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# VANDERBILT

## Laboratory Report

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**PAINT LAB REPORT** No. 3788-14

**TITLE:** VANSIL® W 30 Wollastonite for TiO<sub>2</sub> Spacing in an Interior Latex Flat Paint

**INTRODUCTION:** Various levels of **VANSIL W 30**, a 4 Hegman fineness platy talc or blends of the two minerals were tested as TiO<sub>2</sub> spacers in an interior latex flat paint formula. 50/50 blends were found to maximize the positive aspects of each mineral and minimize the negative ones.

**DISCUSSION and RESULTS:** Every inert filler brings a unique set of properties to the coatings to which it is added. Talc is known to be an effective TiO<sub>2</sub> spacer in latex paints, but because of its softness, talc-filled paint can have low scrub resistance. Wollastonite, being significantly harder than talc, contributes to improved scrub resistance, but optical properties may suffer. The NYTAL® products have been found over the years to offer the best of both worlds because of their unique multi-morphous mix of hard and soft minerals. With regard to the replacement of NYTAL products,

R.T. Vanderbilt Company has recommended the blending of talc and wollastonite to somewhat replicate this multi-morphous mineral mix. In the current study, a series of interior latex flat paints was prepared with various amounts of **VANSIL W 30** or a 4 Hegman fineness platy talc, such as Talcron 35 LOA from Specialty Minerals, Inc., or 50/50 blends of each. For each paint type, three levels of TiO<sub>2</sub> and inert filler were employed. The trials were as follows:

Formula Number	TRIAL Number	Gallons TiO <sub>2</sub>	Gallons VANSIL W 30	Gallons Talcron® 35 LOA talc
112908 A	I	3.8	0.0	7.8
112908 B	II	3.0	0.0	8.6
112908 C	III	2.3	0.0	9.2
112908 D	IV	3.8	7.8	0.0
112908 E	V	3.0	8.6	0.0
112908 F	VI	2.3	9.2	0.0
112908 G	VII	3.8	3.9	3.9
112908 H	VIII	3.0	4.3	4.3
112908 I	IX	2.3	4.6	4.6

See Table 1 for the formulas as run.

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The paints were tested for viscosity, Hegman fineness, dry brightness, L a b color, gloss, opacity, scrub resistance and ASTM Hiding Power. The results are given in Tables 2 and 3 and the accompanying graphs. As anticipated, blending the two minerals took advantage of the strong points of each mineral and minimized the weaknesses. The following observations were made:

- 1) Hegman fineness: All paints were at 5.
- 2) Viscosity: Paints made with Talcron<sup>®</sup> 35 LOA had lower viscosity than those made with **VANSIL W 30**. The viscosity of the paints made with blends of both minerals was higher than that of the paints made with each mineral alone. This could be a result of the finer talc particles packing between the larger wollastonite particles.
- 3) Dry Brightness: The brightness of the paints was not affected by the specific TiO<sub>2</sub> spacer. The quantity of TiO<sub>2</sub> had more effect on the brightness than the particular inert filler. The paints made with blends had a slightly lower brightness than those made with each mineral alone.
- 4) Gloss: Paints made with **VANSIL W 30** had lower 85° sheen than those made with Talcron 35 LOA. The 85° sheen of paints made with blends was slightly higher than that of paints made with **VANSIL W 30**, but lower than that of paints made with Talcron 35 LOA.
- 5) Scrub Resistance: Paints made with **VANSIL W 30** had significantly better scrub resistance than those made with Talcron 35 LOA. The scrub resistance of paints made with blends was worse than that of paints made with **VANSIL W 30**, but better than that of paints made with Talcron 35 LOA.
- 6) ASTM Hiding Power: Paints made with Talcron 35 LOA had higher spreading rates than those made with **VANSIL W 30**. The Hiding Power of paints made with blends was worse than that of paints made with Talcron 35 LOA, but better than that of paints made with **VANSIL W 30**.

These results show that blends of the fillers **VANSIL W 30** and Talcron 35 LOA in an interior latex flat paint can yield the good TiO<sub>2</sub> spacing and hiding power of Talcron 35 LOA and the good low angle sheen and scrub resistance of **VANSIL W 30**.

**EXPERIMENTAL:** The interior latex flat paints were prepared according to the formulas given in Table 1. The paints were tested for Hegman fineness, Stormer viscosity and Brookfield viscosity. Drawdowns were made onto plain white cards at 8 mil clearance and dried at ambient conditions. G. E. Brightness, L a b color and gloss were measured. Drawdowns were made at 4 mil, 6 mil and 8 mil clearance onto black and white opacity cards and air dried at ambient conditions. Opacity was measured as the ratio of the brightness over the black area to the brightness over the white area. Scrub Resistance was measured according to ASTM D 2486-06 on 8 mil clearance drawdowns. Hiding Power was measured according to ASTM D 2805-96a.

**CONCLUSION:** This study shows that blends of **VANSIL W 30** and 4 Hegman fineness platy talc such as Talcron 35 LOA can give improved performance to an interior latex flat paint, as compared to either mineral alone.

**Trademarks:**

VANSIL is a registered trademark of R.T. Vanderbilt Company, Inc.

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Optiflo is a registered trademark of Southern Clay Products, Inc.

Satinone is a registered trademark of BASF Catalysts LLC.

Talcron is a registered trademark of Minerals Technologies Inc.

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Ti-Pure is a registered trademark of E.I. du Pont de Nemours & Company.

UCAR is a registered trademark of Union Carbide Chemicals & Plastics Technology Corporation.

Table 1  
**Formula 112908**  
**50 PVC Interior Latex Flat Paint**  
**TiO<sub>2</sub> Spacing Study**

	112908 A TRIAL I		112908 B TRIAL II		112908 C TRIAL III		112908 D TRIAL IV		112908 E TRIAL V		112908 F TRIAL VI	
	pounds	gallons	pounds	gallons	pounds	gallons	pounds	gallons	pounds	gallons	pounds	gallons
<b>DISPERSION</b>												
2% Cellosize <sup>®</sup> QP 4400 <sup>1</sup>	202.0	24.1	202.0	24.1	202.0	24.1	202.0	24.1	202.0	24.1	202.0	24.1
Drewplus <sup>®</sup> L 475 <sup>2</sup>	2.0	0.3	2.0	0.3	2.0	0.3	2.0	0.3	2.0	0.3	2.0	0.3
DARVAN <sup>®</sup> 7N <sup>3</sup>	10.0	1.0	10.0	1.0	10.0	1.0	10.0	1.0	10.0	1.0	10.0	1.0
Triton <sup>®</sup> CF 10 <sup>1</sup>	2.0	0.2	2.0	0.2	2.0	0.2	2.0	0.2	2.0	0.2	2.0	0.2
Ti-Pure <sup>®</sup> R 706 <sup>4</sup>	125.0	3.8	100.0	3.0	75.0	2.3	125.0	3.8	100.0	3.0	75.0	2.3
Satintone <sup>®</sup> W <sup>5</sup>	150.0	6.9	150.0	6.9	150.0	6.9	150.0	6.9	150.0	6.9	150.0	6.9
VANSIL <sup>®</sup> W 30 <sup>3</sup>	0.0	0.0	0.0	0.0	0.0	0.0	185.0	7.8	205.0	8.6	220.0	9.2
Talcron <sup>®</sup> 35 LOA talc <sup>6</sup>	185.0	7.8	205.0	8.6	220.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0
<i>Disperse at high speed for 15 minutes. Reduce speed for let down.</i>												
<b>LET DOWN</b>												
Water	80.0	9.6	80.0	9.6	80.0	9.6	80.0	9.6	80.0	9.6	80.0	9.6
Drewplus L 475	2.0	0.2	2.0	0.2	2.0	0.2	2.0	0.2	2.0	0.2	2.0	0.2
UCAR <sup>®</sup> 300 Latex <sup>7</sup>	315.0	35.5	315.0	35.5	315.0	35.5	315.0	35.5	315.0	35.5	315.0	35.5
<i>Preblend next two items and add:</i>												
Water	80.0	9.6	80.0	9.6	80.0	9.6	80.0	9.6	80.0	9.6	80.0	9.6
Optiflo <sup>®</sup> H 370 <sup>8</sup>	15.0	1.0	15.0	1.0	15.0	1.0	15.0	1.0	15.0	1.0	15.0	1.0
<i>Mix at slow speed for 10 minutes.</i>												
<b>Totals</b>	1168.0	100.0	1163.0	100.0	1153.0	99.9	1168.0	100.0	1163.0	100.0	1153.0	99.9
<b>PAINT PROPERTIES</b>												
Weight per gallon		11.7		11.6		11.5		11.7		11.6		11.5
% Solids	by weight	54.6		54.4		54.0		54.6		54.4		54.0
	by volume	37.2		37.2		37.2		37.2		37.2		37.2
PVC		50		50		50		50		50		50
Pigment to binder ratio		2.66:1		2.63:1		2.57:1		2.66:1		2.63:1		2.57:1
Calculated VOC	lbs/gal	0		0		0		0		0		0
	g/L	0		0		0		0		0		0

**Raw Material Suppliers**

- <sup>1</sup> Dow Chemical Company, Midland, MI
- <sup>2</sup> Ashland Specialty Chemical Company, Columbus, OH
- <sup>3</sup> R.T. Vanderbilt Company, Inc., Norwalk, CT
- <sup>4</sup> E.I. du Pont de Nemours & Company, Wilmington, DE
- <sup>5</sup> BASF, Florham Park, NJ
- <sup>6</sup> Specialty Minerals, Inc., Barretts, MT
- <sup>7</sup> Arkema Emulsion Systems, Cary, NC
- <sup>8</sup> Southern Clay Products, Austin, TX

**Registered Trademarks**

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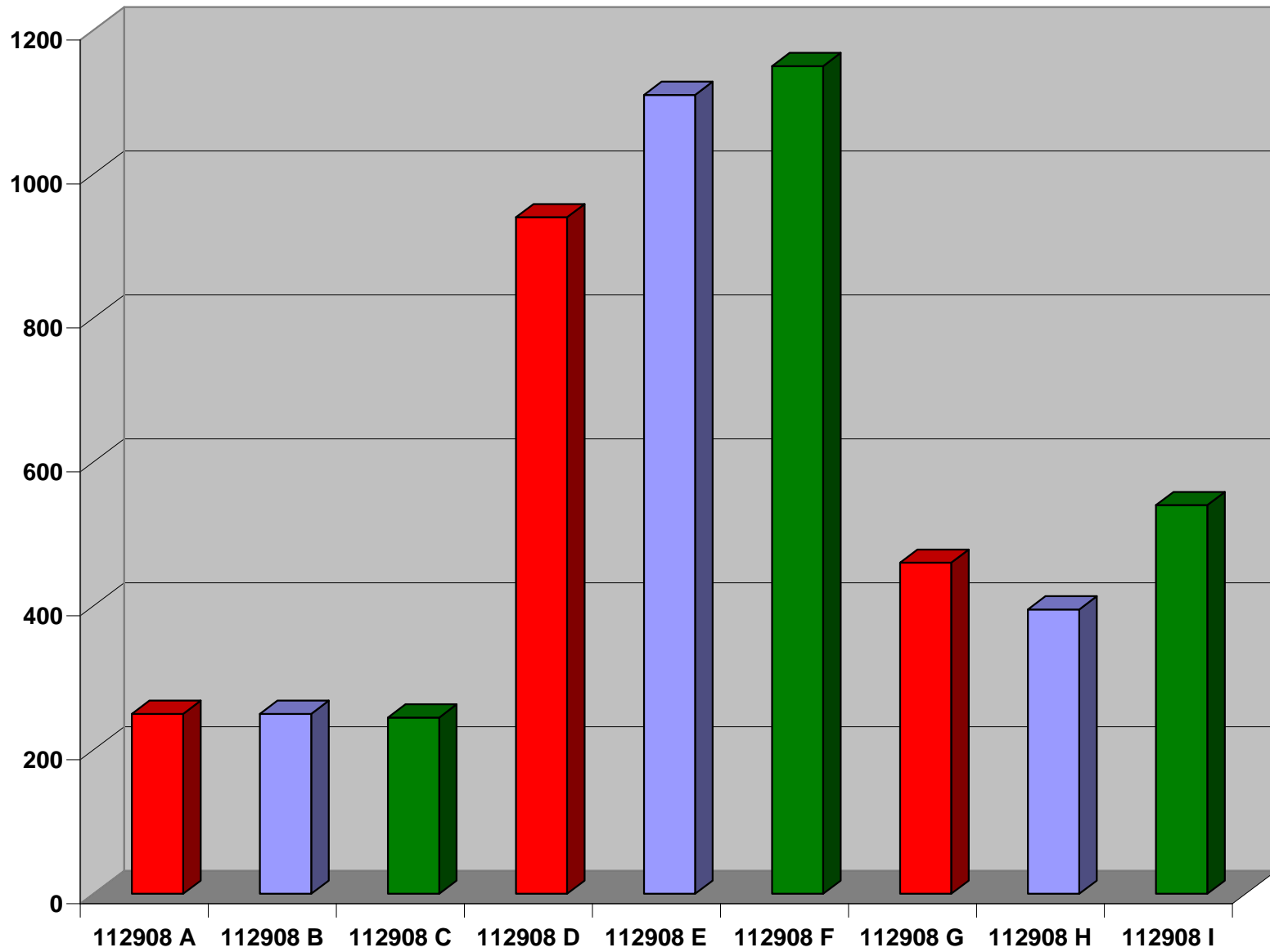
Table 1 (con't)  
**Formula 112908**  
**50 PVC Interior Latex Flat Paint**  
**TiO<sub>2</sub> Spacing Study**

	112908 G TRIAL VII		112908 H TRIAL VIII		112908 I TRIAL IX	
	pounds	gallons	pounds	gallons	pounds	gallons
<b>DISPERSION</b>						
2% Cellosize <sup>®</sup> QP 4400	202.0	24.1	202.0	24.1	202.0	24.1
Drewplus <sup>®</sup> L 475	2.0	0.3	2.0	0.3	2.0	0.3
DARVAN <sup>®</sup> 7N	10.0	1.0	10.0	1.0	10.0	1.0
Triton <sup>®</sup> CF 10	2.0	0.2	2.0	0.2	2.0	0.2
Ti-Pure <sup>®</sup> R 706	125.0	3.8	100.0	3.0	75.0	2.3
Satintone <sup>®</sup> W	150.0	6.9	150.0	6.9	150.0	6.9
VANSIL <sup>®</sup> W 30	94.0	3.9	104.0	4.3	113.0	4.6
Talcron <sup>®</sup> 35 LOA talc	91.0	3.9	100.0	4.3	108.0	4.6
<i>Disperse at high speed for 15 minutes. Reduce speed for let down..</i>						
<b>LET DOWN</b>						
Water	80.0	9.6	80.0	9.6	80.0	9.6
Drewplus L 475	2.0	0.2	2.0	0.2	2.0	0.2
UCAR <sup>®</sup> 300 Latex	315.0	35.5	315.0	35.5	315.0	35.5
<i>Preblend next two items and add:</i>						
Water	80.0	9.6	80.0	9.6	80.0	9.6
Optiflo <sup>®</sup> H 370	15.0	1.0	15.0	1.0	15.0	1.0
<i>Mix at slow speed for 10 minutes.</i>						
<b>Totals</b>	1168.0	100.0	1162.0	100.0	1154.0	99.9
<b>PAINT PROPERTIES</b>						
Weight per gallon		11.7	11.6		11.5	
% Solids	by weight	54.2	54.0		53.6	
	by volume	37.2	37.2		37.2	
PVC		50	50		50	
Pigment to binder ratio		2.66:1	2.62:1		2.58:1	
Calculated VOC	lbs/gal	0	0		0	
	g/L	0	0		0	

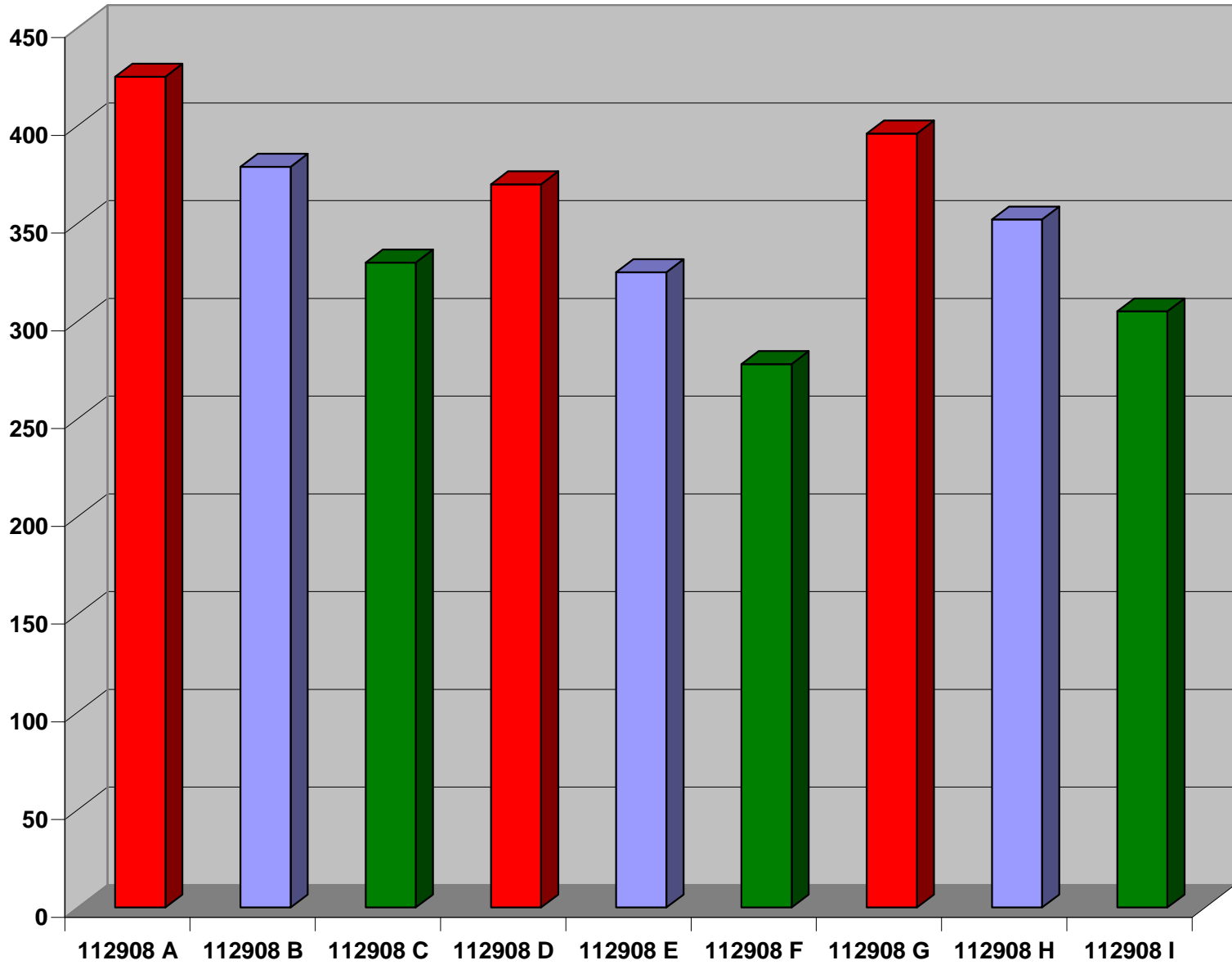




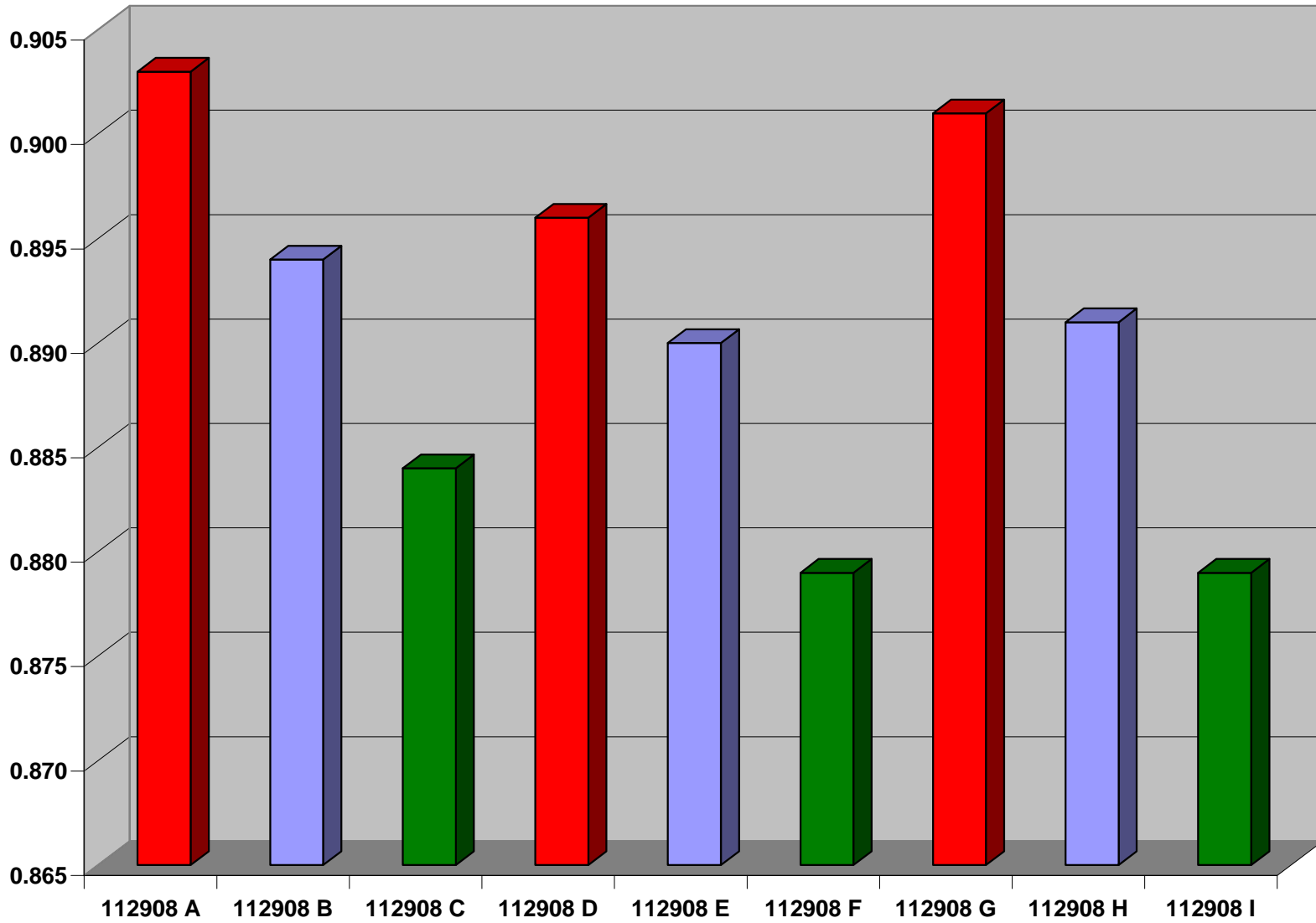
**Graph 1**  
**Scrub Resistance**



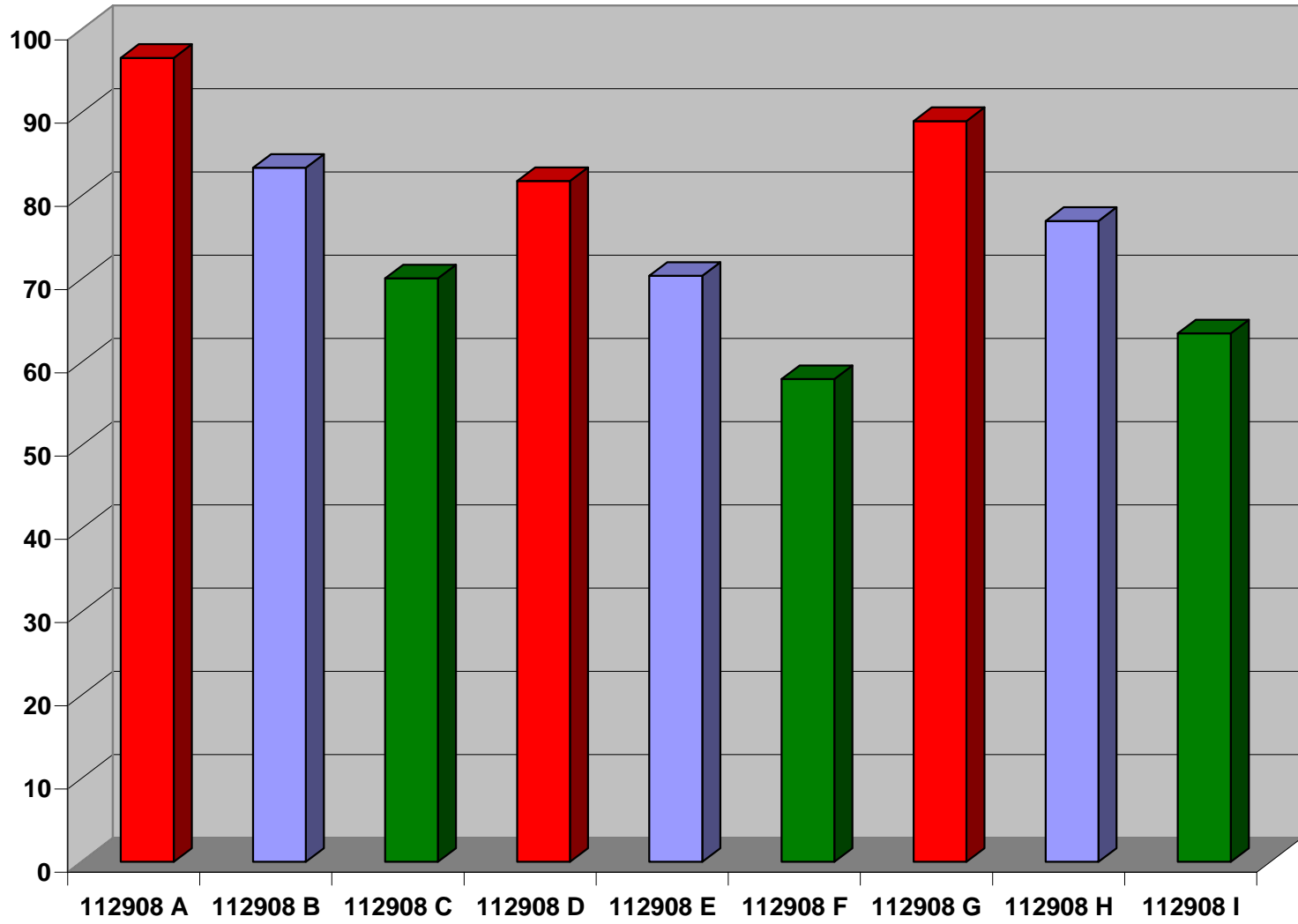
**Graph 2**  
**Hiding Power (ft<sup>2</sup>/gal)**



**Graph 3**  
**Reflectivity**



**Graph 4**  
**Scattering Coefficient**



**Graph 5**  
**Contrast Ratio**

