3D Imaging of Defect in Bituminous Geomembranes (BGM)

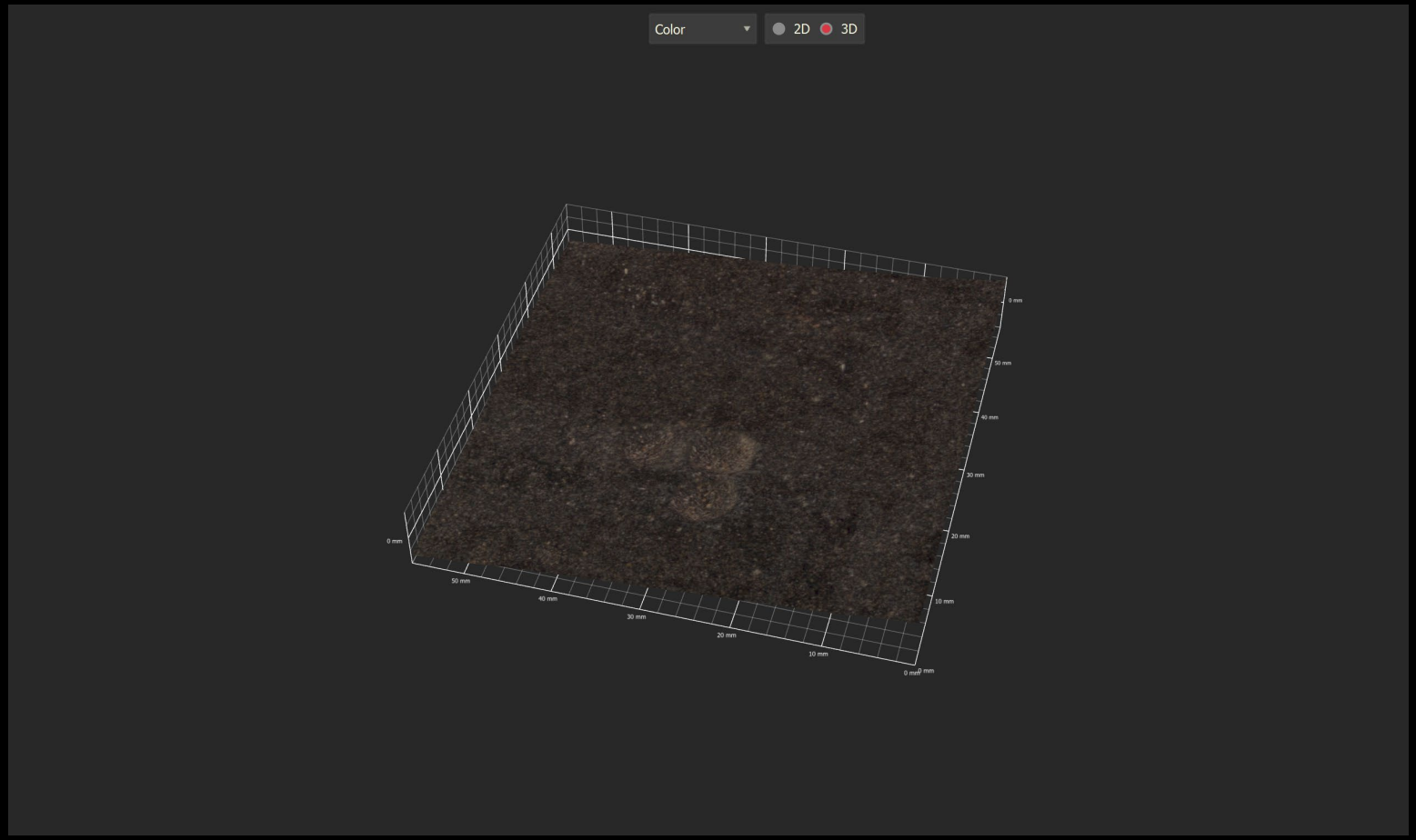
Dr. John Scheirs
www.excelplas.com

Blistered Bituminous geomembrane (BGM) liner

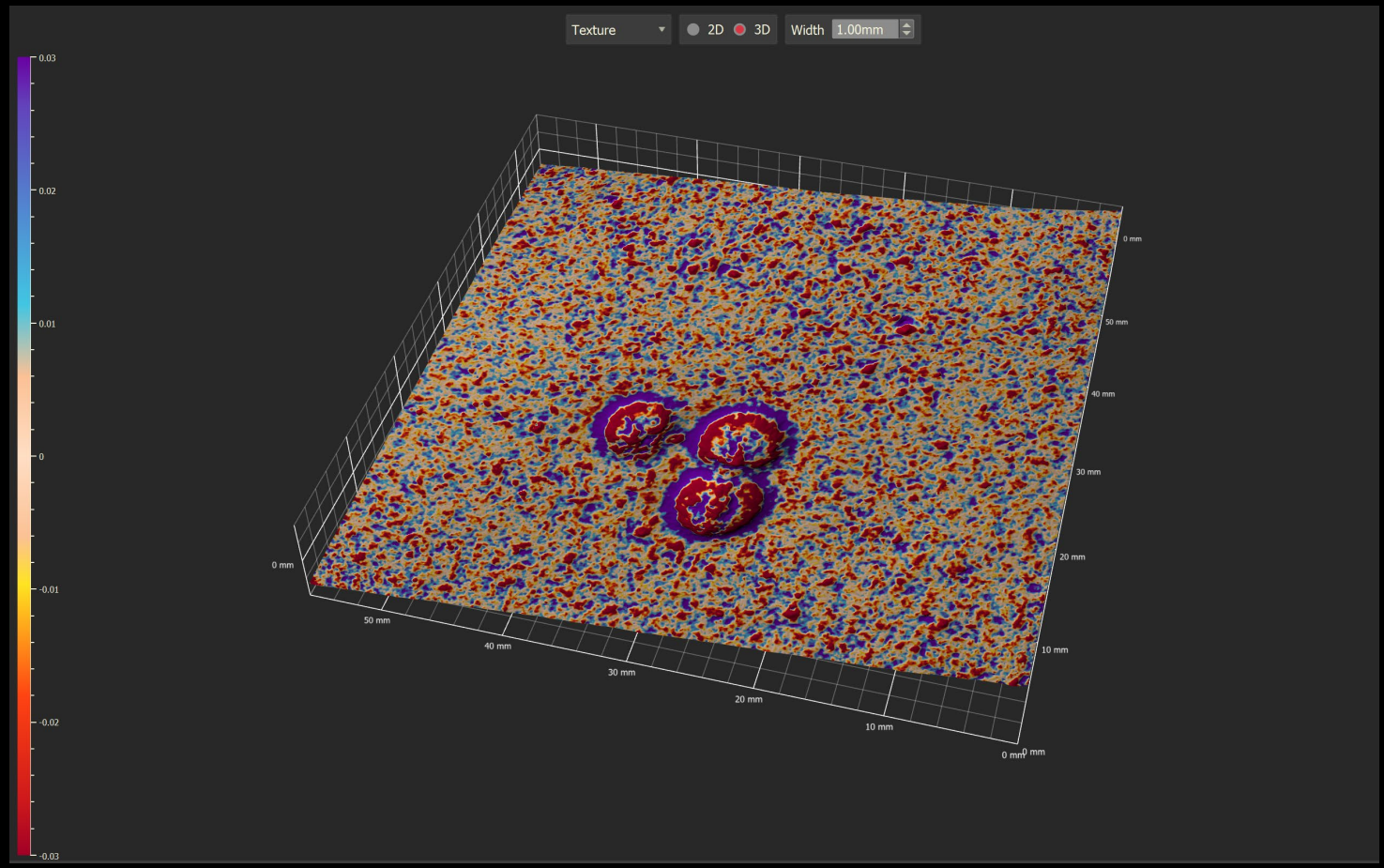
Collection of collapsed blister defects in a BGM liner

BGM liner – Area 1 Photo View

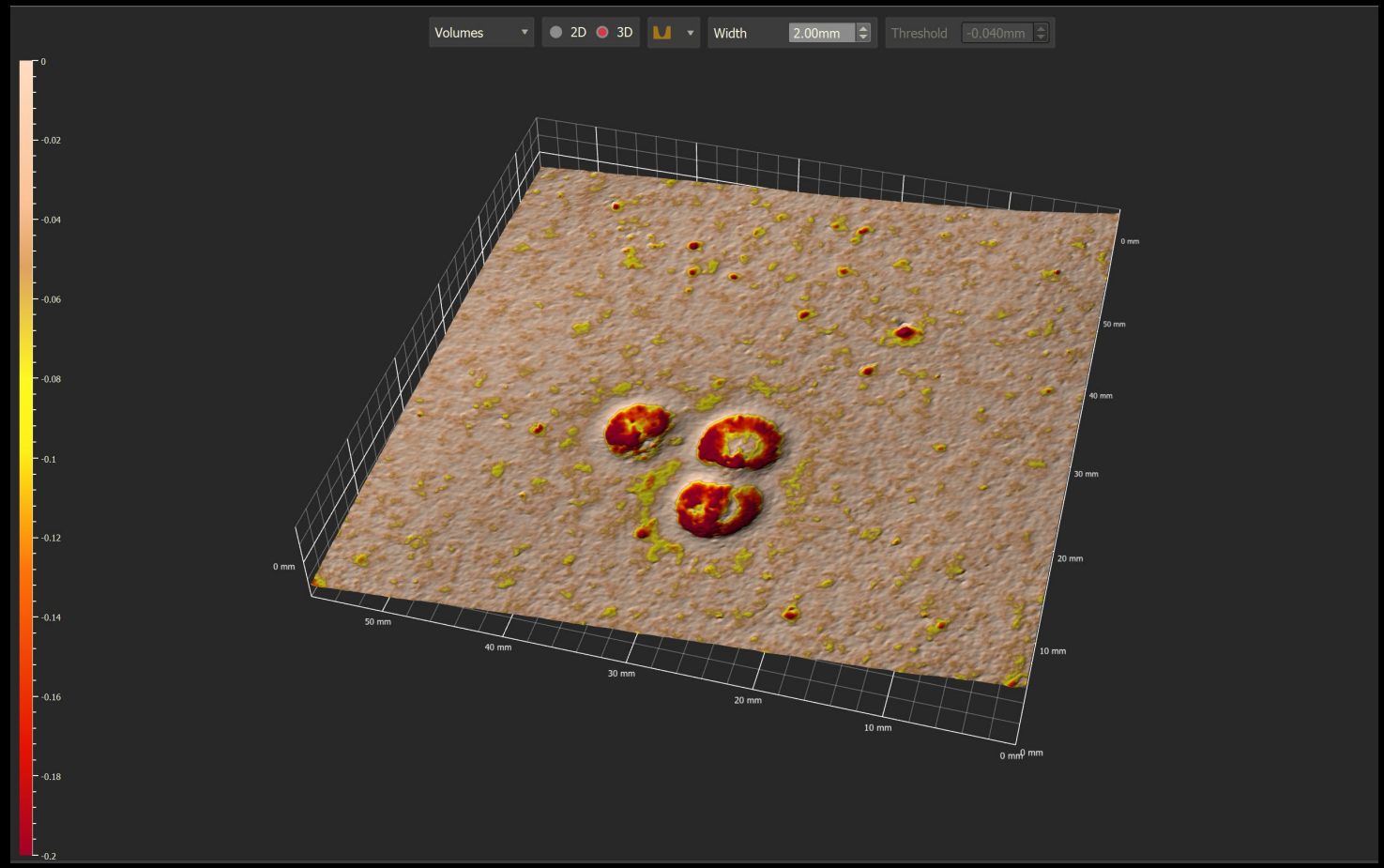
Area 1 - 3D view



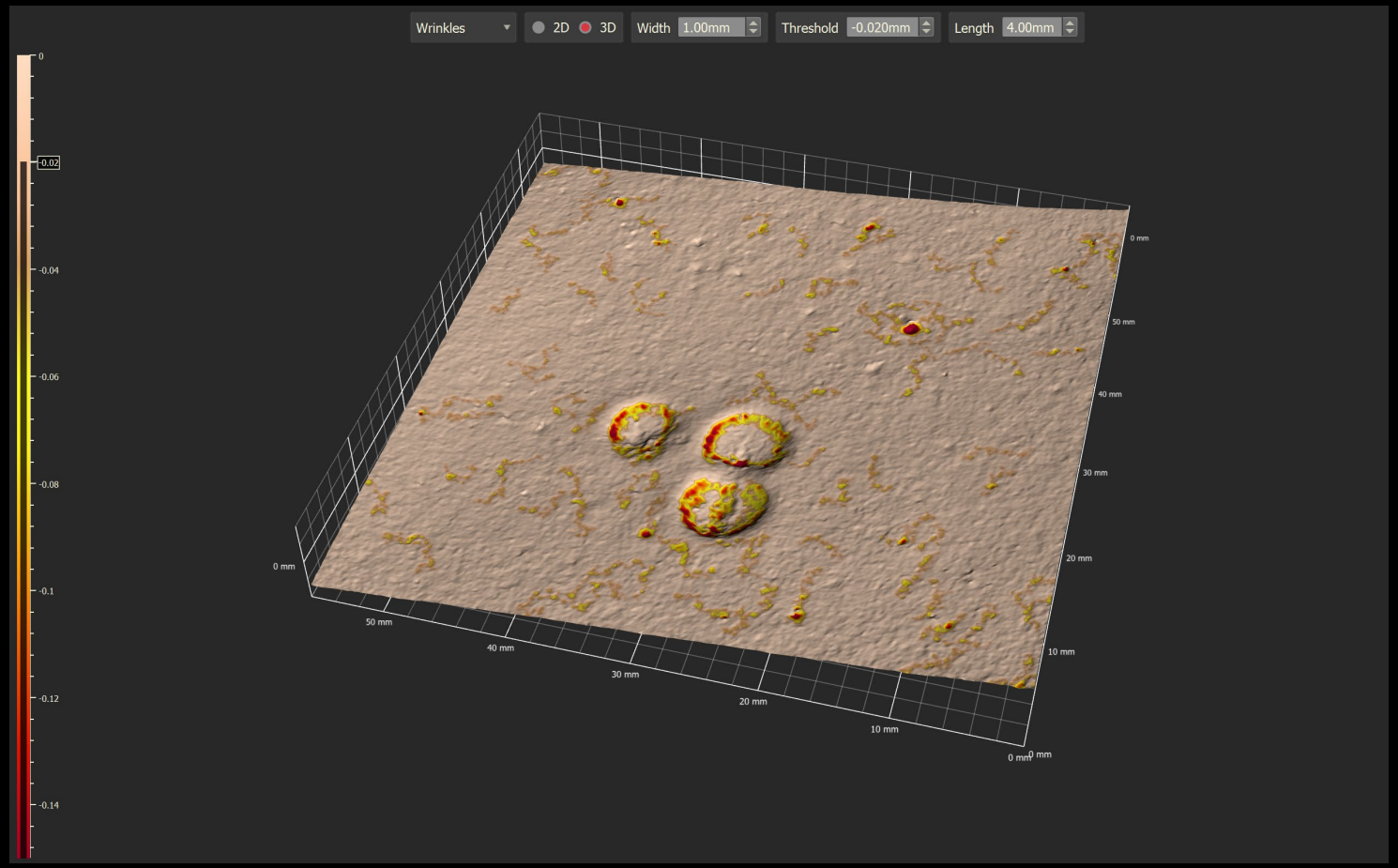
Area 1 - 3D view – Texture format



Area 1 - 3D view – Texture format

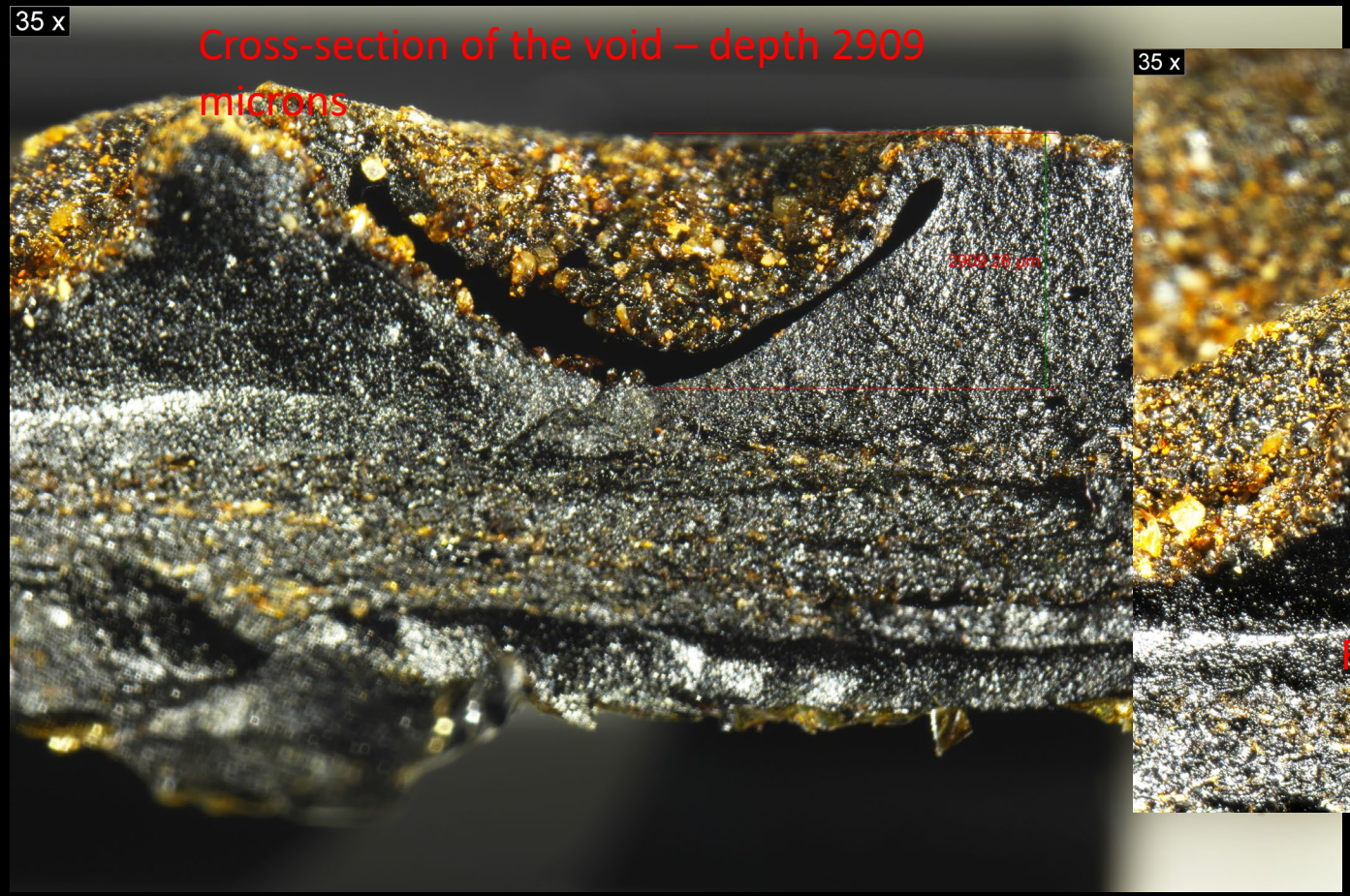


Area 1 - 3D view – Wrinkles format



Area 1 – 2D – Microscopic view

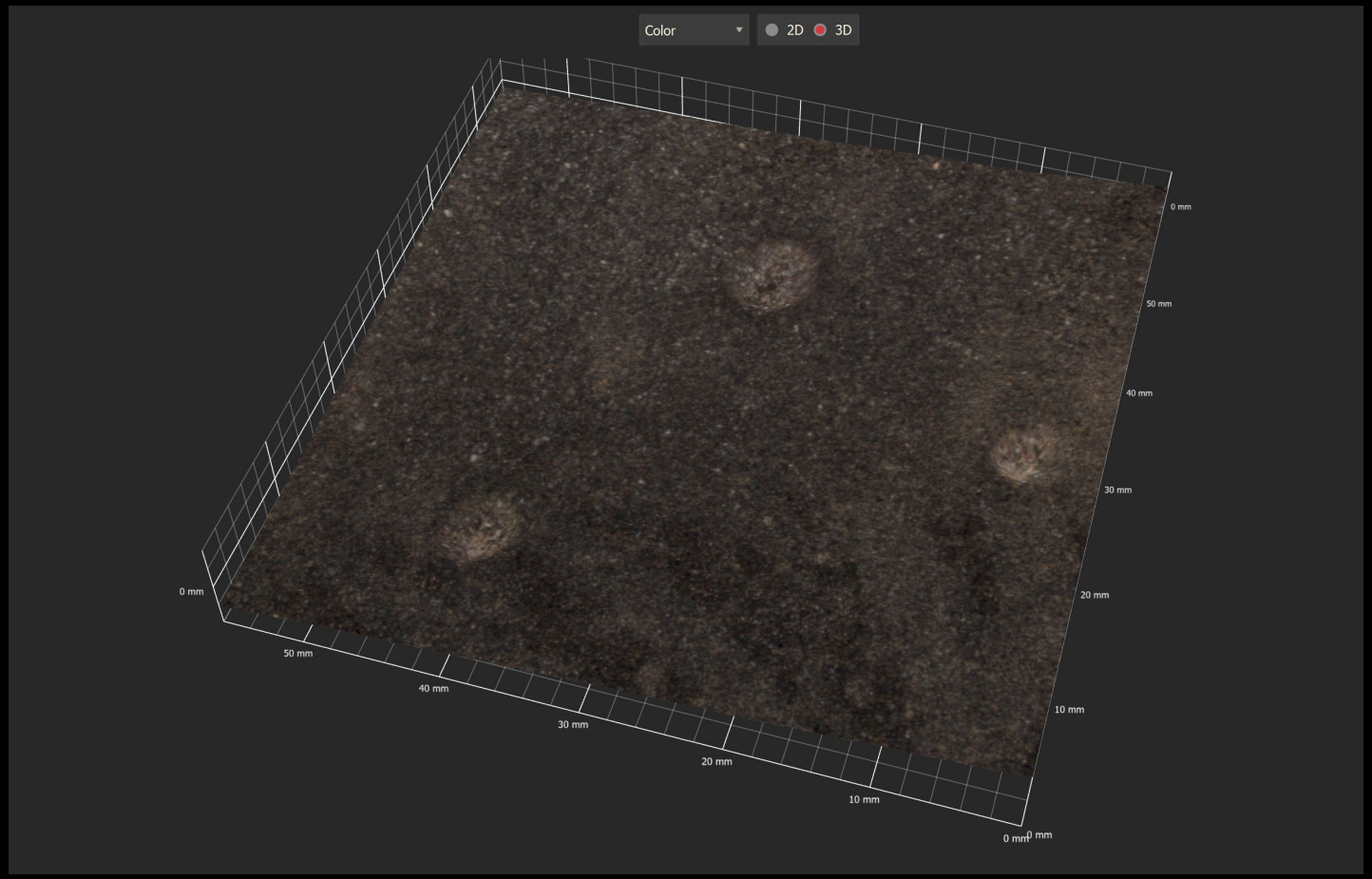
Area 1 – Microscopic view



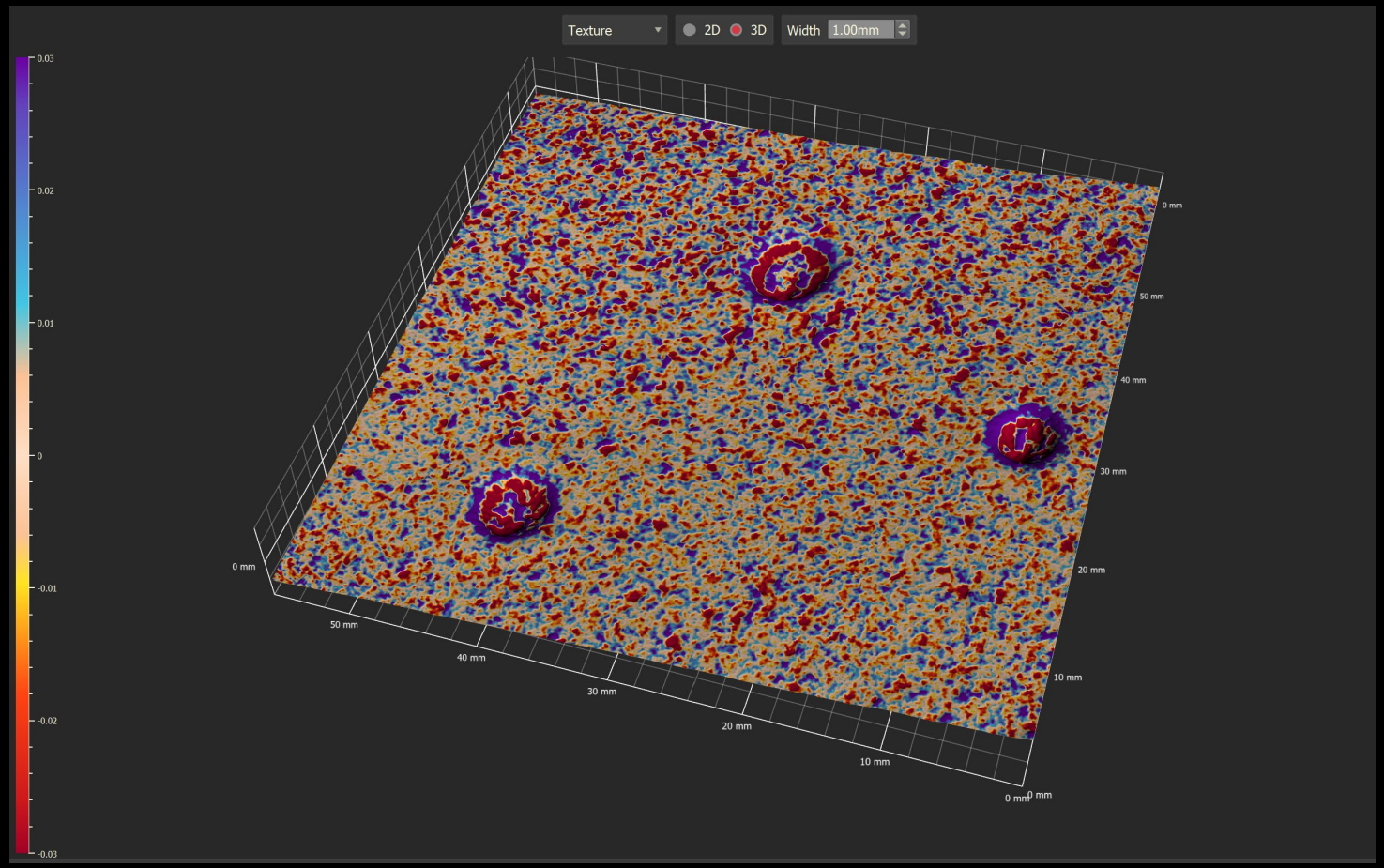
Area 1 – Microscopic view

BGM liner – area 2 macroscopic view

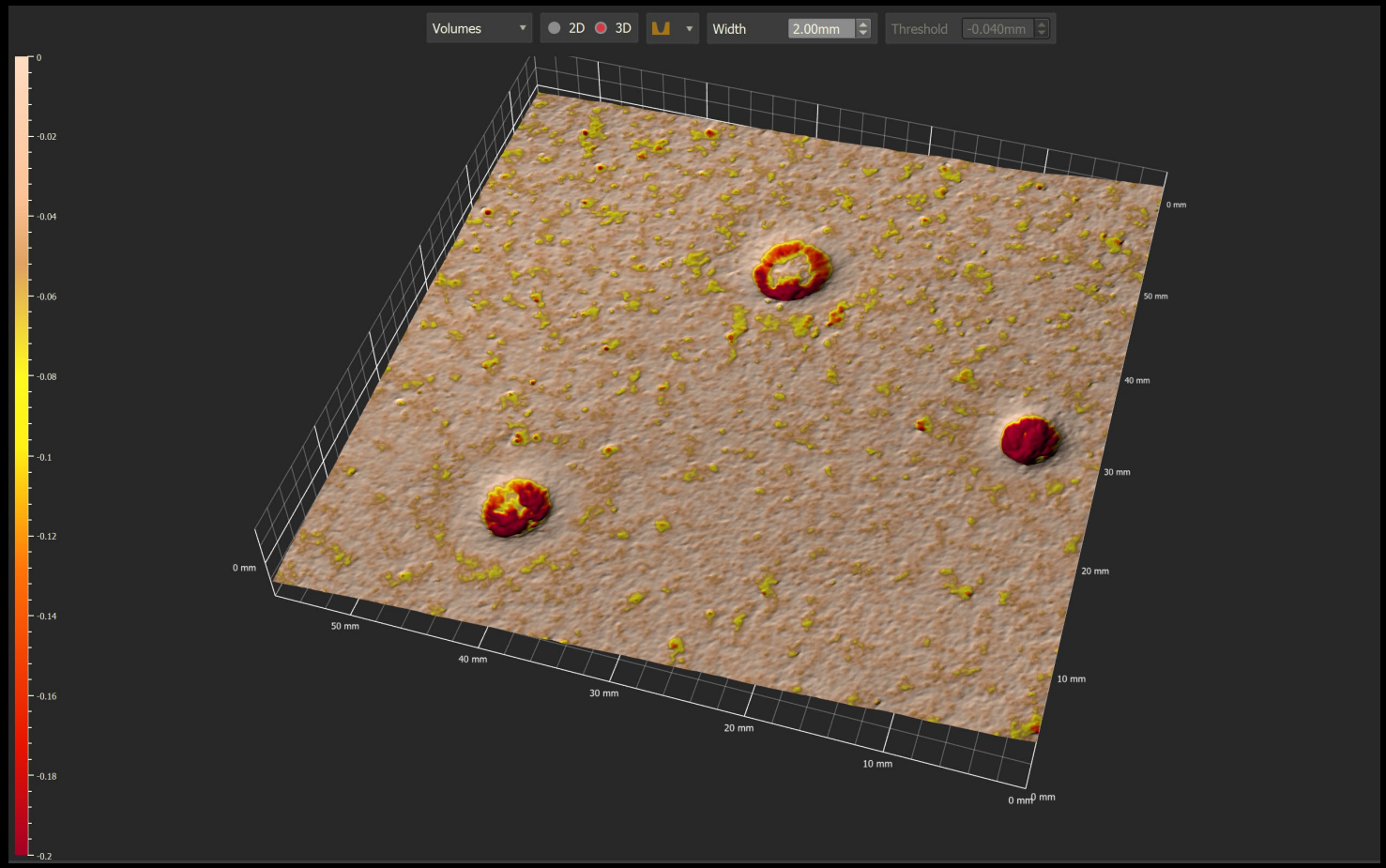
Area 2 - 3D view



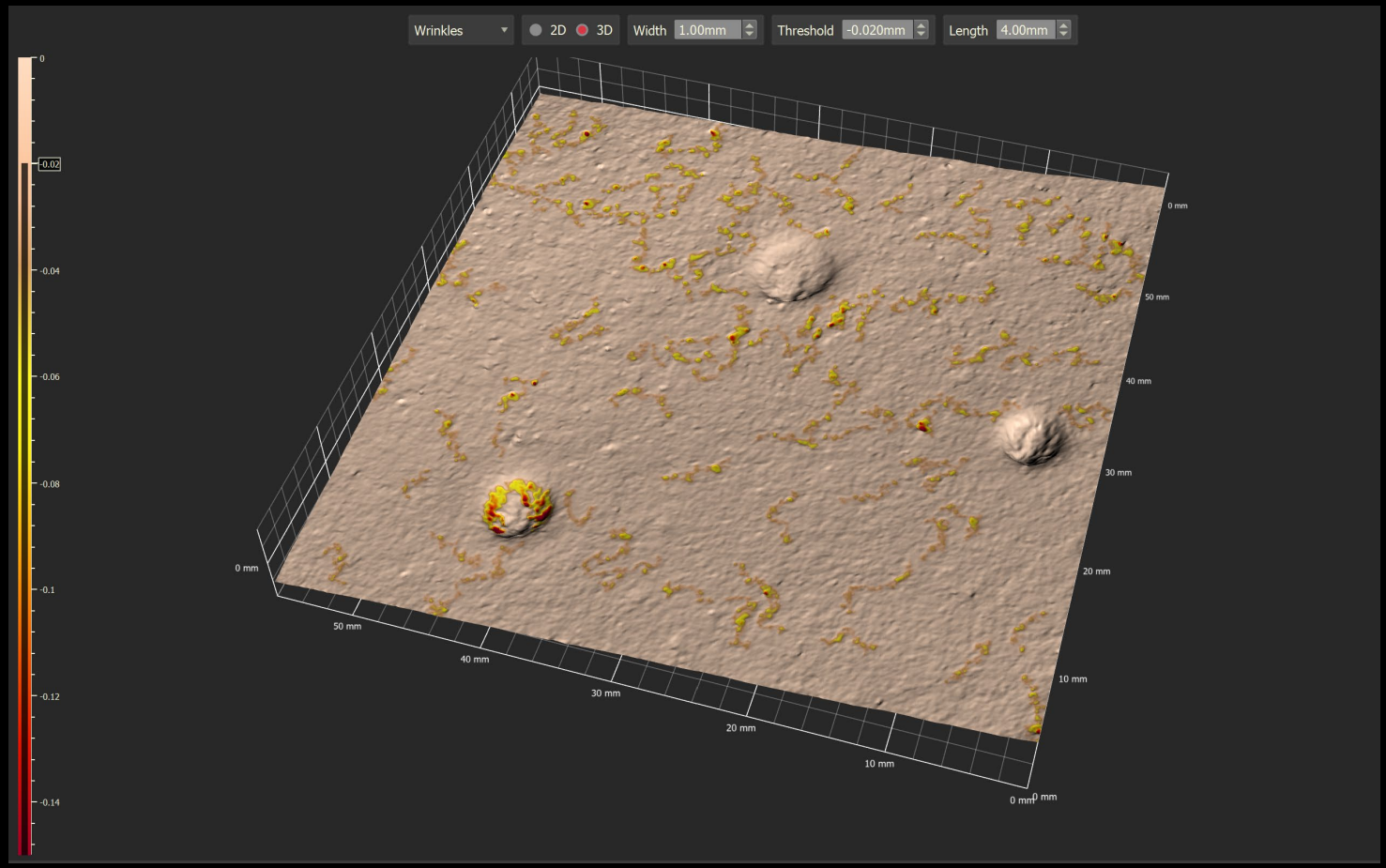
Area 2 - 3D view



Area 2 - 3D view

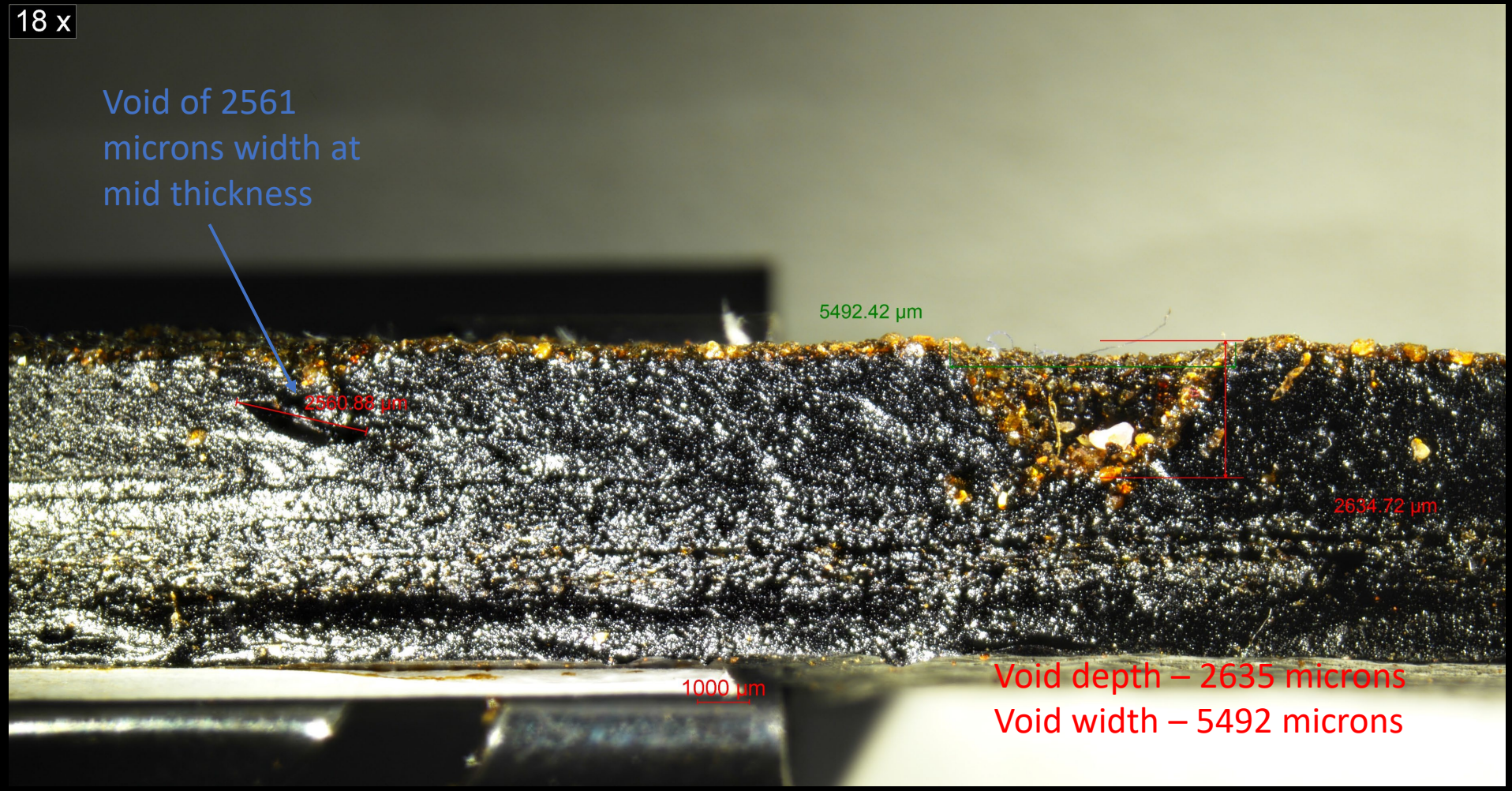


Area 2 - 3D view



Area 2 – 2D – Microscopic view

Area 2 – Microscopic view



Dimple Defects in BGMs

- Dimple defects in bituminous geomembranes (BGMs) are a common manufacturing flaw that can occur when entrapped moisture is present during production. These defects are characterized by small, depressed areas on the surface of the BGM that resemble dimples. They can act as stress concentrations and may lead to tearing of the BGM when subjected to multiaxial or out-of-plane strain.

- One potential cause of dimple defects is the generation of steam vapor during the production process. This can occur if moisture is entrapped within the BGM material as it is being manufactured. The heat and pressure applied during production can cause the entrapped moisture to turn to steam, leading to the formation of blisters on the surface of the BGM. These blisters can then collapse to form dimple defects.

- To prevent dimple defects from occurring, it is important to ensure that the BGM components are free of moisture before it is processed. This can be achieved through proper storage and handling procedures, as well as through the use of moisture-eliminating additives in the BGM formulation. Additionally, the use of proper manufacturing techniques, such as maintaining appropriate temperatures and pressures, can help to minimize the formation of dimple defects.

Blister Defects in BGMs

- Blister defects in bituminous geomembranes (BGMs) can be caused by the presence of trapped air or other gases within the geomembrane material. This can occur when the BGM is exposed to high temperatures, such as when it is stored in direct sunlight. As the temperature of the BGM increases, the air or other gases within the material expand, causing the material to form blisters.

- In addition to being caused by solar heating, blister defects can also be caused by other factors such as the presence of entrapped moisture within the BGM, which can lead to vapour-generated blisters. This can occur if the BGM is stored in an environment where the relative humidity is high, or if the BGM is exposed to water or other liquids that can be absorbed into the material.

- To prevent blister defects in BGMs, it is important to store the material in a cool, dry location and to protect it from direct sunlight. It is also important to ensure that the BGM is properly sealed and protected from moisture, as this can help to reduce the risk of vapour-generated blisters. In cases where the BGM is being installed in an environment where it may be exposed to water or other liquids, it is important to follow proper installation guidelines to ensure that the material is properly sealed and protected.