



Technical Bulletin

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ENERGY STAR APPROVAL

Fabral has Energy Star approval for every metal roofing product we make when it is produced using bare Galvalume or clear acrylic coated Galvalume. (We use clear acrylic coated Galvalume for all of our "unpainted" Galvalume.) We also have Energy Star approval on many of our standard colors for both our Architectural and our Wood Frame product offerings. Attached are summary pages showing all of our standard colors and several non-standard colors, the initial and aged reflectivity values and the initial emissivity values. Emissivity is not a requirement of the Energy Star program, but it is a requirement of several other programs, such as the LEED program. The emissivity values for our Energy Star approved colors have now been tested by the LEED required ASTM E408 test method. (LEED is addressed in Technical Bulletin 726)

The Energy Star program is an EPA program that is promoting highly reflective roofs. The theory is that roofs that reflect most of the solar energy will stay cooler and require less electricity for air conditioning. This, in turn, reduced the amount of electricity that must be produced, which reduces the amount of pollutants discharged into the air at the power plants. This is good for the environment and that's why the EPA is pushing it. Several states are beginning to mandate energy saving construction products, like this one. Notably, California and New York are leading the way. Other states will be following close behind. Architects are also beginning to ask about these issues and specify energy efficient products. This issue and recyclability are becoming more important every day. (Recyclability is addressed in Technical Bulletin 725.)

A new IRA homeowner energy credit went into effect in 2006 and will continue for the next 2 years. This credit is 10% of the material cost and applies to residential projects that use metal roofing that meets the Energy Star requirements, up to a \$500 credit. The credit does not apply to the installation costs; just the cost of the metal roofing material. Fabral has been granted approval of our Enduracote colors for any color that was approved using our Super Alurite paint system.

In order to qualify for Energy Star approval as a low slope roof product (2:12 pitch or less) the product must have an initial reflectance of 0.65 or higher and a reflectance of 0.50 or higher after 3 years. In order to qualify for Energy Star approval as a steep slope roof product (greater than 2:12 pitch) the product must have an initial reflectance of 0.25 or higher and a reflectance of 0.15 or higher after 3 years. The Galvalume producers ran the extensive series of tests on bare Galvalume to qualify for both the low and steep slope requirements. They have distributed this test report to anyone that wishes to get approval.

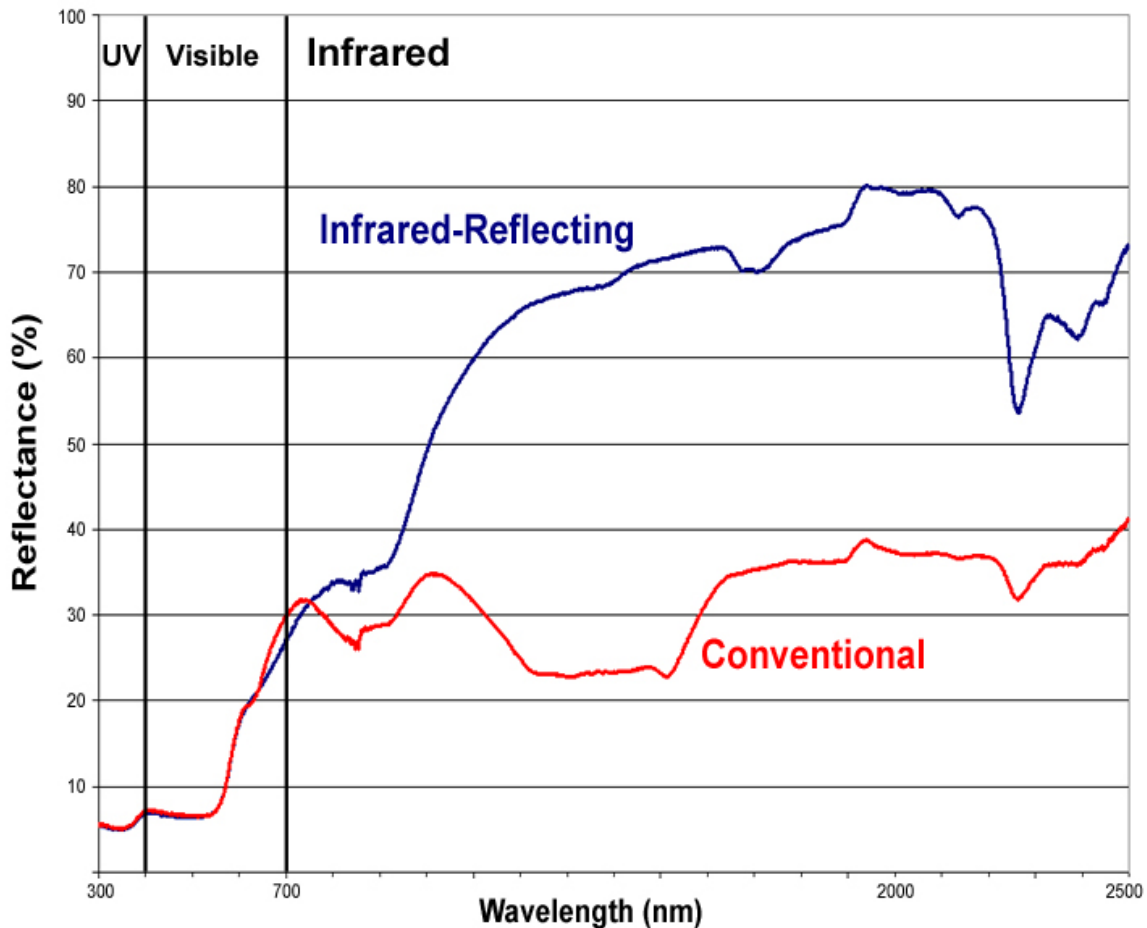
Fabral also has approval for many of our standard and special colors, which are shown on the attached lists. Please be aware that even though our Kynar colors Bone White and Regal White meet the more severe low slope reflectivity requirements, they were aged for 3 years at a 12:12 pitch. The Energy Star program requires they be aged at 2:12 or less. This is just a formality and these colors will certainly meet the aged requirements at 2:12 pitch, but they have not been tested that way so they are technically only Energy Star approved for steep slope use. Most Architects understand that these colors meet the intent of the low slope requirements and will use them for these applications. Our paint

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vendor is retesting these colors but we are 3 years away from having these aged values.

As you can see from the list, light colors are more reflective than dark colors. Darker colors absorb more solar energy, which heats up the panels and the living space inside the building and causes the air conditioner to work harder. Many Architects, however, prefer dark colored roofs which would have lower reflectivity values and not meet the Energy Star standards. This dilemma can be resolved by orders special paint colors with Infrared Reflective pigments. About half of the energy that strikes the earth is in the infrared range. These special pigments reflect more of the energy in that range while not impacting the visible light range significantly; therefore, not impacting the color we see. (See the chart below.) Both our paint vendors have specially formulated “cool colors” but none of them have been aged for 3 years so none are currently Energy Star approved. These colors are available as special colors.





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ARCHITECTURAL KYNAR COLORS 4/06/05

COLOR	Color Number	Initial Total Solar Reflectivity	3 Yr. Exposed Solar Reflectivity	Initial Emissivity	Energy Star Approved
APOTHECARY BLUE	V32	0.26	No Data	0.9	
BANNER RED	V93	0.48	0.47	0.9	YES
BONE WHITE	V03	0.65	0.66	0.9	YES
BRIGHT COPPER	V25	0.45	0.39	0.9	YES
BRIGHT SILVER	V26	0.57	0.58	0.8	YES
BURGUNDY	V24	0.25	0.24	0.9	YES
CHARCOAL GRAY	V06	0.10	No Data	0.9	
COLONIAL RED	V07	0.23	0.23	0.9	
DARK BRONZE	V09	0.07	0.07	0.9	
CLASSIC GREEN	V08	0.14	0.13	0.9	
HARTFORD GREEN	V10	0.09	0.09	0.9	
HEMLOCK GREEN	V11	0.21	0.20	0.9	
MANSARD BROWN	V27	0.08	0.08	0.9	
MATTE BLACK	V12	0.07	0.06	0.9	
MEDIUM BRONZE	V29	0.10	No Data	0.9	
MUSKET GRAY	V30	0.15	0.15	0.9	
OLD TOWN GRAY	V13	0.25	0.25	0.9	YES
PATINA GREEN	V14	0.26	0.27	0.9	YES
PEWTER	V40	0.23	No Data	0.9	
REGAL BLUE	V15	0.16	0.16	0.9	
REGAL WHITE	V38	0.68	0.68	0.9	YES
SANDSTONE	V17	0.51	0.51	0.9	YES
SEAL BROWN	V18	0.12	No Data	0.9	
SIERRA TAN	V70	0.38	0.39	0.9	YES
SLATE BLUE	V19	0.22	0.22	0.9	
SLATE GRAY	V20	0.22	0.22	0.9	
STONE WHITE	V31	0.62	0.61	0.9	YES
SURREY BEIGE	V21	0.41	0.41	0.9	YES
TEAL	V22	0.13	0.14	0.9	
TERRA COTTA	V23	0.38	0.37	0.9	YES
TURQUOISE	V28	0.20	No Data	0.9	
GALVALUME UNPAINTED		0.78	0.58	0.06	YES
GALVALUME / CLEAR COATED		0.68	0.55	0.08	YES

Note: Reflectivity tested by ASTM C1549 and Emissivity measured by ASTM E408 on all Energy Star approved colors and rounded to the nearest tenth. For non-Energy Star approved colors, Emissivity by ASTM C1371.



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SUPER ALURITE 2000 WOODFRAME COLORS 4/06/05

COLOR	Color Number	Initial Total Solar Reflectivity	3 Yr. Exposed Solar Reflectivity	Initial Emissivity	Energy Star Approved
BRIGHT WHITE	424	0.59	No Data	0.9	
EVERGREEN	574	0.14	No Data	0.9	
CHARCOAL	551	0.11	No Data	0.9	
CLASSIC BURGUNDY	553	0.10	No Data	0.9	
TAN	555	0.42	0.39	0.9	YES
COCOA BROWN	556	0.14	No Data	0.9	
DARK BROWN	559	0.09	No Data	0.9	
HICKORY MOSS	572	0.32	0.32	0.9	YES
BLACK	580	0.07	No Data	0.9	
IVORY	583	0.60	0.56	0.9	YES
CARIBBEAN BLUE	584	0.25	0.25	0.9	YES
LIGHTSTONE	588	0.47	0.48	0.9	YES
LIGHT GRAY	589	0.24	No Data	0.9	
PATINA GREEN	593	0.37	0.38	0.9	YES
BRICK RED	598	0.25	0.28	0.9	YES
WHITE	599	0.55	0.53	0.9	YES
BRIGHT RED	545	0.40	No Data	0.9	
ANTIQUE BRONZE	554	0.12	No Data	0.9	
DARK BLUE	558	0.16	No Data	0.9	
ASH GRAY	548	0.37	0.37	0.9	YES
WHITE	299	0.58	0.57	0.9	YES
POLAR WHITE	560	0.63	0.62	0.9	YES
GALVALUME UNPAINTED		0.78	0.58	0.06	YES
GALVALUME/ CLEAR COATED		0.68	0.55	0.08	YES

Emissivity measured by ASTM E408 and rounded to the nearest tenth.



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ENDURACOTE WOODFRAME COLORS 5/05/06

COLOR	Color Number	Initial Total Solar Reflectivity	3 Yr. Exposed Solar Reflectivity	Initial Emissivity	Energy Star Approved
BRIGHT WHITE	824	0.60	No Data	0.89	
EVERGREEN	875	0.25	No Data	0.89	
CHARCOAL	851	0.18	No Data	0.90	
CLASSIC BURGUNDY	853	0.19	No Data	0.88	
TAN	855	0.38	0.39*	0.90	YES
COCOA BROWN	856	0.20	No Data	0.90	
DARK BROWN	859	0.16	No Data	0.90	
HICKORY MOSS	870	0.36	0.32*	0.89	YES
BLACK	880	0.14	No Data	0.90	
IVORY	883	0.62	0.56*	0.89	YES
CARIBBEAN BLUE	881	0.27	0.25*	0.9	YES
LIGHTSTONE	887	0.51	0.48*	0.90	YES
LIGHT GRAY	889	0.31	No Data	0.89	
PATINA GREEN	893	0.38	0.38*	0.90	YES
BRICK RED	898	0.31	0.28*	0.90	YES
WHITE	899	0.54	0.53*	0.89	YES
BRIGHT RED	845	0.28	No Data	0.89	
ANTIQUE BRONZE	854	0.20	No Data	0.89	
GALLERY BLUE	826	0.12	No Data	0.90	
HARTFORD GREEN	821	0.09	No Data	0.91	
ASH GRAY	848	0.46	0.37*	0.91	YES
WHITE	299	0.58	0.57*	0.9	YES
POLAR WHITE	860	0.63	0.65*	0.89	YES
GALVALUME UNPAINTED		0.78	0.58	0.06	YES
GALVALUME/ CLEAR COATED		0.68	0.55	0.08	YES

* Note: Aged values approved based on 3 year aged values of Super Alurite equivalent colors. Emissivity measured by ASTM C1371.