



Some Facts About I-BOND® MDI Resins

Composite Wood Products





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Introducing the world of I-BOND® MDI

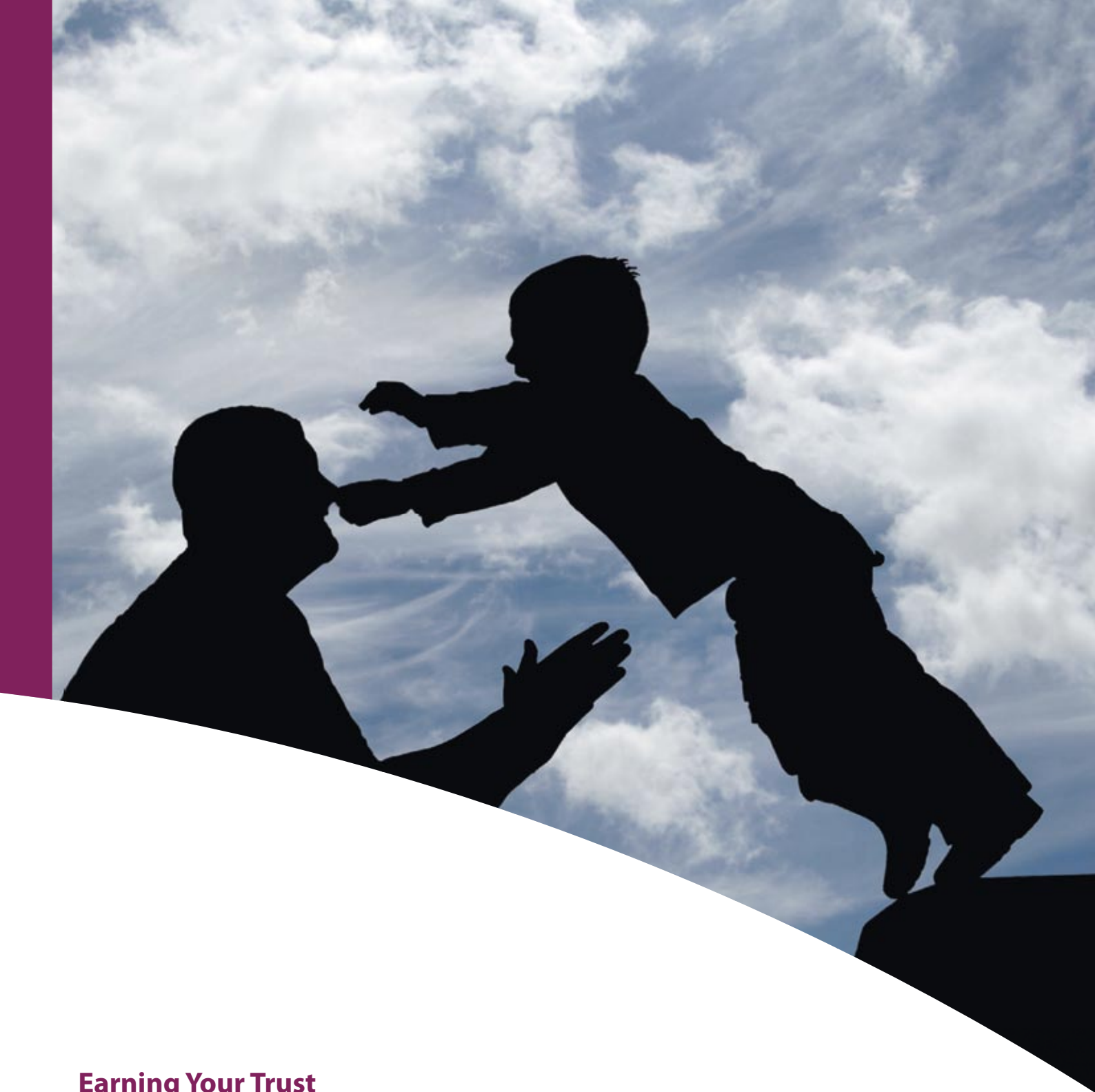


Superior Product

I-BOND® MDI Resins are used exclusively for the manufacture of Composite Wood Products, both for its productivity benefits, and as a no added formaldehyde resin solution. Oriented Strand Board (OSB) has become an ever more popular wood composite product made for the construction industry. OSB is made from timber sourced from managed and sustainable forestry sources which ensures a greater number of trees are planted than those harvested. I-BOND® MDI Resins are used in the OSB production process and allow OSB manufacturers to make a superior no added formaldehyde product for the marketplace.

I-BOND® MDI Resins

Methylene diphenyl diisocyanate (MDI) has been used for various commercial purposes for more than 40 years, primarily to produce polyurethane foams. From the foam insulation that keeps our homes warm, to the refrigerators and picnic coolers that keep our food fresh, to the car seats and bedding that keep us comfortable, we come into contact every day with products made with polyurethanes. MDI is also the key component in I-BOND® MDI Resins. I-BOND® MDI Resins have been growing in popularity in the composite wood industry since the 1980s and are used in mills across the world, in the manufacture of Oriented Strand Board (OSB), Medium Density Fibreboard (MDF), Particleboard (PB) and Wood Fibre Insulation Boards (WFI).



Earning Your Trust

Wherever you live, wherever you work, chemicals are a part of your life. They are a key component in the products used on a daily basis in the home.

As a business unit of one of the world's leading chemical companies, Huntsman Polyurethanes recognizes that the foundation of acceptance and understanding is knowledge.

Huntsman Polyurethanes believes that in today's world, no business can afford to ignore the concerns of its workers, its customers, or the community. This brochure has been prepared to present you with some important facts about I-BOND® MDI Resins, an important ingredient in the manufacture of wood products.

Some Facts About I-BOND® MDI Resins

Bringing better understanding

It is often said, that things aren't always what they seem. This is certainly the case with chemical products and thus so with I-BOND® MDI.

A lot of misapprehension still exist in the panel industry today regarding I-BOND® MDI Resins and their handling. Diisocyanates (-NCO) are often confused with cyanide (-CN) because of similarity of sound of chemical terms.

Given the fact that no cyanide is used to make or is present in I-BOND® MDI, in addition, no cyanide will be released during normal use of I-BOND® MDI. However, hydrogen cyanide can be produced by heating to decomposition and/or burning. In fact, burning any nitrogen-containing material can produce some hydrogen cyanide, including urea.



Setting the record straight

Panel producers may be deterred from using or changing over to I-BOND® MDI because they assume this will evidently lead to high investment costs and purchase of expensive pieces of equipment. This is not necessarily the case. When we introduce our product we want to make sure that it is handled in a safe way to ensure workers are not exposed. Working with chemicals always requires a combination of technical (ventilation, containment), administrative (training, procedure how to use chemicals, zoning of risk areas etc) and individual measures (use of Personal Protective Equipment when Technical and/or Administrative measures are not deemed sufficient to lower exposure risks adequately).

Our experience is that well designed production lines having efficient technical controls and customers with a management team committed to EHS are able to produce composite wood panels safely.

The brochures "Working safely with I-BOND® MDI Resins" and "Infrastructure for Bulk storage" covering the precautions that need to be taken and equipment that has to be present when working with I-BOND® MDI are available upon request.

Health and Safety First

Good work practices when using I-BOND® MDI Resins help to prevent workplace problems.

Huntsman Polyurethanes works closely with mills using I-BOND® MDI Resins to provide instruction and advice regarding safe handling practices in the workplace. We strive to have one of the best safety records in the industry.

Huntsman Polyurethanes' Product Stewardship Program was established in 1986 to help maximize the health and safety of plant employees using our products. Inside the mill, the program has been used to train thousands of employees since it was established. It is one of the many safety programs used by mills for various operations.



All mills using I-BOND® MDI Resins are offered a Product Stewardship training program that includes:

- Extensive employee training on understanding I-BOND® MDI Resins and their safe handling practices and behaviour
- How to handle I-BOND® MDI Resins in everyday situations

Additional services can include

- Regular monitoring service at Huntsman Polyurethanes' customer plants
- Engineering-control technology assistance.
- Auditing of new and existing bulk storage equipment.
- Engineering control evaluation e.g. air monitoring
- Advice on design or improvement of Engineering control technology.



Responsible Care®
Good Chemistry at Work

Collectively, we call this our **Responsible Care** program. Our Responsible Care program is part of our Product Stewardship Program and gives us the opportunity to educate customers, employees and the general public, who are interested in learning about products manufactured in their community. The Product Stewardship Program provides extensive support to help advance the safe use of I-BOND® MDI Resins by our customer's employees and management.

The Responsible Care and Product Stewardship Programs ensure that whether you work in a mill or live in a nearby community, we support the health and safety of you and your family.



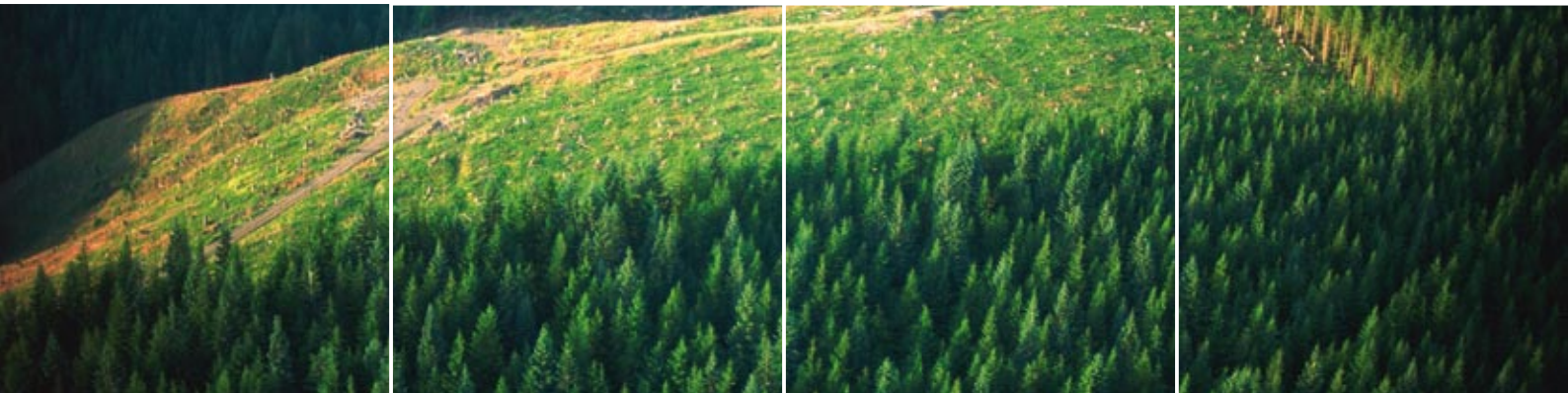
I-BOND® MDI Resins – The Mill and Community

Questions sometimes arise about the safe use of chemicals. The use of I-BOND® MDI Resins in the making of wood products can offer confidence to the manufacturers and their workers and provide reassurance to the community.

Low Emissions

Emissions may occur during the production of OSB and other products. Huntsman Polyurethanes has measured I-BOND® MDI emissions from several mills and found that concentrations of I-BOND® MDI in the air are well below levels reported to pose a threat to human health in the workplace or in the surrounding community.

Chemical emissions occur at two primary points in the production of Composite Wood Products: the wood dryers and the hot press. In the wood drying process, I-BOND® MDI Resins are not used or released. Small concentrations of I-BOND® MDI Resins vapours may be released when the boards are pressed in the hot press. But properly installed engineering controls, such as enclosures and local exhaust ventilation, prevent I-BOND® MDI Resins vapours or particulate from being emitted in excess of local environmental or community emission limits.



No Board Emissions

Health effects have been associated with wood composite boards glued with traditional resins, because of off-gassing during use. Huntsman has determined that this problem does not exist with I-BOND® MDI Resins. Using methodology suggested by the U.S. Environmental Protection Agency (EPA), Huntsman has conducted a series of tests on freshly manufactured wood composite. The results indicate that there is no health risk associated with I-BOND® MDI emissions in the lifetime of boards manufactured with I-BOND® MDI Resins. In the finished product, tests have shown that I-BOND® MDI is not present at, or above, detectable limits.

No MDI Detected in the Community

Monitoring of the air for I-BOND® MDI has been conducted at the fence-line or perimeter of OSB mills using I-BOND® MDI Resins. The results indicated that concentrations in the air was below 20 parts per trillion (ppt). 20ppt is a level that is scientifically considered to be well below the level that poses a health risk to the surrounding community.

As a point of reference, one part per trillion is equivalent to one drop of water diluted into 20 two-metre deep Olympic-size swimming pools (50,000 m³). Scientific assessments, such as ambient air sampling, clearly indicate that this does not represent a health risk to the surrounding community.



I-BOND® MDI Resins – The Mill and Community

No Added Formaldehyde

I-BOND® MDI Resins contain no formaldehyde and therefore do not add to the formaldehyde emissions already being released naturally from the wood itself.

CARB Compliance

Panels produced solely with our I-BOND® MDI resin during a production trial have been tested by the Wilhelm-Klauditz-Institut Holzforschung (WKI). The samples subjected to these one-off tests have received the CARB certificate and compliance with F**** and EPF-S standards. A copy of the complete test report and detailed certification is available upon request.

Pollutant Reducer

Using I-BOND® MDI Resins rather than traditional resins may allow mill dryers to run at lower temperatures, resulting in significantly reduced volatile organic compound (VOC) emissions. In fact, the EPA is now conducting research on I-BOND® MDI as a potential pollutant reducer for both plant sites and finished wood composite boards. An additional economic benefit arises in the form of energy savings associated with this temperature reduction.

Communication Is Key

An important goal for us is to provide our customers and the communities that surround them with the information they need to feel comfortable with the use of I-BOND® MDI Resins. We hope the information in this brochure has helped accomplish that goal. We have regional teams of experts available in Europe, Asia and the Americas.

For additional information
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The Huntsman Corporation

Huntsman is a global manufacturer and marketer of differentiated chemicals. Its operating companies manufacture products for a variety of global industries, including chemicals, plastics, automotive, aviation, textiles, footwear, paints and coatings, construction, technology, agriculture, health care, detergent, personal care, furniture, appliances and packaging. Originally known for pioneering innovations in packaging and, later, for rapid and integrated growth in petrochemicals, Huntsman today has 12,000 employees and operates from multiple locations worldwide. The Company had 2008 revenues exceeding \$10 billion.

For more information about Huntsman, please visit the company's website at www.huntsman.com



One of our top priorities is to develop and nurture long-term productive relationships with our customers by helping them to develop solutions to the product, technical and business issues they face every day.

Huntsman is not interested only in the bottom line. We believe that ethical and moral values are the cornerstones on which to do business. We are committed to protecting the environment, as well as to the safety and health of our employees, our customers and the community.

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