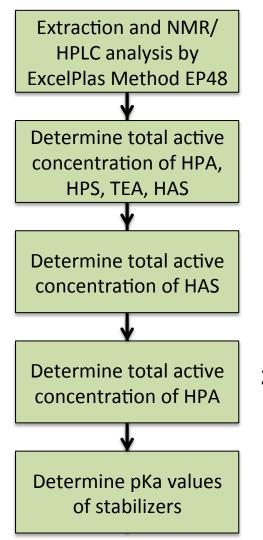
DEFORMULATION OF GMB TO DETERMINE FITNESS FOR PURPOSE FOR SPECIFIC SERVICE ENVIRONMENTS



Reverse Engineering of the additive package of the GMB using quantitative **NMR/HPLC** to determine all additives and their levels

Best practice GMB should contain greater than **5000 ppm** total active antioxidant and stabilizer concentration (gateway 1)

Best practice GMB should contain greater than **3000 ppm** total active high MW hindered amine stabilizer concentration (gateway 2)

Best practice GMB should contain greater than

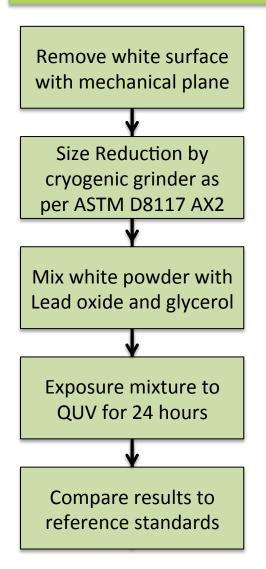
2000 ppm total active hindered phenolic antioxidant

concentration (gateway 3)

Compare the **pKa values** of the detected stabilizers as measured by Destro and Guo with pH of intended service environment (gateway 4)



DEFORMULATION OF WHITE GMB TO DETERMINE FITNESS FOR PURPOSE FOR SPECIFIC SERVICE ENVIRONMENTS



Challenge testing of titanium dioxide white pigment to determine level of photopassivation and photo-durability

Microgrinding of the white layer in Wiley mill to liberate the titanium dioxide (coated rutile)

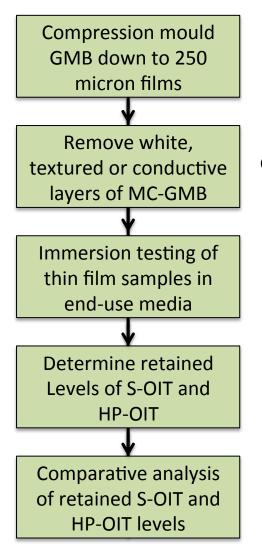
Prepare polymer surrogate for UV exposure using ExcelPlas method EP76 based on Scheirs CFAP book pp. 504-506

Measure degree of darkening of mixture. The greater the retention of whiteness, the higher the photo-durability and passivation of the rutile

Compare the degree of whiteness with DuPont reference standards for durable grade of coated rutile pigments



THIN FILM IMMERSION (TFI) TESTING OF GMB TO DETERMINE FITNESS FOR PURPOSE FOR SPECIFIC SERVICE ENVIRONMENTS



Grind and compression mold the GMB down to uniformly thin 250 micron films by compression moulding with metal shims

Grind and compression mold the white, textured or conductive layers down to uniformly thin 250 micron films by compression moulding with shims

Use ExcelPlas Method EP62 for immersion testing of thin film samples (to achieve 10X accelerated testing) at 85 deg.C (to achieve 16X accelerated testing) in intended end-use liquor media environment

Determine levels of retained S-OIT and retained HP-OIT after 2 weeks and 4 weeks immersion to determine relative retention of HPA and HAS

Compare the retained S-OIT and HP-OIT levels to each other and known 'best practice' reference standards of GMB samples

