



Search Definitions  
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- condensation trail**—(Or contrail; also called vapor trail.) A cloudlike streamer frequently observed to form behind aircraft flying in [clear](#), cold, humid air.

Condensation trails may persist and encourage the formation of a layer of [cirrus](#) clouds. Condensation trails may form by either of two distinct processes. First, addition of [water vapor](#) to the swept path of the aircraft inevitably accompanies exhaust of combustion products from the engines. If the humidifying effect of this addition overbalances the concomitant addition of the [heat](#) of combustion, [exhaust trails](#) may form depending on [mixing](#) with air from the [environment](#). The [thermodynamics](#) of this process is such that the effect becomes important only for rather low [temperatures](#) of the order of those encountered near the [tropopause](#), so this type of condensation trail is only usually observed for high-altitude flight. On occasion, exhaust provides needed [condensation nuclei](#), but this effect has not been fully investigated. Second, in air that is clear, but almost fully saturated, the aerodynamic [pressure reduction](#) that accompanies flow of air around propeller tips and around wingtips can so cool the air as to induce [condensation](#) and form aerodynamic trails. The latter propeller-tip trails and wingtip trails are seldom as dense as are exhaust trails. Under some conditions the pressure reduction lowers the temperature below that for homogeneous condensation of [ice](#) and the trail consists of ice [particles](#) even at ambient temperatures as warm as  $-15^{\circ}\text{C}$ . Wingtip trails only occur with aircraft of such heavy wing-loading as to yield very strong tip [vortex](#) circulations. Interceptor planes pulling out of dives, and hence imposing temporarily heavy wing-loading, may produce transient tip vortex trails. Faint vortex trails may appear aft of the corners of flaps during aircraft landings.