Understanding the degassing of magmas, without associated explosive activity, has long been an interesting issue in the study of volcanology. This is especially true in silicic systems (dacitic to rhyolitic), when the high viscosity of the melt is thought to inhibit exsolution of volatiles and physical movement of vesicles within the melt. As a result the mechanisms by which degassed dome lavas and obsidian flows lose volatiles and the mechanisms by which volcanic gases are separated from their parent magmas are not well understood. Traditionally, the open-system degassing of silicic volcanic systems has been attributed to volatile flow through open pathways such as interconnected fracture and vesicle networks, however, these systems are poorly understood. In the course of this study, we conducted textural analyses of back-scattered electron images of volatile-poor pumice pyroclasts taken from the crystal rich, 2.56Ma rhyodacitic Cerro Galan Ignimbrite (CGI), Argentina, in order to determine the physical processes by which these pyroclasts were degassed. Here we present a previously unrecognised texture within coherent pyroclasts: ductile fractures forming an interconnected fracture network at the scale of 100-400µm, with individual fractures comprised of coalesced micro-vesicles (<30 µm). This fracture network defines near-hexagonal polygons of glassy melt with a non-vesicular rim, and a vesicular core. This polygonal network represents a natural example of textures generated experimentally. Open-system degassing is due to an unconfined fracture network which results from self-organised vesiculation due to cooling induced tension within the melt prior to solidification.