



FIW München

Calibration of the lift-off technique for measuring the internal pressure of VIPs

Part 2: extension of the running project to develop the method and the boundary conditions for the measurement of fiber core VIPs with the foil lift-off technique

Project outline and cost estimate



Applicant: VIPA International
Avenue Jules Bordet 142
1140 Brussels

Project Partner: Forschungsinstitut für Wärmeschutz e.V. München
FIW München
Lochhamer Schlag 4
82166 Gräfelfing
Germany
Phone: +49 (0)89 85800-0
Fax: +49 (0)89 85800-40
info@fiw-muenchen.de

Project Management: Dipl.-Ing. Christoph Sprengard
Phone: +49 (0)89 85800-58
sprengard@fiw-muenchen.de

1 Background and Objectives

The foil lift-off technique is the most commonly used method or procedure used by manufacturers to determine the internal pressure of VIPs during and after the production process. It is used for more than a decade now without any evidence or comparison to a ***direct and calibrated measurement method***. In fact, nobody ever showed how close are the liftoff pressure readings to the actual internal pressure.

To date the foil lift-off technique is only possible for silica core VIPs. Cores made from glass fibers start to expand if the pressure in the surrounding chamber is lowered. This core expansion leads to a decrease of the internal pressure in the VIP due to an increase of the encapsulated volume.

Additionally the expansion rate, detected by the laser sensors, is similar to the change of the distance readings over time when reaching the same pressure in the chamber as in the VIP. As a result, the foil lift-off technique is not giving accurate (or not at all processible) readings of the internal pressure of the VIP (with fiber core).

FIW wants to investigate how the foil-lift-off method could be adapted for fiber-filled VIPs. The basic idea is to use a very small metering section and prevent expansion of the core by fixing the panels in a rigid frame / box (fixation from outside) and using a support construction (stiff plate) within the panel in the area of the metering section. The idea is based on the assumption that the size of the stiff plate within the panel should be larger than the metering section. The stiff plate will prevent the expansion of the fiber core within the metering section and will only allow the foil lift-off.

The purpose of this project is to

- 1. calibrate the readings of the liftoff units against calibrated pressure gauges for the first time for fiber filled panels and to***
- 2. describe a reliable procedure for deriving pressure results from the obtained measurement raw data (assessment and algorithm) for fiber filled panels***

2 Aims and benefits for VIPA members

- Higher confidence for manufacturers for their declaration of performance (liability aspects)
- Better accuracy and more experience for the testing method
- Better known relation to real internal pressure (better knowledge on own products)
- Correct values for internal pressure (and pressure increase over time) are the basis for durability calculations on their products
- Pre-normative research: influence the standardization process
- Technical data about equipment and measurement value acquisition (know-how on equipment and algorithms for automation)
- Basis for future development of internal pressure measurement techniques that could be applicable for fiber core panels as well

3 Cost estimation and time schedule

In order to be able to carry out the investigation properly, an amount of

€ 10,000-(net)

will be necessary for the above mentioned extension of the internal pressure study. Of course we are flexible to adjust the investigation program to the needs of the VIPA members. The investigations can be carried out starting March/April 2017. Time required to carry out the study is 4 months.

3.1 Terms of Payment

- 50 % at the start of the project
- 50 % after completion of the evaluation of the final report

3.2 Further conditions

3.2.1 Review

After submitting the final report VIPA has 2 weeks for review. Requested changes or comments will be applied to the report by FIW within reasonable time, not exceeding one month. After completion of this evaluation the second half of the payment is due.

3.2.2 Delays

If the deadline of (to be defined) cannot be met by FIW, a discount of 500 € for every month of delay will be granted. This term is only valid for delays caused by FIW. If force majeure delays are occurring FIW can request for extension of the project without granting aforementioned discount.

3.2.3 Termination

If severe breaches of the terms and conditions of this contract occur the contract can be terminated.
Possible payments can be reimbursed.

3.3 Arbitration clause

German law will be applicable to this contract. In the event of a dispute between parties that cannot be resolved through good faith negotiation, the dispute will be resolved under the arbitration of the registered Court of Amtsgericht München, VR 1925.

VAT-ID-No.: DE 129 515 824

FIW Munich

Friday, December 23, 2016



Christoph Sprengard