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**Title:** Experiments to Evaluate Cloud Seeding Materials using Cloud Chambers

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**Abstract:** Cloud chambers are an important tool for determining the performance of seeding material used for precipitation enhancement projects. Experiments conducted in cloud chambers are important for understanding the physical processes involved in increasing precipitation since they provide a controlled environment for the formation of clouds. The Pi Cloud Chamber at Michigan Technological University (MTU) is an important facility for evaluating products used to increase precipitation in operational weather modification programs. The Pi Cloud Chamber allows the qualification of new formulations, methods, and techniques that has not been available since the decommissioning of the Colorado State Cloud Chamber in the late 1990s. Experiments that use cloud chambers enables the qualification of the ice number concentration which results from introduction of ice nuclei and the formation of large droplets from the introduction of hygroscopic seeding materials. To introduce material into a clouds chamber requires some type of injection system that dilutes the concentration so the cloud chamber is not contaminated and realistic of concentrations found in the atmosphere. Additionally, seeding material needs to be generated using the same methods as employed during operational weather modification programs. For example, seeding flares should be burned with air flow similar to a seeding aircraft. Large blowers can be used to produce the required air flow; however, blowers introduce particles that need to be removed with particle filters. A seeding flare burning system, coupled to a dilution system, has been developed and tested at the University of North Dakota. This injection systems enables cloud chambers to be used to improve cloud seeding materials.