
Response to “Toxic Solar Panel Materials”

1. Solar panel’s ability to withstand hail

The concern for “toxic solar materials” is partly connected to potential damage to solar panels by hailstorm. First of all, solar panel quality varies from one brand to another. The risk of solar panel cracking due to hail events can be effectively minimised. Control measures are adopted early in the product selection process, where we only choose a solar panel that is designed to withstand hail stones. The product must demonstrate passing of a Hail Test according to international standard IEC61215. An example [Hail Test Report](#) from manufacturer JA Solar (refer to Appendix 1) is attached for reference, which shows the product has no major visual defects after the hail. That is to say, the solar panel remains intact after the hail test.

In general, utility-scale solar farms, which the proposed development belongs to, have a stringent product selection criteria for higher quality and durability in the interest of the asset owner. Therefore, the chance of our selected solar panels being damaged by hail stones is extremely low.

2. Potential heavy metals in solar panels

The potential presence of three heavy metals - cadmium, lead and chromium - in solar panels is of general concern. Before any further discussions, please be aware that solar panels can be categorised into different types based on solar cell technology.

Crystalline silicon solar panels and thin-film solar panels are two broad categories. The three heavy metals mentioned earlier can be fully or partially present in thin-film solar panels. However, it is not the case with crystalline silicon solar panels, which will be used in the proposed development.

Crystalline silicon panels DO NOT contain cadmium (Cd) or chromium (Cr) due to the nature of the technology. They use silicon as the base material and do not either require or benefit from cadmium or chromium chemical compounds. Please find the attached [Material Safety Data Sheet \(MSDS\)](#) from manufacturer JA Solar (refer to Appendix 2), which shows the materials used in various components of a solar panel without the presence of cadmium or chromium.

Lead (Pb) may exist in crystalline solar panels, and it varies from one product to another. We will select a product that either contains no lead or whose lead content is strictly within local and international standards. According to the Heavy Metal content table below, the example solar panel product from JA solar has a trace amount of lead whose content conforms to the standard set by the European Union.

Components	Heavy Metal (unit: wt%)				Standard Requirement
	Pb	Cd	As	Se	
Frame	0	0	0	0	< 0.1 wt%
Screw	0	0	0	0	< 0.1 wt%
Cable	0	0	0	0	< 0.1 wt%
Lamination of PV Module	0.07	0	0	0	< 0.1 wt%

In conclusion, the chance of productive agricultural land being polluted by potential heavy metals in our solar panels can be considered negligible.

Best Regards,

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External Attachments:

Appendix 1 - Solar Panel Hail Test Report by JA Solar

Appendix 2 – Solar Panel Material Safety Data Sheet (MSDS) by JA Solar