Sandwich Panel Mechanical Strength

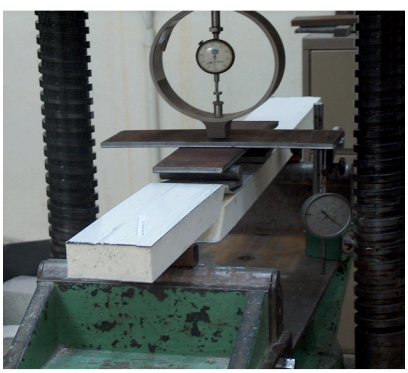
The quick assembly of the sandwich panels used as coating material in the roof, wall, interior or cold stores of the buildings, their high insulation specifications as well as bearing capacity, bring it to the front plan in architectural preferences. The factors such as self weight, wind load, snow load, temperature, etc. have separate or combined impact on the buildings. From ASSAN PANEL roof and wall system bearing tables, the products appropriate for meeting the requirements of all architectural projects can be selected.

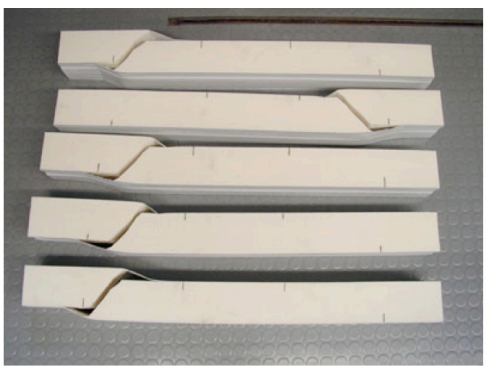
Since the sandwich panels are the composite materials formed of polyurethane filling material between two metals, their behavior against the loads to which they expose must be considered carefully. Although the metal surfaces and the polyurethane filling material have their own bearing capacity, they are even challenged to carry their own weights due to low elasticity module values. On the other hand, a new system having a better bearing capacity than every layer, is generated thanks to the composite high sliding and inclination strength. Due to the homogeneous distribution at the joints and the high adherence, only the metal surfaces meet the inclination moment and therefore directly affect the buckling on the surface. Most part of the sliding impact is met by the thicker filling material rather than metal surfaces. Therefore, the composite system provides advantages to sandwich panels thanks to its increasing sliding capacity. In conclusion, the corrugated sheet form of the panels and the strength of the filling material affect the bearing capacity

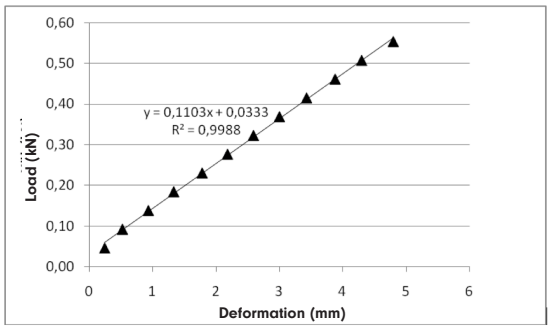
The mechanical strength at sandwich panels has been explained in details with test methods in **TSE EN 14509** (Double surface metal coating self-supporting insulation panels) standard;

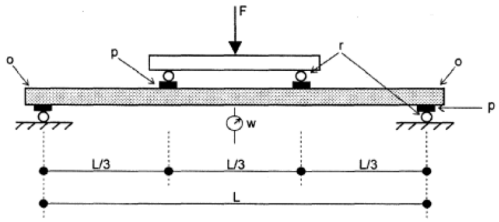
1. Sliding Strength and Sliding Module

A load-deformation diagram is drawn to determine the sliding strength and sliding module. The load and effective spans are determined as to realize the collapse in the core material.



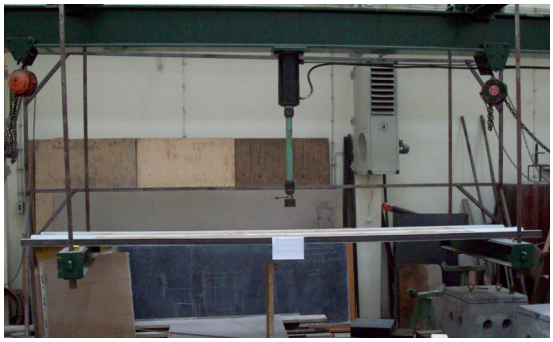


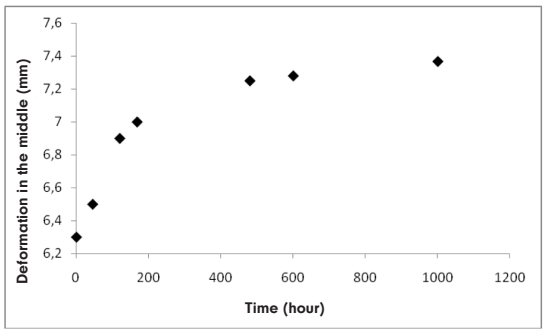




2. Swelling Coefficient

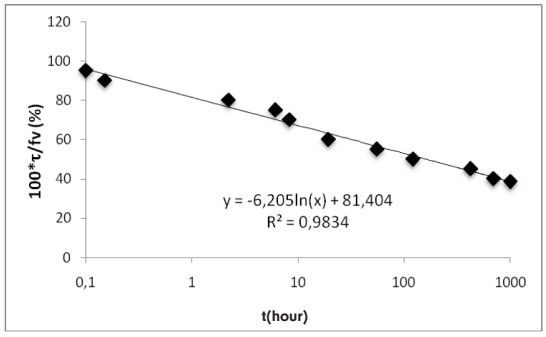
The swelling coefficient must be assigned for all panels that are used as roof or ceiling designed to carry the long-term or permanent loads such as the snow load and their own weight. The load value corresponding to the 30% to 40% of the average load causing the sliding collapse is applied to the system with two bearers and the deformation-time curve is drawn.





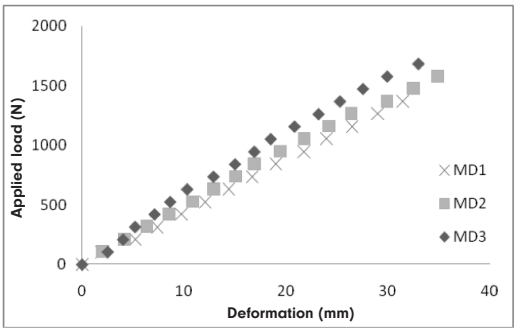
3. Sliding Strength After Long-Term Loading

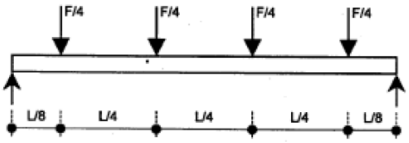
The regularly allocated loads are selected with at least 10 samples and the behavior of the collapse as a function of the time is drawn. The collapse times are recorded between the first 6 minutes to the 42nd day and the long-term sliding strength results of the material are obtained.



4. Inclination Moment Capacity and Torsion Stress

With this test method, the inclination strengths of the panels having adequate L span for the formation of the inclination collapse such as torsion, yield or surface distortion, etc. can be determined. The load-deformation curve is drawn. In the tests performed by placing bearer to the center, the inclination moment capacity is tried to be simulated at the systems with multi-span. The torsion stress of the plain or light profile surfaces or the torsion or yield stress of the profile surfaces can be determined with this calculation.



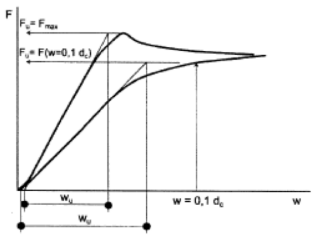


5. Pressure Strength and Tensile Strength

The vertical tensile strengths and the elasticity module of the core material under tensile are determined for panel surfaces. Through drawing the load-deplacement curve, the tensile strength is determined according to the final load, and by considering the final deplacement, the elasticity module is determined.

Furthermore, the pressure strengths of the core material and the elasticity module under pressure can be determined. By considering the final deplacement, the elasticity module under pressure can be determined.

- Compression Strength Test
- Tensile Strength Test



Assan Panel reserves the right to make changes in this file that has been issued for informative purposes.
Reference: 1. Assan Panel Studies 2. TSE EN 14509 /08.01.2009 3. Lightweight Sandwich Construction, J.M. Davies 4. Sandwich Panel Construction, Rolf Koschade 5. Durability Assessment of Sandwich Panel Construction, Dr. Lars Pfeiffer 6. İTÜ - Technical Report 2009 7. iS-mainz Publications 8. Practical Guide to EN 14509, Klaus Berner 9. Bayer Material Science Publications