



## Characterization of Ice for Return-To-Flight of the Space Shuttle: Part 2; Soft Ice (Paperback)

By -

Bibliogov, United States, 2013. Paperback. Condition: New. Language: English . Brand New Book \*\*\*\*\* Print on Demand \*\*\*\*\*.In support of characterizing ice debris for return-to-flight (RTF) of NASA's space shuttle, we have determined the microstructure, density and compressive strength (at -10 C at approximately 0.3 per second) of porous or soft ice that was produced from both atmospheric water and consolidated snow. The study showed that the atmospheric material was generally composed of a mixture of very fine (0.1 to 0.3 millimeters) and coarser (5 to 10 millimeter) grains, plus air bubbles distributed preferentially within the more finely-grained part of the microstructure. The snow ice was composed of even finer grains (approximately 0.05 millimeters) and contained more pores. Correspondingly, the snow ice was of lower density than the atmospheric ice and both materials were significantly less dense than hard ice. The atmospheric ice was stronger (approximately 3.8 MPa) than the snow ice (approximately 1.9 MPa), but weaker by a factor of 2 to 5 than pore-free hard ice deformed under the same conditions. Zero Values are given for Young's modulus, compressive strength and Poisson's ratio that can be used for modeling soft ice from the external tank.



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