

关于中国岩棉外墙保温系统的问答

1. 问题：**施工现场火灾发生的原因是什么？**

回应：原因是施工场所使用的材料，特别是易燃材料。另外，人们在现实生活中的人为失误也是引发火灾的因素，这些失误包括在施工期间（使用不合格材料、工地施焊、明火、吸烟）发生的，也包括在入住后（厨房炉火、外墙明火）发生的失误。不幸的是，使用易燃保温产品会放大人为失误造成的后果。

2. 问题：**提高监管部门的执行力度、加强施工现场管理以及行业自律能否避免施工现场人为失误的发生？**

回应：提高监管部门的执行力度并加强施工现场的管理至关重要。但是这并不能避免人为失误的发生。同时由于行业之间存在着各种利益之争，因此行业自律这种方案也不可行。

3. 问题：**A级不燃材料是否会对人身及财产安全构成威胁？**

回应：A级不燃岩棉产品对人身、健康以及财产安全不构成任何威胁，特别是在施工现场管理没有达到最高标准的情况下，如遇火灾，A级不燃材料能提供一定的安全保障，这一点可燃材料是无法做到的。

4. 问题：**要使用具有良好导热性能并且防火的岩棉产品，是否意味着必须降低抗拉强度，吸水性和耐久性等方面的要求？**

回应：中国制造的优质岩棉完全可以满足抗拉强度、吸水率、耐久性与保温性能方面的所有要求，而且属于A级不燃材料。在大部分应用中，岩棉的保温性能可与聚苯乙烯板相媲美，甚至在一些应用中超过聚苯乙烯板的保温性能。

5. 问题：**岩棉能否适用于外墙外保温复合系统？**

回应：岩棉是极好的外墙外保温复合系统保温产品，不仅如此，由于其不燃性能，岩棉还是一种建筑防火安全解决方案，被视为高层建筑的首选材料与解决方案，这些都充分反映在EN13500与ETAG004标准的规定中。泡沫保温制品的可燃性会对人身及财产造成很大风险与损害，因而欧美不允许在高层建筑中使用这种材料。

6. 问题：**在欧洲，比如德国，岩棉在所有外墙外保温复合系统应用中是否仅占很少的市场份额？**

回应：在德国，对于22米以上的高层建筑，岩棉外墙外保温复合系统中的市场份额为100%。而在整个欧洲的外墙外保温复合系统应用中，岩棉占市场份额为5.6%，但必须注意的是：这一统计结果包括了欧洲最常见的低层单户住宅建筑，这与中国盛行高层建筑的现状可比性不大。

7. 问题：**岩棉是否与矿渣棉相同？**

回应：岩棉和矿渣棉属于不同产品。矿渣棉的主要成分是矿渣，具有渣球含量高，熔点和酸度系数低的特点，因此，矿渣棉的导热系数较高，遇火也会有很严重的热收缩性。

矿渣棉通常不能应用于有防火要求的工程中。而且矿渣棉不能满足外墙外保温复合系统的应用，因此不该应用于外墙保温复合系统。

8. 问题：是否有足够的岩棉产能满足中国外墙外保温复合系统的要求？

回应：目前没有足够的产能满足中国建筑节能的需求。然而，岩棉行业正大量投资扩大产能，这将使供需差距不断缩小。而且，缺乏产能也不应成为放弃未来最佳方案的理由。

9. 问题：岩棉系统的成本是不是非常高？

回应：就拿建筑面积100平方米的楼房来说，整个楼房使用岩棉外墙保温系统比起使用EPS系统，增加的成本仅为1000元¹。与楼房的售价相比微乎其微，但这一点点成本却能够使建筑物安全防火，使建筑物和居民得到切实保护。

10. 问题：岩棉是否会对人体健康造成严重损害？

回应：当然不会。一些组织（如：世界卫生组织）已经就岩棉纤维是否致癌进行了大量研究，结果清楚表明：岩棉纤维不是致癌物。研究²结果为：“绝热玻璃棉、连续玻璃丝、岩棉及渣棉不可归为人类致癌物质（第3类）”。我们作为建筑行业的一分子，得知中国塑料加工工业协会EPS专委会仅出于自身的利益就使用这些错误的论点，导致建筑工人与客户产生恐惧，我们实为惊讶。岩棉致癌性研究众所周知，并且这些研究报告是公开的。此外，就健康问题而言，我们并不知道有任何（严格的）岩棉应用限制。

值得一提的是，为使某些泡沫产品达到B1级所使用的阻燃剂HBCDD³是一种PBT物质（持久性、生物累积性、毒性物质），欧盟化学总署早前就决定将HBCDD列入需要特别关注的物质（SVHC）。而从生产到安装和拆除⁴，矿物棉（包括岩棉）是绝对可以被排除为有害物质的。

11. 问题：岩棉生产过程会消耗大量能源，产生大量排放物和废水吗？

回应：现代工厂的全部或大部分生产废物是可循环利用的，剩下少量废物经过处理后，排放物会被减少到最低水平。一个单位的岩棉在其使用中所节省的能耗百倍于其在生产中的能耗。制造1千克岩棉消耗约20MJ能量，而制造1千克聚苯乙烯板消耗至少85MJ。制造聚苯乙烯板的原材料基本为石油天然气等矿物燃料，而制造岩棉只需使用非常普通的岩石——玄武岩，其可用储量近乎无限。

¹按 100 平米建筑面积的楼房约有 50 平米数的外墙保温面积计算，乘以每平方米岩棉外墙系统比 EPS 外墙系统成本高出的 20 元，使用岩棉系统所增加的费用约为 1000 元。

²国际癌症研究机构：国际癌症研究机构专著项目，81 卷，339 页

³六溴环十二烷

⁴英国环境署技术指引摘要 MW2-www.environmental-agency.gov.uk

Q&A for Stone Wool ETICS in China

1. **Question:**

What are the reasons for fire to occur on building sites?

Answer:

The materials used on site, especially if they are of combustible nature. Additionally, human errors made in real-life, both during construction (use of sub-standard material; welding on a building site; open fire; smoking) and after (kitchen fire, rubbish fire outside the facade) also can be contributing factors. Unfortunately, using combustible insulation products leave no room for human errors.

2. **Question:**

Can supervision, proper on-site management and self-discipline by the industry solve the issues of human errors on building sites?

Answer:

It is indeed necessary to improve the performance of the supervision department and to strengthen the construction site management but this cannot take away fully the possibility of human mistakes. Self-discipline by an industry has never been a viable solution as it will have to compete with the self-interest of the same industry.

3. **Question:**

Do Class A non-combustible materials still represent a threat to lives and safety of properties?

Answer:

Class A non-combustible stone wool products are no threat to life, to health nor to property safety in any way. And especially in cases where on-site management is not of the highest standard, Class A non-combustible materials give an extra margin of safety in cases of fires whereas combustible materials are not as forgiving.

4. **Question:**

In order to use stone wool with high thermal performance that meets the fire protection requirements, do I have to sacrifice performance towards tensile strength, water absorption and poor durability?

Answer:

The high quality stone wool produced in China meets all requirements in terms of tensile strength, water absorption, durability and thermal insulation performance as well as being Class A non-combustible. For most applications, the thermal insulation performance of stone wool is comparable to EPS and in some applications even better than EPS.

5. **Question:**

Is stone wool suitable for ETICS?

Answer:

Stone wool is an excellent thermal insulation product for ETICS but even more so, as a fire safe solution for buildings due to its non-combustibility and it is seen as the preferred material and solution for high-rise construction – which is clearly reflected in eg. EN13500 and the ETAG004 requirements. In both Europe and the USA, foam based insulation products are not allowed to be used in high rise buildings due to its combustibility, as it would cause too much risk in harming people and properties.

6. **Question:**

Is stone wool having only a small market share in ETICS in European Union countries like Germany?

Answer:

In Germany, the market share of stone wool ETICS in high-rise buildings higher than 22 meters is 100%. When including all ETICS applications, it is 5.6% but these also include the most common buildings: low-rise one family buildings. It is not comparable to the high-rise applications prevalent in China.

7. **Question:**

Is stone wool the same as slag wool?

Answer:

Stone wool and slag wool are different products. Slag wool is produced mainly using slag and has properties of higher shot content, lower melting temperature and lower acid ratio, which result in higher thermal conductivity and serious shrinkage in case of fire. Slag wool in general should not be used in any application that requires fire performance as a performance parameter. In addition slag wool does not meet the requirements for ETICS application and therefore should not be used for ETICS.

8. **Question:**

Is there enough stone wool capacity available in China to use for ETICS?

Answer:

Currently there is not enough capacity to fulfill all the Chinese demand for use in energy conservation constructions. The stone wool industry is however heavily investing in extending the capacity which will close this gap. Lack of capacity in itself should not cause this optimal solution to be abandoned for the future.

9. **Question:**

Is the cost of stone wool very high?

Answer:

For a typical 100 square meter apartment the added cost for using a fire safe insulation material like stone wool would only be 1,000RMB for the entire

apartment. Compared with the sales price for apartments this is very little. Adding only 1,000RMB in construction cost is very marginal especially in order to make an apartment fire safe to protect its occupants and the construction itself.

10. Question:

Is stone wool dangerous to human health?

Answer:

No it is not. Extensive research has been done (eg. by the World Health Organisation) to establish if stone wool fibres are carcinogenic and the result is clear: they are not. The conclusion of such research: “Insulation glass wool, continues glass filament, rock (stone) wool and slag wool are *not classifiable as to their carcinogenicity to humans (Group 3)*”. As an industry we’re shocked and appalled that some parties are using such false arguments to breed fear into construction workers and customers solely for their own gain. This research is well known and easily accessible. We do not know of any countries having stringent restrictions to stone wool applications in regards to health issues.

It is however worth mentioning that the fire retardant used in certain types of foam to reach Class B1, HBCDD, is a PBT-substance (persistent, bio accumulative toxic substance) and the European Chemicals Agency decided to include HBCDD in the Substances of Very High Concern list (SVHC). Mineral wool (which includes stone wool) is categorically excluded as hazardous waste, either from production operations or from construction and demolition.

11. Question:

Does stone wool production use a lot of energy and produce a large amount of emissions and waste water?

Answer:

Most of the production waste of the modern stone wool facilities – if not all – is recycled, leaving little waste to be disposed of and emissions are reduced to the minimum. The energy used to produce one unit of stone wool is saved more than 100 times by that unit in energy savings. It costs around 20 MJ to produce 1 kilogram of stone wool while it takes at least 85 MJ to produce 1 kilogram of EPS. The raw materials for EPS production are based on fossil fuels like oil and natural gas while for stone wool a very common type of rock named basalt is used with almost infinite accessible reserves.