

every day – everywhere

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Highly effective additive

Liquid fire blanket stops major fires



Demonstration for specialists – in the town of Templin in Brandenburg, Degussa worked together with its partner SAFE-TEC to demonstrate how Firesorb® works. It was tested in a secure gravel pit for use in the case of forest fire. In this connection the additive, a liquid polymer preparation, offers major advantages over conventional fire-fighting water, for example in establishing effective fire breaks or in preventing neighboring buildings from catching fire. SAFE-TEC uses the Degussa product as part of its fire protection measures.

Powerful winds were whipping up the flames, driving them closer and closer to Los Angeles, a city of millions. Overnight, fire laid waste to almost 3,500 acres of woodland and scrubland in Orange County. Thousands of people had to flee and more than 2,000 houses were evacuated. Around 900 firemen fought around the clock to contain the massive blaze, which broke out in Anaheim to the east – only 40 kilometers away from the center of Los Angeles.

Bulletins like these are becoming a regular feature of news broadcasts around the world. Every year thousands of square miles fall victim to the ravages of fires on all continents. In Siberia, the last major fire alone swept through more than 54 million acres – approximately double the woodland surface of the whole of Germany.

Water, the traditional means of fighting fires, is often pushed to its very limits by such massive blazes. An innovative additive from Degussa AG, the company that ranks number one in specialty chemicals worldwide, is greatly increasing the effectiveness of water. When added in just small quantities, Firesorb® (sold in the USA under the brand name of Thermo-Gel®) is suitable both for fire-fighting and for protecting prop-

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erty threatened by fire. If applied directly to the fire, a concentration of just one to one and a half percent is sufficient to act as an extinguisher. When used as a preventive measure or where there is a danger that a fire could spread to buildings and industrial facilities, adding a higher concentration of between two and three percent provides an even greater cooling and protective effect that also lasts longer. In addition, the gel will then adhere even better.

Cool gel smothers the fire

Firesorb® is a liquid polymer preparation that can absorb many times its own weight in water, creating a heat-shielding gel that can adhere even to ceilings and vertical walls. Because of its high viscosity, the Firesorb® gel takes a long while to drain away from the burning material, so it stays effective for longer. The protective film assimilates the heat of the combustion on the surface, while the protective capabilities un-

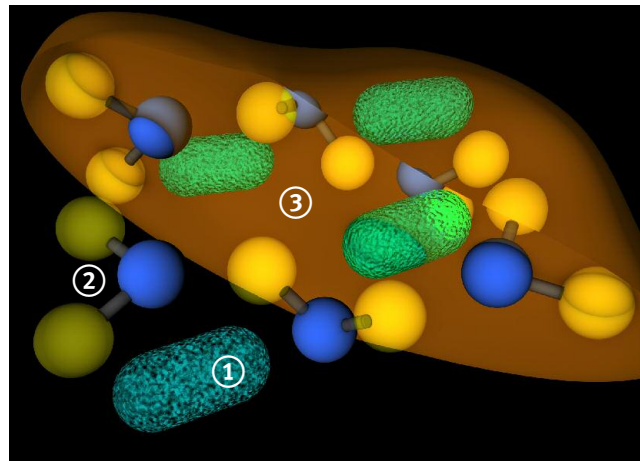


Easy to handle – the Firesorb® concentrate can be easily mixed into fire-fighting water by stirring or pumping. The finished gel then comes out the end of the pipes or hoses ready for use. The special dosing equipment FIRE-DOS enables the concentrate to be added to the stream in a continuously variable flow of between 0.5 and 3 percent by volume. These tiny amounts are fully sufficient to generate an enormous extinguishing and protective effect.

derneath remain unaffected. "Water with our product added acts as a liquid fire blanket, smothering the fire by sealing out the air and creating a cooling effect", explains Ralf Röhlen, Product Manager for Firesorb® at Degussa.

In California, entire firebreaks were created with the chemical additive to stop the fire encroaching further – and to outstanding effect. The flames suffocated as soon as they reached the "gelled" areas. "Firesorb® also prevents soil erosion during forest fires and saves huge amounts of water", emphasizes Manuel S. Lamborena, Director of the Fire Department Park in the Spanish town of Castro Urdiales. Here in the Province of Cantabria major fires have been a regular occurrence over the past few years. The additive provides yet another advantage

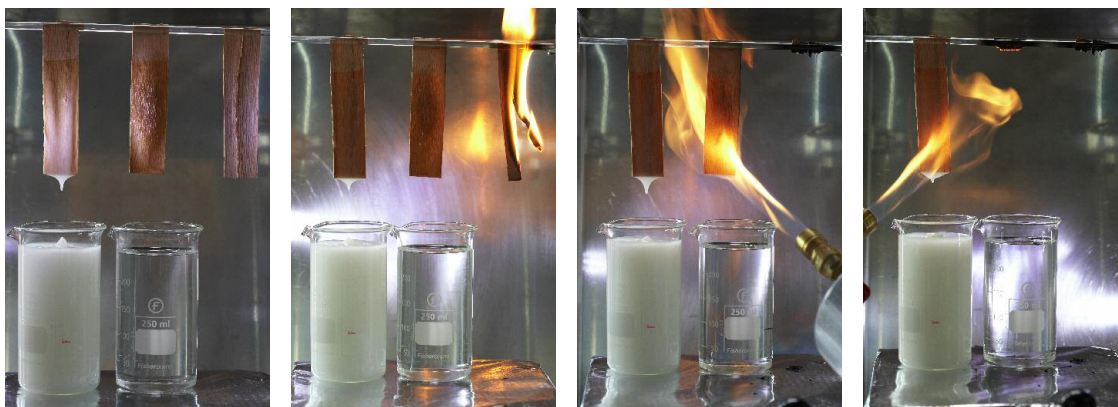
Tailor-made solution – the Firesorb® concentrate consists of three components. The superabsorbent polymer (1) is pre-swelled with just a little water (2) and then brought into an organic phase (3). This is easily bio-degradable and consists of a fatty acid ester based on rapeseed oil. This oil prevents further water from being absorbed until the additive is mixed into the fire-fighting water.



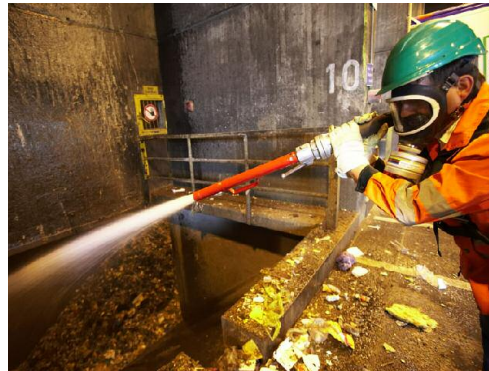
for nature – it has been classified into German water-hazard category 1, which is the lowest class.

Firesorb® is a concentrate made from superabsorbent polymer particles that are lightly pre-swelled with water. Because they are wrapped in a special biodegradable oil the polymers are prevented from absorbing further amounts of water. The additive can be transported and handled very easily in this form. As soon as it is added to larger amounts of water, water binding accelerates drastically, and stirring or pumping increases this effect even more. This is what makes Firesorb® particularly effective, especially in situations where every second counts. Even as the fire-fighting water is pumped up through the hoses or pipes it acquires the property that makes it a ready-to-use gel by the time it reaches the spray head (nozzle). And it offers yet another benefit: fire departments need no particular special equipment.

And what is also very important is that the concentrate is not particular about the kind of water it will work with. Whether city water supplies, groundwater or spring water, they are all suitable water sources, as are surface waters such as streams, rivers and lakes – crucially important when it comes to deploying fire-fighting planes and helicopters.



Impressive series of experiments – a 1,500°C flame is applied to wood chips at Degussa's technical center in Marl. The wood chip on the left is coated with Firesorb®, the one in the middle is soaked in water and the one on the right is untreated. Within a few seconds the dry chip ignites and burns up totally. The wet sample withstands the heat for just a little while longer. The chip coated in gel refuses to ignite and remains unscathed.



“Scene of the crime”: garbage incineration – as many as three Firesorb® systems have been installed at the facilities of the Abfallwirtschaftsgesellschaft Wuppertal waste disposal company – one in the dumping hall, where the garbage trucks empty their loads, and two in the boiler house. So-called Venturi mixers are used here (photo on left). These are capable of mixing the concentrate into the fire-fighting water particularly effectively. Although fire is a relatively rare occurrence at the 100 German garbage incineration plants, if it does occur it is difficult to extinguish. For problem situations like this Firesorb® is again the product of choice.

In addition to its use in fighting forest fires, Firesorb® is also ideally suited for combating dangerous, highly energy-rich fires. These are the kind that can occur in the plastics industry, and in waste incineration and processing plants, tire warehouses and power stations. In such instances water may evaporate before it even reaches the seat of the fire. But the extinguishing agent containing the Firesorb® additive will reach its target, where the gel film immediately seals out oxygen from the burning material and ensures an intensive cooling effect. This is also the major difference to extinguishing foam, which contains a great deal of air. The ambient temperature of the fire is effectively lowered immediately. Hot, often toxic, particles in the fire smoke are kept down and under control. There is also a positive side effect particularly where buildings are involved: because Firesorb® requires far less water, the damage caused by the fire-fighting water is usually much less extensive.

Amazing effect in the shortest period

Numerous test demonstrations conducted by Degussa have fired the enthusiasm of even “old hands” dedicated to the service of the general public in voluntary or professional fire departments. Experiments with fires using plastics and tires tell their own story: burning bottle crates were extinguished in as little as ten seconds, and a stack of 50 car tires was set ablaze and the fire put out in 44 seconds. Conventional extinguishing agents take much longer and require a great deal more of the agent involved. “Even seasoned fire-fighters are regularly surprised by how fast the fires can be put out”, explains Günther Kirchner, Fire Department Chief from Obing in Upper Bavaria, who has tested Firesorb® in practice with great success.

The polymer preparation is produced at Degussa's Krefeld site by the internal start-up Creasorb, a part of Creavis Technologies & Innovation where the specialty chemicals company has pooled the setting up of new strategic business fields. Further development was also done here, after the water-retention abilities and thickening effect of cross-linked polyacrylates, the superabsorbers, were recognized. “However, these granulates are not suitable for direct fire-fighting use. So we had to find special solutions – so-called emulsion polymers – that can work with the dosing technology the fire departments use”, comments Dirk Regett, Head of Creasorb.

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Günther Kirchner,
Fire Department Chief
from Obing in Upper Bavaria



Giant extinguisher – the American freight company Evergreen has equipped a jumbo in the USA with large tanks to receive fire-fighting water. The “flying fire department” can release 80 tonnes of extinguishing agent at one go. That is the equivalent of seven times the volume of the largest fire-fighting planes currently in operation. Certification flights were recently conducted in collaboration with the Degussa partner company Thermo Technologies LLC. During the flights, blue-colored Firesorb® gel was also used. The experiments to test load jettisoning were successful, and once again demonstrated how effectively and efficiently the additive works.

The extinguishing agent can be ordered in Germany round the clock for use in emergencies. A nationwide dealer network means that emergency services can always get hold of Firesorb® at short notice. For bigger blazes larger quantities are stored at four sites in Germany (Hamburg, Marl, Viersen and Heidelberg). The roll-off container kept at the Viersen fire department, loaded up ready with 5,200 kilos of Firesorb® and a large dosing unit (1,000 liters per minute), can be ready for action within around 15 minutes after it has been requested. Logistics vehicles and trailers stand ready at the other three sites to transport Firesorb® and dosing technology on demand to the scene of the fire.

Increasing demand

Firesorb® has already demonstrated its value many times over as a means for fighting and preventing fires, and is proving to be an innovative supplement to conventional extinguishing agents. Demand is constantly on the rise. In the USA the Degussa partner company of Thermo Technologies, LLC (Bismarck, North Dakota) is even selling homeowner kits that families can use to protect their own homes. “The costs for an average-size building are around 1,000 dollars”, reports Ralf Röhlen. That may not seem like peanuts at first glance but it is definitely a cost-effective solution when the value of all the assets at risk is taken into account – and that applies not just to the inhabitants of Los Angeles.

TV journalists can phone +49 611- 890 38 10 to order a film in professional format about Firesorb® (no rights reserved).

Degussa is the global market leader in specialty chemicals. Our business is creating essentials—innovative products and system solutions that make indispensable contributions to our customers’ success. In fiscal 2005 around 44.000 employees world-wide generated sales of 11.8 billion euros and operating profits (EBIT) of 940 million euros.