

## **6 Minutes for Safety Topic: Maximum Load Calculations**

The ability to know and/or quickly calculate your maximum retardant load in gallons is a professional responsibility as a pilot and as an aerial firefighter, and certainly is an important risk management tool. Too many aircraft have launched with the aircraft weight being over the maximum manufacturer certified gross weight. This situation and the associated unnecessary risks are usually due to lack of pilot knowledge and / or professionalism.

Takeoff over maximum aircraft gross weight compromises safety, violates manufacturer's guidance and the FARs, and puts the aircraft and pilot at unnecessary risk.



In addition for the potential unsuccessful takeoff attempt illustrated in the photo above, over-grossing the aircraft places excess stress on the aircraft's structure and particularly the wing spar. Manufacturer G-limits, structural and maneuvering speeds, etc. are affected and long term can lead to "excessive bending and flexing of metal" that shortens aircraft structural life and has potential dire consequences for future flights.

The following example depicts a representative AT-802 maximum load calculation. This methodology is applicable to all aircraft:

1. Numbers:
  - a. Retardant Weight: 9.2 Lbs / Gal
  - b. Fuel Weight (Jet-A): 6.8 Lbs / Gal
  - c. Pilot Weight: 200 Lbs
  - d. Miscellaneous equipment weight: 50 Lbs
  - e. Aircraft Empty Weight: 6700 Lbs (Example Only – See your specific aircraft weight & balance information on board the aircraft)
  - f. AT-802 maximum gross weight (manufacturer): 16,000 Lbs
  - g. Fuel capacity: 300 Gallons
2. Assumptions for this example: Full fuel load
3. Maximum retardant load calculation:

6700 Lbs (Aircraft empty weight)  
2040 Lbs (300 gallon fuel weight at 6.8 Lbs / Gal)  
200 Lbs (Pilot weight)  
50 Lbs (Miscellaneous equipment weight)

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8990 Lbs

16,000 Lbs – 8990 Lbs = 7010 Lbs (total authorized retardant load)

7010 ÷ 9.2 Lbs / Gal (retardant weight) = **762 Gallons (maximum load with full fuel)**

*It is your professional responsibility to know the maximum retardant load for your aircraft's weight and fuel load.*

*Superior Pilots Use Superior Judgment to Avoid Stressful Situations Which Might Call for Superior Skills*