泛华化学
INTER-CHINA CHEMICAL

TITANIUM DIOXIDE FOR COATINGS | TECHNICAL REPORT

CR-85
Acrylic Coating
Application Performance Report

Formulation evaluation of hiding, tinting strength and gloss

Coating application illustration

Test date: 6 January 2024

Version 1 | 2025

Performance Summary and Test Conditions

Six samples compared in the same acrylic formulations

CR-85 combines competitive hiding, tinting strength and gloss in this acrylic coating test set. Its white-paint contrast ratio of 93.2% ranks joint second among six samples. Grey-paint relative tinting strength is joint highest at 100.0%, while white-paint 20° gloss is 69. These results support screening CR-85 where hiding, tinting performance and film gloss matter together.

Property	CR-85	Five-benchmark range
White-paint contrast ratio (%)	93.2	92.5–93.4
Grey-paint relative tinting strength (%)	100.0	96.3–100.0
White-paint 20° gloss	69	61–71

Formulation and preparation

Item	Conditions
White paint	Thermoplastic acrylic resin solution, 27% solids; TiO_2; PVC = 16%.
Grey paint	Thermoplastic acrylic resin solution, 33% solids; TiO_2 and black colorant paste; PVC = 15%.
Preparation	Shake and grind with glass beads to slurry fineness below 10 µm. Apply with an automatic coater and 100 µm wet-film applicator; test after air drying.
Color measurement equipment	Datacolor® 600 spectrophotometer

Comparison basis

Benchmark A–E identify five commercial comparison samples consistently throughout this report. Rankings apply only to the measured results in this set; small numerical differences do not establish statistical significance. White and grey paints use different formulations and are evaluated separately.

White Paint Hiding and Gloss

PVC = 16% | Thermoplastic acrylic white paint

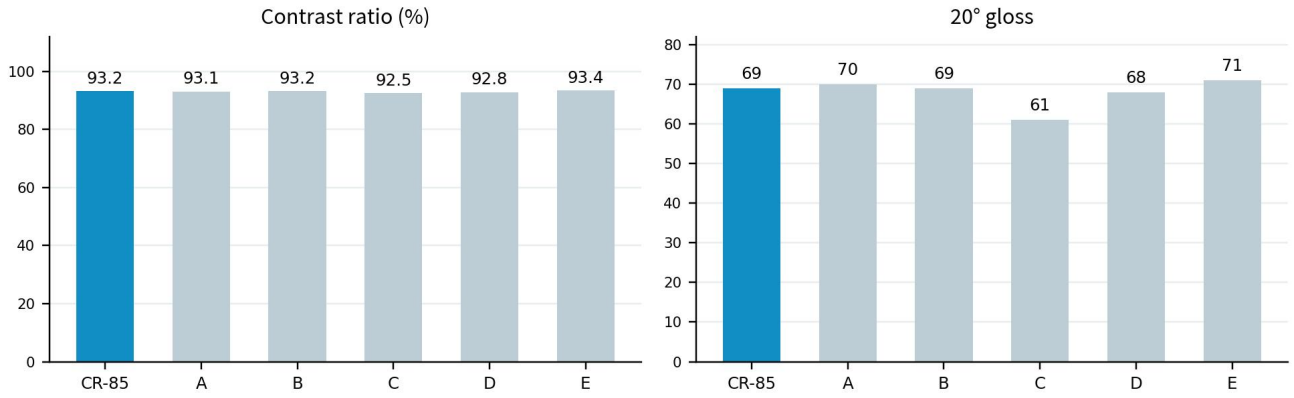

Figure 1 Measured results in the same formulation

Property	CR-85	A	B	C	D	E
Contrast ratio (%)	93.2	93.1	93.2	92.5	92.8	93.4
20° gloss	69	70	69	61	68	71
L*	97.48	97.50	97.46	97.37	97.51	97.65
a*	-0.39	-0.37	-0.35	-0.38	-0.33	-0.44
b*	0.57	0.38	0.47	0.54	0.36	0.48

Interpretation

CR-85 and Benchmark B both give a contrast ratio of 93.2%, 0.2 percentage points below the highest value of 93.4%. Its 20° gloss of 69 also matches Benchmark B and lies toward the upper end of the 61–71 range. Together, these results are relevant to white-paint selection balancing hiding and gloss.

CR-85 has L* = 97.48. Its b* of 0.57 is the highest positive b* in this set, indicating a relatively yellower shade. Formulations targeting low yellowness or a cool white should be color-matched to the required shade.

Grey Paint Tinting Strength and Shade

PVC = 15% | Thermoplastic acrylic grey paint

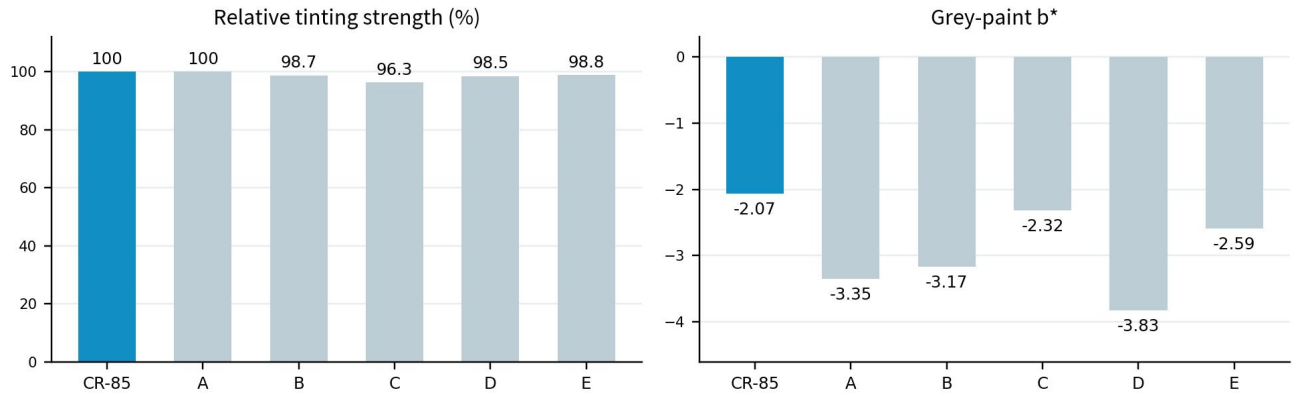

Figure 2 Measured results in the same formulation

Property	CR-85	A	B	C	D	E
Relative tinting strength (%)	100.0	100.0	98.7	96.3	98.5	98.8
L*	61.96	61.95	61.63	60.96	61.54	61.73
a*	-0.82	-1.02	-0.98	-0.82	-1.09	-0.93
b*	-2.07	-3.35	-3.17	-2.32	-3.83	-2.59
Undertone value	-18.22	-21.59	-21.12	-18.93	-22.90	-19.61

Interpretation

CR-85 gives a relative tinting strength of 100.0%, joint highest with Benchmark A; the other four benchmarks range from 96.3% to 98.8%. This indicates competitive tinting performance in this grey-paint formulation, but cannot be directly converted into a TiO_2 dosage reduction.

Grey-paint b* is −2.07, closest to zero in the set and therefore less blue than all five benchmarks. The reported undertone value is −18.22. CR-85 selection should emphasize tinting performance alongside hiding and gloss; strong blue-undertone targets require separate shade validation.

Conventional Properties and Application Selection

Distinguishing conventional tests from formulation performance

Property	CR-85	A	B	C	D	E
Conventional relative tinting strength (%)	116	126	121	119	125	122
Oil absorption (g/100 g)	18.2	18.6	14.6	15.8	15.1	16.9
Dispersion fineness in alkyd resin (μm)	10.0	10.0	10.0	12.5	12.5	10.0

CR-85 has a conventional relative tinting strength of 116, below the benchmark range of 119–126, while its acrylic grey-paint relative tinting strength is 100.0%. These are different tests: their numerical values are not directly comparable and neither substitutes for the other. Coating selection should incorporate actual formulation results.

Oil absorption is 18.2 g/100 g, toward the higher end of this set. Check wetting, viscosity and dispersant demand in the customer formulation. Dispersion fineness is 10.0 μm in alkyd resin; that result applies to the tested alkyd system.

Recommended evaluation focus

Prioritize screening in acrylic coatings requiring a balance of white-paint hiding, grey-paint tinting strength and film gloss. Conduct substitution trials at consistent TiO_2 loading, resin system, dispersion process and film thickness, while checking target shade, viscosity and application behavior.

Customer validation priorities

For white paint, confirm contrast ratio, 20° gloss and yellow–blue shade. For tinted paint, confirm tinting strength and color match. Recheck film properties after adjusting dispersant or resin levels; a single property should not determine the substitution ratio.

Data source: six-sample comparison dated 6 January 2024, covering conventional tests and acrylic white and grey paints.

Technical note: Results apply to the tested samples and stated conditions. They do not establish weatherability, durability or cost savings. Actual performance depends on formulation and processing; supply quality is governed by agreed specifications and contract.