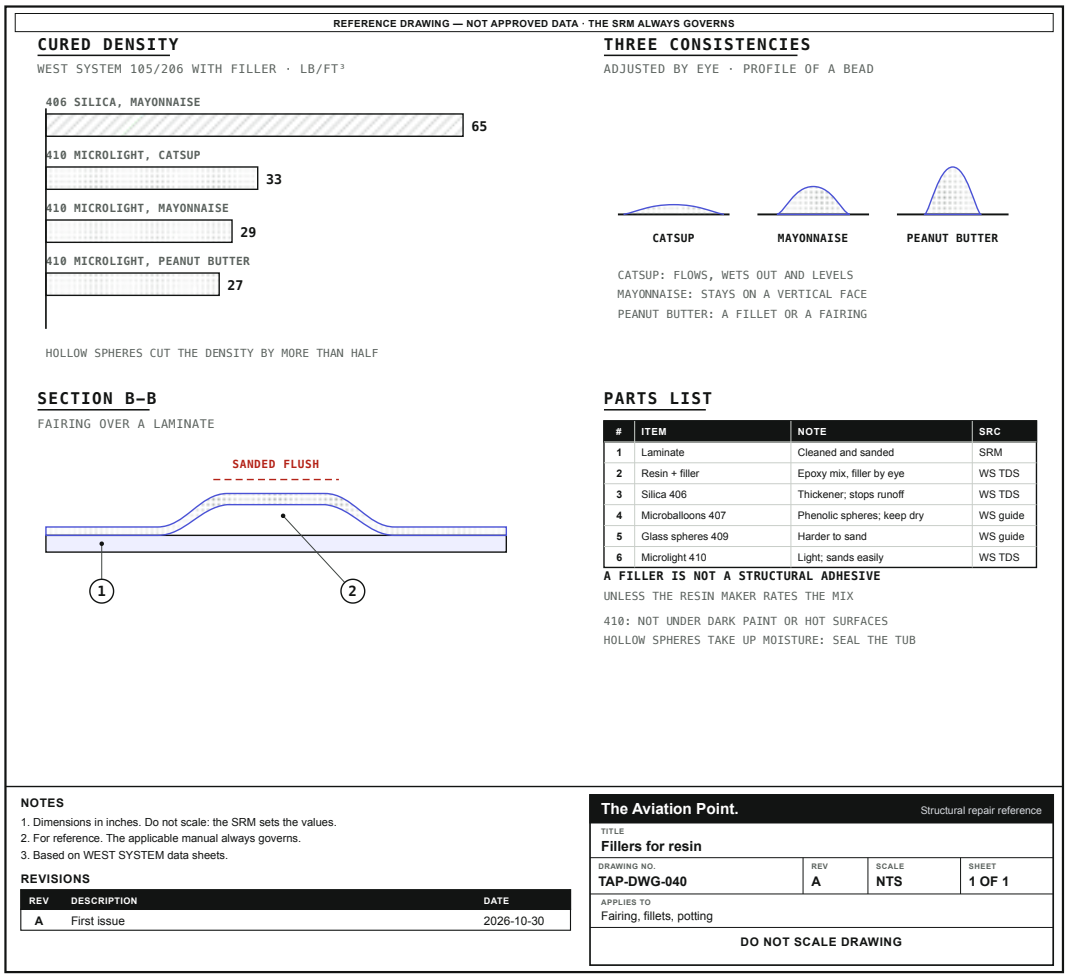
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Fillers: Microballoons and Colloidal Silica

Silica · hollow spheres · fibres · consistency



Cured density and consistency profiles after the WEST SYSTEM 406 and 410 data sheets, with parts list.

The common fillers

Filler	What it is	What it does to the mix	Typical use
Colloidal silica (406)	Silicon dioxide powder; bulk density about 50 g/L	Thickens and controls viscosity; stops runoff on vertical and overhead joints; raises abrasion resistance. The most versatile filler	Bonding, gap filling, fillets; blended with other fillers in fairing mixes
Microfibres (403)	Milled cotton fibre	Holds resin in the joint, so porous surfaces do not starve it	Bonding wood and glass fibre; gap filling
High-density filler (404)	Mineral powder	For the highest properties where hardware is bonded under cyclic load	Bonding hardware; strong fillets
Filleting blend (405)	Wood pulp fibre, brown	Smooth fillets that need little sanding; colours other fillers	Fillets on wood with a natural finish
Low-density filler (407)	Phenolic microballoons, about 50 microns; bulk density about 100 g/L	Lower density; cosmetic fillets and fills; takes up moisture, so keep the tub airtight	Fillets and fairing; softer adhesives only
Microspheres (409)	Hollow glass spheres, 40 to 80 microns	Lower density, but harder; the mix is noticeably harder to sand	Fairing where hardness matters
Microlight (410)	Hollow glass spheres, about 50 g/L	Lightest; mixes easily and is about 30 % easier to sand than 407; feathers to a fine edge	Fairing large areas. Not under dark paint or on hot surfaces

What it does to the cured weight

Mix (105 resin / 206 hardener)	Cured density	Notes
406 colloidal silica, mayonnaise	65 lb/ft³	Shore D hardness 80; compression strength 8,500 psi (406 data sheet)
410 Microlight, catsup	33 lb/ft³ (0.53 g/cm³)	410 data sheet
410 Microlight, mayonnaise	29 lb/ft³ (0.46 g/cm³)	410 data sheet
410 Microlight, peanut butter	27 lb/ft³ (0.43 g/cm³)	Sands and carves like basswood (410 data sheet)

Educational reference only, not approved data. Always consult the applicable SRM, AMM, or AC 43.13-1B and your certifying authority.

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Key points

- **A filler changes the mix, not the strength.**
- **Silica** thickens and stops runoff; **hollow spheres** lighten and fair; **fibres** hold resin in a gap.
- **Consistency by eye:** catsup, mayonnaise, peanut butter. No fixed ratio.
- **Cured density:** 65 lb/ft³ (silica) against 27 to 33 (Microlight).
- **Keep spheres dry**; Microlight not under dark paint or on hot surfaces.
- **Aircraft work:** only the mix the SRM or the resin maker allows.

Step by step

1. Mix resin and hardener to the ratio.
2. Add the filler to the consistency.
3. Apply within the pot life.
4. Cure; sand; check balance if on a control surface.

SOURCES · WEST SYSTEM, Filler Descriptions and Uses, Version A · WEST SYSTEM, 406 Colloidal Silica Technical Data Sheet · WEST SYSTEM, 410 Microlight Filler Technical Data Sheet · FAA-H-8083-31B, AMT Handbook — Airframe, Volume 1, Chapter 7

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