

Fortress FR-100 (1.68 lb/gal mix ratio)

Fortress FR-100 is a dry concentrate formulation that uses magnesium chloride ($MgCl_2$) as the inorganic fire-retardant salt. Fortress FR-100 contains a polymer thickener to provide a medium viscosity product for improved drop characteristics. The FR-100 formulation contains a fugitive coloring agent, and subsequently, the color will fade over time with exposure to sunlight.

Specifically, FR-100 is made from two forms of $MgCl_2$; magnesium chloride hexahydrate ($MgCl_2 \cdot 6(H_2O)$), and anhydrous magnesium chloride ($MgCl_2$). When mixed with water, the product will heat up. This increase in the temperature of the mixed product may be as much as 25° F warmer than the temperature of the water used for mixing. This heating is normal and expected and will begin to subside once fully mixed. A warmer product temperature will make the product less dense. As the product cools, its density will increase (volume will decrease, but total weight will not change). Magnesium chloride is hygroscopic which means it can absorb moisture from the air after it has been applied to fuels.

Product Type:	Medium viscosity, gum-thickened, dry concentrate; generally, batch mixed.
Application:	Fixed-wing airtanker, SEATS, helicopter bucket, and ground-based fire apparatus.
Use level:	Proper salt content is achieved when 1.68 pounds (lbs) of FR-100 is mixed with 1 gallon (gal) of water to produce 1.10 gal of mixed retardant. Each gallon of mixed retardant contains 1.52 lbs of FR-100 product concentrate.
Yield:	1 ton of dry concentrate yields 1313 gallons of mixed retardant.
Viscosity:	401 – 800 centipoise (cP) Field measurement (Marsh Funnel): A flow-through time of 19 – 27 seconds using the Low Viscosity Marsh Funnel with 7/16 inch tip indicates an acceptable viscosity.
Salt content:	Field measurement (refractometer): A reading of 16.5 indicates proper salt content. A reading between 14.8 and 18.0 indicates an acceptable salt content.
Specific weight:	9.08 lb/gal for mixed retardant; equivalent to a density of 1.088 g/mL. At 70°F, a density between 1.079 and 1.097 indicates an acceptable salt content. This is equivalent to 9.00 lb/gal – 9.15 lb/gal. At higher temperatures, the specific weight is affected. If a freshly mixed batch is being loaded different densities are expected. At 100°F, the expected density range would be between 1.073 g/mL and 1.089 g/mL. This is equivalent to 8.96 lb/gal – 9.09 lb/gal. Please refer to the graph on the next page to correct for temperature when evaluating density.

