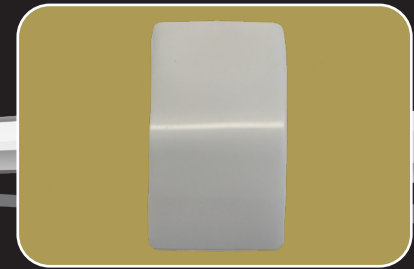




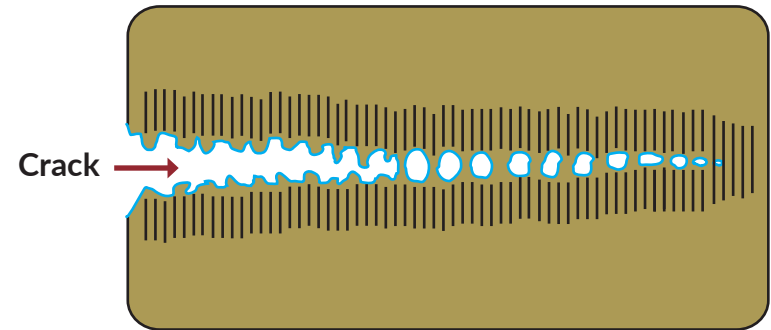
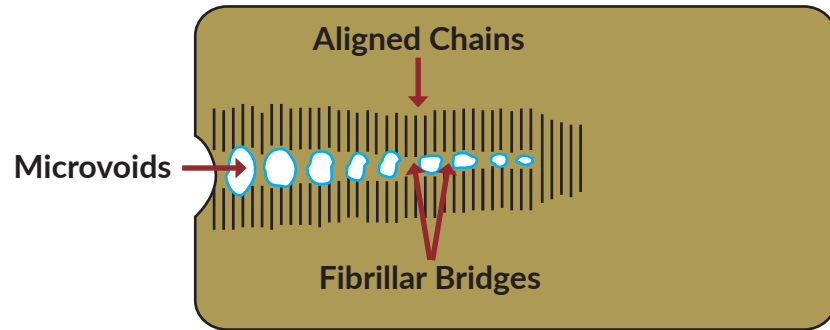
STRESS WHITENING IN POLYPROPYLENE

Most injection molders and end-users are familiar with stress whitening in polypropylene. This is where a part under stress shows a whitened area. Stress whitening, sometimes called blush, can occur during molding if ejector pins push into the molded part during ejection from the tool, during part handling, from an impact event or during actual use conditions. Stress whitening is more common in polypropylene impact copolymers, especially if they are colored as the pigments can also contribute to the stress-whitening effect.

One definition of stress whitening is “a white line or curve that appears when a part is bent, impacted or stressed” (see photograph to the right).



Stress whitening is really a craze, which is a pre-cursor to a crack. As the material is stressed, micro-voids are formed and polymer chains (fibrils) link the two sides of the craze. Because the refractive index of the craze is different than the refractive index of the base polymer you ‘see’ this as the whitening effect (see image below).



Crazes can be formed around pigment particles or reinforcements or fillers. In the case of impact copolymers, crazes form around the impact modifier particles, which is why impact copolymers are more prone to stress whitening than homopolymer or random copolymers.

Stress-whitening is affected by the specific grade of polypropylene, the color, the processing conditions used during molding, the part design and wall thickness as well as the end use conditions.

The good news is that there are ways to eliminate, or at least reduce, stress-whitening defects. Contact your Entec Polymers sales representative for assistance in eliminating stress-whitening and improving your parts aesthetic appearance.