

Results From Investigation of Crystallized WINS Impactor Oil

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Abstract

In late 1998, field technicians servicing recently deployed PM_{2.5} samplers in Connecticut noted that oil in the WINS impactors sometimes appeared milky, nearly opaque and solid. Although related to cool or cold weather, this phenomenon was not a simple change of state (i.e., freezing) and could not be reproduced in the laboratory by exposing oil to low temperatures. Because it was believed to alter the collection efficiency of the impactor, and therefore the collected PM_{2.5} mass, more in-depth tests of the phenomenon were undertaken.

The authors discuss observations regarding both the possible cause(s) of crystallization and reasons for the limited reporting to date of this phenomenon. Photographs of normal and crystallized oil are presented. Also included are technical data and highlights from conversations with oil vendors, some of whom have long noted the occurrence of crystallization when employing this oil as the working fluid in vacuum diffusion pumps. Meteorological conditions prevailing when crystallization was noted are described as are experimental results employing different oils and oil blends.