

MANUFACTURER'S RECOMMENDATIONS FOR WALL AND ROOF SANDWICH PANELS IN DARK COLORS (GROUP III)

The product standard for sandwich panels EN 14509:2013 classifies facing colors into three groups and assigns them the following surface temperatures and light reflectance values (RG):

- **Group I – very light:** +55°C; RG > 75; standard RAL colors: 9010, 9002, 7035 and related RAL: 1013, 1015, 1016, 1018, 1026, 2007, 6019, 9001, 9003, 9016;
- **Group II – light:** +65°C; RG ≤ 74; standard RAL color: 9006 and related RAL: 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1011, 1012, 1014, 1017, 1019, 1020, 1021, 1023, 1024, 1027, 1028, 1032, 1033, 1034, 2000, 2001, 2003, 2004, 2005, 2008, 2009, 2010, 2011, 2012, 3012, 3014, 3015, 3017, 3018, 3022, 3024, 3026, 4003, 4005, 4009, 5012, 5014, 5015, 5018, 5024, 6011, 6013, 6017, 6018, 6021, 6027, 6033, 6034, 7000, 7001, 7002, 7003, 7004, 7023, 7030, 7032, 7033, 7034, 7036, 7037, 7038, 7040, 7042, 7044, 7045, 7046, 7047, 8001, 8003, 8023, 9018, 9022;
- **Group III – dark:** +80°C; R_g ≤ 39; standard RAL colors: 7016, 7024, 9007, 3009, 3011, 8004, 8017, 6029, 5010 and related RAL: 2002, 3000, 3001, 3002, 3003, 3004, 3005, 3007, 3013, 3016, 3020, 3027, 3031, 4001, 4002, 4004, 4006, 4007, 4008, 4010, 5000, 5001, 5002, 5003, 5004, 5005, 5007, 5008, 5009, 5011, 5013, 5017, 5019, 5020, 5021, 5022, 5023, 6000, 6001, 6002, 6003, 6005, 6006, 6007, 6008, 6010, 6012, 6014, 6015, 6016, 6020, 6022, 6024, 6025, 6026, 6028, 7005, 7006, 7008, 7009, 7011, 7012, 7013, 7015, 7021, 7022, 7026, 7031, 7039, 7043, 8000, 8002, 8007, 8008, 8011, 8012, 8015, 8016, 8019, 8022, 8024, 8025, 8028, 9004, 9005, 9007, 9011, 9017.

The standard classifies facing colors as variable climatic loads. The thermal load absorbed at the surface of steel facings coated in specific colors is transferred into mechanical stress throughout the panel. It is combined with structural loads. In certain conditions, **particularly for dark colors from Group III**, thermal loads may lead to spontaneous damage of sandwich panels, visible as buckling, waviness, or gas blisters.

The PIR foam core, which provides insulation and structural performance, is less elastic than the facings and does not respond identically under solar exposure, which may lead to delamination. This appears as gas blisters beneath the facing surface, caused by differences in thermal expansion between steel and foam and by the bimetal effect (temperature differences between external and internal facings), resulting from thermal work of the panels.

This information is provided **prior to order** placement, because color selection cannot be based only on aesthetic preference. Sandwich panels are composite construction materials, and the use of specific colors should always be preceded by a feasibility study and load analysis. The use of very light and light colors is strongly recommended. **The selection of dark colors involves a risk of buckling, waviness, and delamination**, which each customer should consider individually and consciously when deciding to purchase panels of such specification.

Additionally, please note that the optimal installation temperature for panels is from +5°C to +25°C (on the facing surface). Facings heated above this range produce a significant bimetal effect, causing the panel to bend toward the heated side and preventing proper joint assembly. Lower temperatures, in turn, cause a reduction in the total panel length, making the difference compared to summer conditions significant (an annual temperature range on the facing surface from -20°C to +80°C results in a length change of approximately 1 mm per 1 m of panel).

If bulging of the facing is observed on the façade, a hole should be drilled immediately using a metal drill bit (preferably HSS-G type N) with a diameter of 1.0–1.5 mm in the center of the visible blister. This can also be performed as a paid service. This reduces internal pressure, preventing further expansion and allowing the facing to return into contact with the core.

For roof panels, if delamination occurs, a separate repair procedure applies.

At the same time, please note that in accordance with the Europanels General Terms and Conditions of Sale, **warranty and liability do not apply to sandwich panels in dark colors that are damaged due to thermal expansion.**