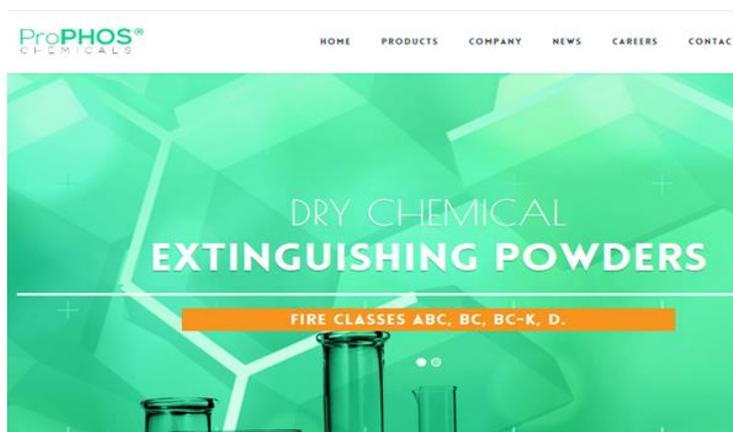


## ProPHOS Chemicals S.r.l



**Website:** <http://en.prophoschemicals.com/>

ProPHOS Chemicals S.r.l. (ProPHOS), a young, dynamic and innovative company based in San Giovanni in Croce (northern Italy), is an eco-minded producer of firefighting powder, micro granular fertilizers and flame retardant materials. The company owns its name from 1st May 2014 (previously it was called Megavit S.r.l.) and is the only chemical company in Italy that for more than 20 years has been producing dry powder for outbreaks of all classes of fire. ProPHOS gives particular attention to the environment, in fact the name of the company illustrates the importance of phosphorus recycling, from firefighting waste products to eco fertilizers.

ProPHOS is owned by Vania Manfredi (CEO) and William Grandi (Business Development Manager) and is driven by COO Dr. Marco Michelotti. The company has a team of 25 people and its highly competent workforce is divided essentially into 2 parts: production and offices. The company has 3 multilingual sales managers who are constantly building on relations with European customers, in order to emphasize the importance of the company's vision and mission.



**ProPHOS's aim and vision is to be a Green chemical company, to invest in research, to develop innovative products and services made-to-measure for the customer while respecting in full the value of sustainability and work ethics.** ProPHOS Chemicals S.r.l. works following social work values and ethics: all its infrastructures and facilities are certified according to CE levels and the Italian safety law D.lgs 152/06. In order to further reduce emissions and environmental impact, all forklift trucks are electric and their maintenance is entrusted to an external company.

The company encourages the creation of a corporate modus operandi with respect for cultural equality, meritocracy and organizational wellbeing at all levels. In 2012, PROPHOS has been qualified with certificate to the "ethical social label" standard in relation to its vision. Such business behaviour creates a commercial network that supports the process of internationalisation, in place both at the European level and worldwide.



ProPHOS Chemicals enforces the collaboration of its R&D team with both public and private institutes with the aim of developing more effective chemical formulae and efficient technologies for the recovery of raw materials, while all the time reducing energy consumption. The company's main strength is the commitment to innovation while a fruitful and synergetic collaboration with the world of academic research has led it to join the **Consortium Italbiotec** and the **Cluster of Green Chemistry**.

New solutions for improvement and increased performance of fire extinguishing powders, flame retardants and fertilizers are studied on a daily basis. The ProPHOS R&D team also strives to meet customer needs, performing tests and specific formulations: for powders, for example, by changing particle size distribution during the grinding process or by researching and measuring quantity or quality or type of components of the final products. One of the company's strength is the approach to consider both powder and extinguisher as a single system. Studying the physical features of the extinguisher, in fact, it's possible to put forward any physical changes to customize the final product. The company is owner of some patents about that.

ProPHOS Chemicals is the **ONLY** producer in Italy of extinguishing products for all kinds of fires. **The company operates according to the requirements of UNI EN ISO 9001:2008 regulations (in 2016 the company will switch to UNI EN ISO 9001:2015 regulations).** To maintain these very high standards and to be able to provide punctually each customer a high quality product, all raw material and each big bag produced is checked for bulk density, particle size distribution, fluidity, humidity and chemical composition, respecting chemical and physical values of EN 615:2009 (E) Fire protection – Fire extinguishing media – Specifications for powders (other than class D powders). The quality of products is confirmed by the approvals obtained by European certifying bodies such as MPA Dresden (Germany) and CNPP (France).



Since the year 2011 the company has been playing the role of pioneer in Italy, illustrating the importance of phosphate recycling to market operators, a big job considering that the domestic market accounts for more than 2.000 firefighting stations. For many years ProPHOS has indicated the direction to a circular economy and a new producer to final user mentality and the importance of recycling chemical components rather than simply disposing of them.

### Infrastructure and technical equipment

The production site consists of installations for the manufacture of ABC polyvalent powders, BC powders and fertilizers (GRC system). The factory is situated directly behind the administrative building. The production of ABC and BC extinguishing powders takes place in a sealed room located in a total floor area of 3.110 m<sup>2</sup>. The main process stages that lead to the final product ready for shipment to the customer are divided into:



*Loading operation for raw materials*



*Batch preparation*



*Hot air grinding*



*Remove ammonia*



*Self-cleaning bag filter*



*Additives*



*Packaging*

ProPHOS Chemicals retrieves annually about 500 m<sup>3</sup> of water from the local aqueduct and is fully used in the production process: 200 m<sup>3</sup> for the production of solutions and ammonium sulphate, and 300 m<sup>3</sup> for the granulation of fertilizers and flame retardants. A batch reactor is filled with water and the required amount of ammonium sulphate. After the dissolution of the salt, the solution is discharged into tanks and loaded into trucks for delivery to customers.

An auxiliary mixing plant for the production of fertilizers is also available at ProPHOS facilities as well as a GRV-7 LB pilot batch granulator (see Figure) of about 7l capacity. The use of this plant gives information regarding operational conditions and is of utmost use for industrial production. The water is added with specific nozzles placed on the inner bar by a pump. When the granulation is finished and the product is ready, it is emptied from the bottom of the granulator and left to dry in a thermostatic heater. There are a number of parameters that can be changed and, in particular, in this test the operating conditions are:

- bar rotation speed: 2.000 rpm;
- reactor rotation speed: 1.270 rpm;
- discordant rotating direction of the 2 elements.



ProPHOS Chemicals has also a new and modern system for the production of fertilizers, flame retardants and other micro-granulated products, called GRC, located in the factory. The main process stages are:

- grinding raw materials;
- mixing components/additives;
- granulation;
- drying and cooling of the product;
- sieving;
- packaging.



*GRC plant*



*GRC granulator*



*Remove ammonia*

It's important to notice that, during the granulation phase, parameters like inclination of the reactor, rotation speed, amount of solution (water) may affect the shape and dimensions of the final product. However, thanks to many years of experience, the ProPHOS's team has become familiar with every aspect concerning granulation, and so each time choosing the best production conditions for meeting specific customer requirements and continuously producing products in line with high quality standards. Another critical phase of the production process is drying and cooling of the product, since, during the heating it releases ammonia. So the entire line over which the hot product passes is closely and directly connected with the GRC scrubber, in order to remove ammonia emissions. When the particle size distribution of the grains is between 0,5 and 1,0 mm, they are qualified as micro-granules but, replacing the sieve sizes with those of different specifications (for example different hole spacing), ProPHOS is able to provide a final product of a very wide dimension range (even up to 2,5mm). Another green aspect of the ProPHOS production plant is that the discarded fractions, in particular very thin ones, are reprocessed, feeding the barrel reactor through the dedicated loading section, limiting loss of raw materials and maximizing process yield, both in terms of quantity and cost. The product with the desired characteristics is then bagged in loads of 1.000 kg and if needed then brought via forklift truck to the bagging plant (see Figure), in series with the GRC plant. Even during bagging, any dust emitted is fed through filters directly connected to the GRC scrubber to remove ammonia emissions.



ProPHOS Chemicals has a competent maintenance team, available at all hours, to ensure, if needed, the continuity of production without significant interruption and/or loss of time. There is also an internal maintenance plan where all work carried out on machines is logged according to the systems supplier.

ProPHOS has a warehouse located in a gross floor area of about 6.000 m<sup>2</sup> given to storage of finished products and exhausted powders. The company also provides a delivery service for its customers by way of its own company truck.



ProPHOS has its own laboratory, modern, advanced and equipped with accurate instrumentation to ensure high quality standards for the activities of research and development. The lab acts as internal quality control for monitoring the production of extinguishing powders and fertilizers (moisture content, bulk density, flow ability, particle size distribution, pH and titles). The lab is also equipped with wet granulation of powders (a highly efficient mixing system with batch size from 1 to 7 kg) and a heating oven for drying.

