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**From:** Diane Daems [diane\_daems@huntsman.com]  
**Sent:** 15/12/2010 14:50:00  
**To:** Alengrin, Simon [simon.alengrin@saint-gobain.com]  
**Subject:** RE: Fire toxicity assessment of PIR vs other insulants

Dear Mr Alengrin,

Please find my reply underneath. My apologies for the late sending.

The study that was undertaken by Stec and Hull is based on small scale toxic potency tests. As you can read from the literature description in the article the outcome from small scale toxic potency tests varies considerably depending on the choice of the test, the test conditions and the way the results are presented and interpreted. This debate is going on since 30 years. The value and reliability of this particular experimental work will need to be checked as some strange results have been observed and reported.

Toxic potency tests need to be taken with great caution. It gives the toxic potential of a material under certain test conditions. There is no easy relation between toxic potency tests and real toxic hazard in a fire. One critical element is the contribution of the product in a fire situation. There is a tendency for materials that decompose at higher temperatures, to show higher toxic potency values in a test. However, they also tend to contribute less in a fire. Therefore there is a danger that on the basis of toxic potency values, good performing products are de-selected and consequently the fire hazard is increased. This phenomenon is well explained in ref. D Buszard, The role of flame retardants in reducing fire hazards, Flame retardants 98, p45-54, Interscience Communications.

The evaluation of the toxic hazard from fire (risk assessment) is very complex. It comprises many factors such as the amount of available combustible material, ease of evacuation, active and passive fire suppression etc. In many cases the toxic hazard of the fire is mainly determined by the building contents, not the envelope. Building products, when installed and used in a responsible way, only show limited contribution during the period of evacuation. Analysis of statistics of a fire have indicated that with PIR insulation, most of the insulation is still in place in the later stage of a fire and after the fire. Only a part of the insulation mass has been lost and decomposed in airborne fire effluents. (For example see EPIC weblink to fire research programme lead by Ove Arup or analysis of fire cases by Tenos fire engineering consultants [http://www.epic.uk.com/fire\\_studies.jsp](http://www.epic.uk.com/fire_studies.jsp)) This has not been taken into account in the small scale tests.

As a second example, successful fire risk assessment on internal applications with PIR have been performed with a client in French institutes LNE and Efectis, taking into account the French regulation "l'arrêté du 4 Novembre 1975 - analyse de l'Azote et du chlore dégagés par la combustion" and testing in the French smoke toxicity test: NF X 70-100. A similar study for PS could not lead to successful results because of the greater contribution leading to both unacceptable fire and smoke tox hazards.

As a final point, several approvals of PIR applications exist that are based on risk assessment taking into account also the effects of airborne fire effluents. The number of approvals via this route is expected to increase further in the future.

Trust that this gives an acceptable answer to your questions.

Dr Diane Daems  
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"Alengrin, Simon" <Simon.Alengrin@saint-gobain.com>  
12/15/2010 09:48 AM

To "Diane Daems" <diane\_daems@huntsman.com>, "Kristof Dedecker"  
<kristof\_dedecker@huntsman.com>  
cc

Subject RE: Fire toxicity assessment of PIR vs other insulants

Dear Ms Daems,

Could you please tell me what you think about the article I sent to Kristof on Dec 3rd?  
Do you consider the allegations of the authors that PIR is more toxic than EPS is scientifically valid? What is your opinion on the assessment method they use?

Regards,

**Simon Alengrin**  
Techno-Marketing Insulation Activity

Saint-Gobain Isover  
Les Miroirs -18, avenue d'Alsace  
92096 La Défense Cedex - France  
Tel: [REDACTED]

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Kristof Dedecker/BE/PU/HUNTSMAN

12/03/2010 10:52 AM

To "Alengrin, Simon" <Simon.Alengrin@saint-gobain.com>, "Diane Daems"  
<diane\_daems@huntsman.com>  
cc "Dr. David Evans" <david\_evans@huntsman.com>  
Subject Re: Fire toxicity assessment of PIR vs other insulants [Link](#)

Dear,

I am traveling in russia at the moment.

I copy your request to our fire expert diane daems who can hopefully provide you her view on the article.

Kristof

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**Van:** "Alengrin, Simon" [Simon.Alengrin@saint-gobain.com]  
**Verzonden:** 03/12/2010 10:38 CET  
**Aan:** Kristof Dedecker  
**Onderwerp:** Fire toxicity assessment of PIR vs other insulants

Dear Kristof,

I received today this article from our scientific watch.

As we present to our CEO today the project New Horizons, could you please tell me what you think about the conclusions of this article?

Could we talk about it over the phone ASAP?

Best regards,

Simon

[attachment "20101203\_Assessment-of-the-fire-toxicity-of-building-insulation-materials.pdf.zip" deleted by Diane Daems/BE/PU/HUNTSMAN]