Haydale Technologies Inc.
1446 South Buncombe Road
Greer, South Carolina, 29651
United States of America

SI-TUFF™ Performance SiC Food Contact Compliance Information

This certificate presents compliance information for the following product with the United States Code of Federal Regulations Title 21, Volume 3, Part 174, Sec. 174.5 for indirect food additives (21CFR174.5):

- SI-TUFF™ Performance Silicon Carbide, grade "P-SW"
- SI-TUFF™ Performance Silicon Carbide, grade "P-SF"

SI-TUFF™ Performance Silicon Carbide, grades "P-SW" and "P-SF" are used globally in indirect food contact applications, in both ceramic and polymeric coatings. They have no extractables and they are non-toxic by ingestion.

Purity analysis was conducted using *Inductively Coupled Argon Plasma Optical Emission Spectroscopy*, also known as ICP analysis. This is a very sensitive test and can measure most metals down to as low as 1 ppm. Results are shown in Table 1. All metals detected in this assay are elemental, zero-valent metals in solid solution with silicon carbide. As such, they are not extractable and pose no health hazard.

Table 1. Purity Assay of Silicon Carbide Using ICP.

Materials	**Level (SC-050)**	**Level (SC-300)**	**Detection Limit**
SiC	> 99.6%	> 99.6%	± 0.1%
SiO_2	< 0.4%	< 0.4%	± 0.1%
Impurities			
Na	12 ppm	1117 ppm	1 ppm
Fe	41 ppm	6 ppm	1 ppm
Ca	720 ppm	162 ppm	1 ppm
Mg	180 ppm	338 ppm	1 ppm
Ga	None detected	None detected	1 ppm
Ni	5 ppm	1 ppm	1 ppm
Ti	1 ppm	48 ppm	1 ppm
Cu	None detected	None detected	1 ppm
Zn	None detected	None detected	1 ppm
Heavy Metals			
Sb	None detected	11 ppm	1 ppm
As	None detected	None detected	1 ppm
Ba	None detected	129 ppm	1 ppm
Cd	None detected	7 ppm	1 ppm
Cr	10 ppm	5 ppm	1 ppm
Pb	None detected	1 ppm	1 ppm
Hg	None detected	1 ppm	1 ppm
Se	None detected	None detected	1 ppm

The ICP methodology is as follows. ICP works by injecting a nebulized mist from a liquid into the center of an argon plasma. A plasma is created from a flow of gas within a high-energy field (in the case of an ICP, by a strong alternative current of RF energy flowing in a coil just outside of the gas flow) which ionizes the gas and causes intense heating. Temperatures inside an ICP plasma reach 10,000K. When the mist of the sample enters the plasma, the intense heat causes the dissociation of most chemical compounds, and the energy that the component atoms absorb causes them to undergo excitation and ionization energy transitions. These transitions produce spectral emissions characteristic of the elements being excited. The spectra produced by the plasma is broken down into individual spectral lines by the ICP's spectrometer, and the ICP's computer database of all elements translates the spectral lines into concentrations for a specified suite of all elements.