, the evaporation of volatile hydrocarbons can quickly be terminated, by which the risk of explosion can be significantly reduced.

- It can be used immediately also in case of burning contamination.

- Thanks to the rapid reaction time, emulsion formation can be prevented.

- Using **Exoline®** Oil Stop, the spreading of oil spills on water sur

- face can be prevented.

- It is environmentally friendly, as after encapsulating oil, it no longer damages the environment.

- It can be integrated with the technologies that have so far been applied and with the machines and equipment used there.

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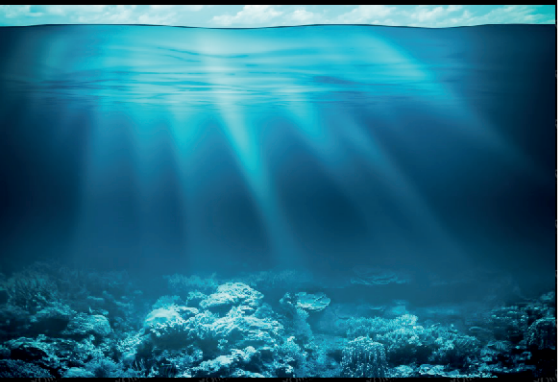
After binding oil contamination, a plastic-like material is formed from Exoline® Oil Stop. Thereafter, it floats on the surface of water, so it can be removed from the water by conventional methods. It may happen that a part of the material (1–6%) becomes recessed, which depends on the type of the oil and on the waves of the sea. After it sinks, it does not let the oil contamination out of itself; it does not have any adverse effect on the environment and sediment is formed from it. The resulting sediment is incorporated into its environment within a short period of time, and thanks to the natural ingredients of Exoline® Oil Stop, it serves as a nutrition source for the aquatic population!



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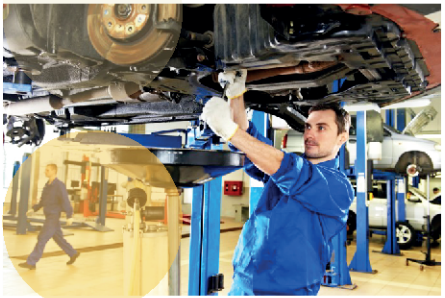
Further possibilities for the general use of Exoline® Oil Stop are:

- Cleaning of concrete or asphalt surfaces (removal of freshly spilled oil)
- From a distance of 30-40 cm, spread the powder on the oil freshly spilled on concrete or asphalt.
- Leave the applied powder on the oil spill for about 10 minutes and allow it to react with the oil and begin the absorption process.
- After 10 minutes and the absorption of oil, sweep the powder by using conventional cleaning utensils (broom). When cleaning up already existing oil spills that have occurred earlier, the process is partly the same, except for the need to rub **Exoline®** Oil Stop into the dry oil stain with a root brush, and then, after 10 minutes, we can sweep it and, if it is necessary, the process can be repeated, after which the surface adsorbed with **Exoline®** Oil Stop is washed with normal water.

Exoline® Oil Stop consists of very small particles (2-18 µm), therefore it is able to penetrate into the small unevenness of the surface and bind the oil particles located there to itself, thus by using only a small amount of water, these bound particles flow to the surface, cleaning the contaminated surface efficiently and in an environmentally friendly way, even in case of porous surfaces that are difficult to clean, such as: concrete, paving stones, flooring, etc. It can also be applied on pavements and roads contaminated with algae and fungal coverage.

Since lime is an excellent material to kill algae and fungi, it is a quick, long-lasting and environmentally friendly solution to clean pavements and roads. In addition to **Exoline®** Oil Stop, you will not need anything else but a coarse brush to easily and quickly clean the surface. It provides the same solution for degreasing and slip removal of oily and greasy pavements and roads, too. The powder that has been spilled on the floor before starting work and that has been left there must be swept at the end of the day. The material collects the existing oil-fat particles, then binds also the new dirt emerging during the day and provides a safe and non-slip surface throughout the day. An environmentally friendly solution for safe workplaces.



Industrial use of Exoline® Technology

It can be used to clean up oily water flowing out of oil transporting tankers, railway and road tanker trucks in an environmentally friendly way, on the spot. Water purified with **Exoline®** Oil Stop can be recycled, so the costs of wastewater draining can be saved.

Application of Exoline® technology on land or sandy areas.

In one of the cases, we mix the sand contaminated with oil well with water, then we separate the contaminated water and the sand from each other. Dose the powder to the contaminated water and mix it well. As **Exoline®** Oil Stop is a powder that is made up of very small (2-18 µm) particles, it can easily bind the small oil drops mixed in water. After about 20 minutes of sedimentation, the water becomes cleansed, the **Exoline®** Oil Stop and the oil bound by it will float on the surface of the water, then it can be removed by skimming; what's more, the purified water can be reused.

Another possibility is when **Exoline®** Oil Stop and the sand contaminated with oil is mixed dry. Thus, with the efficient oil-binding ability of the powder, during the mixing process, it will take up all the oil from the sand, which, if covered with water, after a time, the Exoline® Oil Stop mixed with oil and lighter than water, will swim up to the surface of the water together with the bound oil. It can be removed by skimming, as well. As the final result, we got pure sand and clean water. The skimmed Exoline® Oil Stop can be reused up to the point where the oil becomes saturated. The powder saturated with the oil obtained as the end product of the procedures consists exclusively of natural ingredients, therefore no end product is generated that would be harmful to the environment. Thus, the oily end product can be burned even in a thermal power plant by which we can recover energy, but an experiment has been carried out, too, in which the oil itself could be successfully regained.

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The use of Exoline® Oil Stop in households.

Spill Exoline® Oil Stop on the oil-contaminated surface and after a few minutes, simply remove the oil absorbed by the powder with a paper towel. Important information! The oil absorbed by Exoline® Oil Stop no longer contaminates the environment directly because thanks to its (adsorbent) properties, the powder encapsulates the oil and keeps it in itself. Exoline Green Technology – By using Exoline® Oil Stop, complete solutions can be provided for complementing and further developing unique and the already existing equipment and technologies.

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Our group of companies intends to contribute to the achievement and maintenance of an environmentally conscious world by conducting continuous research (**Exoline®** Oil Stop) and further development of the usage technology. The content of the information note reflect the continuous research and records from the period between 2007 and 2018.

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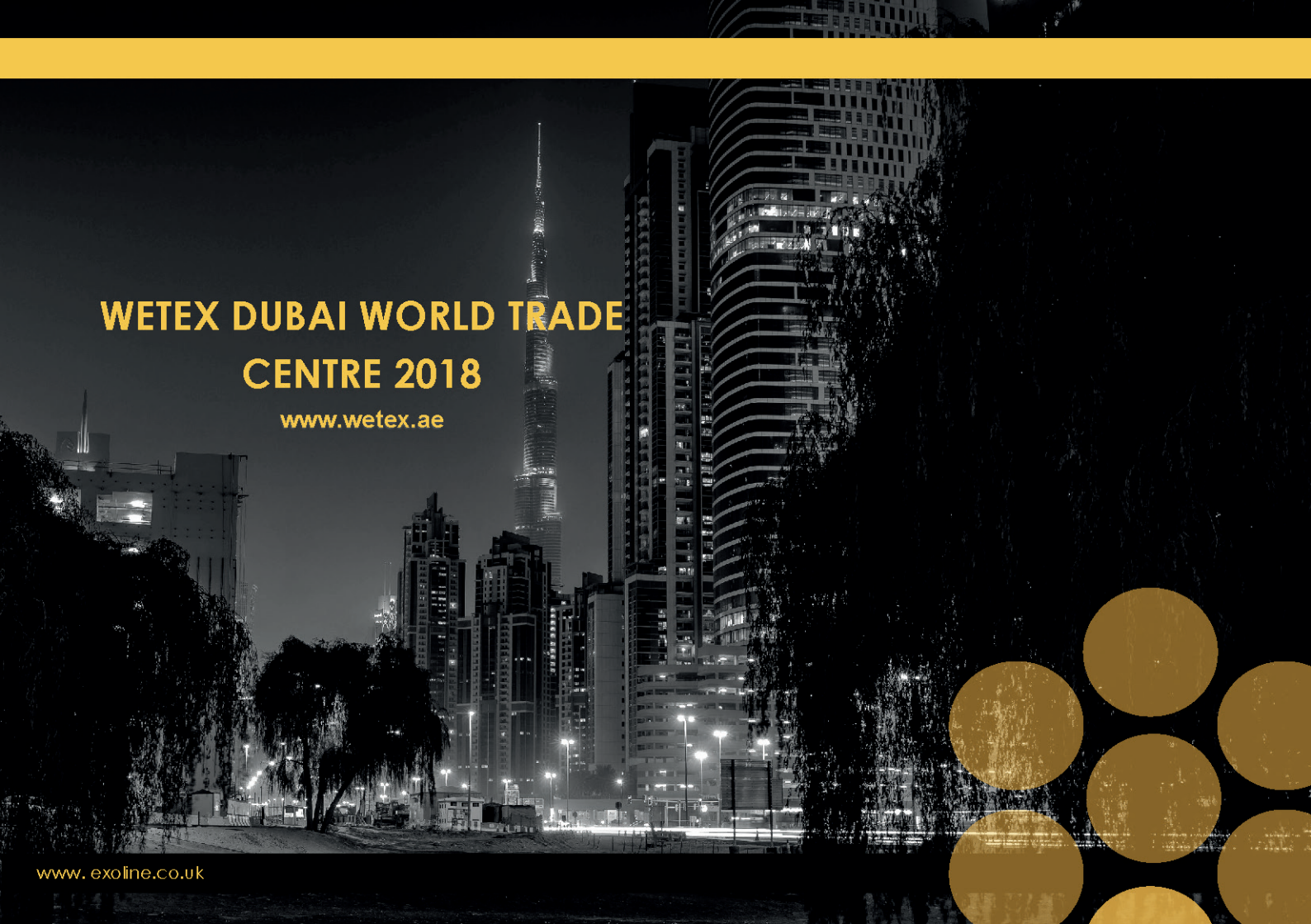
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