

Turbine Engine Bird Ingestion Standards

Bird Categories		AC 33-1	AC 33-1A	CFR 33.77 AMDT 6	CFR 33.76 AMDT 20	CFR 33.76 AMDT 23/24	
Small Flocking	No ingestion standards prior to 1965	2-4 OZ • ≤ 50% thrust loss ok	2-4 OZ • ≤ 25% thrust loss ok	3 OZ • ≤ 25% thrust loss ok • 16 max ingested	3/4 - 2^{1/2} LB • ≤ 25% thrust loss ok	Same as AMDT 20	
Medium Flocking			1-2 LB • ≤ 25% thrust loss ok	1^{1/2} LB • ≤ 25% thrust loss ok • 8 max ingested			
Large Single		2-4 LB • ≤ 50% thrust loss ok	3-5 LB • safe shutdown ok	4 LB • safe shutdown ok • single ingestion			4-8 LB • safe shutdown ok
Large Flocking (large engines only)		1965	1968	1974	2000	2007	4-5^{1/2} LB • ≤ 50% thrust loss ok
Major Accidents	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>1960 Electra at Boston</p> </div> <div style="text-align: center;">  <p>1975 DC-10 at JFK</p> </div> <div style="text-align: center;">  <p>2009 A320 at Hudson River</p> </div> </div>						
	1950	1960	1970	1980	1990	2000	2010