§ 23.1047 Cooling test procedures for reciprocating engine powered airplanes.

Compliance with §23.1041 must be shown for the climb (or, for multie- 
gine airplanes with negative one-engine-inoperative rates of climb, the de- 
scent) stage of flight. The airplane must be flown in the configurations, at 
the speeds and following the procedures recommended in the Airplane Flight 
Manual, that correspond to the applicable performance requirements that 
are critical to cooling.

[Amdt. 23–51, 61 FR 5137, Feb. 9, 1996]

LIQUID COOLING

§ 23.1061 Installation.

(a) General. Each liquid-cooled engine 
must have an independent cooling sys- 
tem (including coolant tank) installed 
so that—

(1) Each coolant tank is supported so 
that tank loads are distributed over a 
large part of the tank surface;

(2) There are pads or other isolation 
means between the tank and its sup- 
sports to prevent chafing.

(3) Pads or any other isolation means 
that is used must be nonabsorbent or 
must be treated to prevent absorption 
of flammable fluids; and

(4) No air or vapor can be trapped in 
any part of the system, except the 
coolant tank expansion space, during 
filling or during operation.

(b) Coolant tank. The tank capacity 
must be at least one gallon, plus 10 per- 
cent of the cooling system capacity. In 
addition—

(1) Each coolant tank must be able to 
withstand the vibration, inertia, and fluid loads to which it may be sub- 
jected in operation;

(2) Each coolant tank must have an 
expansion space of at least 10 percent 
of the total cooling system capacity; and

(3) It must be impossible to fill the 
expansion space inadvertently with the 
airplane in the normal ground attitude.

(c) Filler connection. Each coolant 
tank filler connection must be marked 
as specified in §23.1557(c). In addition—

(1) Spilled coolant must be prevented 
from entering the coolant tank compart- 
ment or any part of the airplane other than the tank itself; and

(2) Each recessed coolant filler con- 
nection must have a drain that dis- 
charges clear of the entire airplane.

(d) Lines and fittings. Each coolant 
system line and fitting must meet the 
requirements of §23.993, except that the 
inside diameter of the engine coolant 
inlet and outlet lines may not be less 
than the diameter of the corresponding 
engine inlet and outlet connections.

(e) Radiators. Each coolant radiator 
must be able to withstand any vibra- 
tion, inertia, and coolant pressure load 
to which it may normally be subjected. 
In addition—

(1) Each radiator must be supported 
to allow expansion due to operating 
temperatures and prevent the trans- 
mittal of harmful vibration to the radi- 
ator; and

(2) If flammable coolant is used, the 
air intake duct to the coolant radiator 
must be located so that (in case of fire) 
flames from the nacelle cannot strike 
the radiator.

(f) Drains. There must be an acces- 
sible drain that—

(1) Drains the entire cooling system 
(including the coolant tank, radiator, 
and the engine) when the airplane is in 
the normal ground altitude;

(2) Discharges clear of the entire air- 
plane; and

(3) Has means to positively lock it 
closed.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as 
amended by Amdt. 23–43, 58 FR 18973, Apr. 9, 
1993]

§ 23.1063 Coolant tank tests.

Each coolant tank must be tested 
under §23.965, except that—

(a) The test required by §23.965(a)(1) 
must be replaced with a similar test 
using the sum of the pressure devel- 
oped during the maximum ultimate ac- 
celeration with a full tank or a pres- 
sure of 3.5 pounds per square inch, 
whichever is greater, plus the max- 
imum working pressure of the system; and

(b) For a tank with a nonmetallic 
liner the test fluid must be coolant 
rather than fuel as specified in 
§23.965(d), and the slosh test on a speci- 
men liner must be conducted with the 
coolant at operating temperature.