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Without Prejudices.

This document is intended for the sole purpose of promoting discussion regarding the factors surrounding chemical degradation of EPDM solar absorber, and the phenomenon generally referred to as “tea leafing”. This information has been researched using a number of reputable sources within the public domain, and is supported by a significant amount of objective evidence collected from within the industry over a number of years.

A Discussion on Tea-Leafing and EPDM Solar Absorbers for Swimming Pools.

EPDM rubber has been successfully used in countless solar pool heating installations, and is traditionally used in potable water storage and transport systems globally. The main reason for the choice of EPDM in these applications is its high intrinsic resistance to attack from free chlorine. Free chlorine is widely used to disinfect and sanitize water for potable applications and also swimming pools. The purpose of any pool or spa disinfectant is to:

1. Sanitize (kill all living organisms),
2. Disinfect (kill all disease-causing organisms), and
3. Oxidize (destroy ammonia, nitrogen-containing contaminants and swimmer sweat and waste).

A disinfectant must be continually active in water so that it can instantly react with bacteria, algae and other organic matter as they are introduced into the water. The Total Chlorine present in the water is the sum of both Free Chlorine and Combined Chlorine. The Free Chlorine is the form of Chlorine that is active and able to sanitize and oxidize contaminants in the water. At ideal dosing levels, the Free Chlorine is completely consumed or neutralized during the sterilization of bacteria and micro-organisms in the water. Combined Chlorine (typically Chloramine) may also be present, but has already reacted with other contaminants and therefore already used up its ability to sanitize.

Strong evidence is now starting to appear that suggests the degradation of conventionally compounded EPDM is due to high levels of chloramines, as opposed to free chlorine. Chloramine attack on EPDM breaks down the polymer cross-linking bonds, resulting in microcracks on the material surface. Water then begins to penetrate the elastomer, resulting in further propagation of the cracks and liberation of particles of polymer and compounding components. This black “sooty” residue is most likely the phenomenon referred to as “tea leafing”. Anecdotal evidence also suggests that the occurrence and severity of tea leafing also appears to have increased during the last 12 months or so.

It appears that tea leafing is the by-product of aggressive chemical attack, due to a combination of individual, but co-dependant conditions, on the EPDM material used in the manufacture of the solar absorber. It has been generally accepted within the pool industry that tea leafing is most likely caused by a combination of chemical imbalances and environmental conditions, which could include one or any number of the following:

- Inconsistent pool and solar heating maintenance and temperature fluctuations,
- Irregular running or flushing of the solar system (particularly in the off-season),
- Blockages within the solar absorber resulting in stagnant water or restricted water flow,



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- Used for indoor pools, or excessive use of pool cover without adjustment of the chlorine and/or chemical dosing (both manual and automatic),
- Incorrectly plumbed or poorly drained installations.

Because BOSS Polymer Technologies is not able to control the installation, operation or maintenance of any part of the pool solar heating system, our warranty (expressed or implied) does not include tea-leafing and is limited to the repair and/or the replacement of faulty material only, and does not include labour. This warranty is pro rata for a period of 10 years from date of sale.

However, it has always been the position of BOSS Polymer Technologies to support the solar pool industry by considering performance issues and claims outside of the limits of our warranty – on a case-by-case basis. We consider it to be a sound business strategy to assist and support, where appropriate, the users of our products by sharing some financial burden - where circumstances leading to the failure of our product cannot be clearly defined.

Robert Andrews
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BOSS Polymer Technologies

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