DYNASTEE
NEWSLETTER ISSUE 2026/25

Foreword

On 11 and 12 May, the second working meeting of IEA-EBC Annex 94: Validation and Verification of In-situ Building Energy Performance Measurement Techniques took place in Paris. As in previous Annexes 58 and 71, DYNASTEE supports Annex 94 through dissemination and the organisation of training events. Updates on the Annex 94 subtasks can be found in this Newsletter.

For the 12th time, we are organising the DYNASTEE Summer School in Almería (Spain) from 14 to 18 September 2026, where we will focus on the assessment of the Heat Transfer Coefficient (HTC) using measurement data from experiments. If you are, or know someone who might be interested, please refer to the announcement in this Newsletter and (pre-)register.

Adjacent to the third working meeting of Annex 94, which will be held in Madrid on 28 and 29 October 2026, we are organising a symposium on 27 October. The focus will be on novel building performance measurement. We hope to continue bringing together people from academia, industry, and policy to further advance building performance, so please feel welcome to attend the symposium!

Twan Rovers

IEA-EBC Annex 94 2nd working meeting at CSTB and Université Gustave Eiffel, Paris

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Announcement: DYNASTEE Summer School 2026
14–18 September 2026, Almeria, Spain

Dates: 14 – 18 September 2026 • **Venue**: University of Almería, Spain - CIESOL building • **Registration fee**: €500. Pre-registration is €150 • **Registration deadline**: 15 June 2026. For further information, visit: dynastee.info

For pre-registration. please fill in the online form: https://forms.gle/gAi4syDqihBWec3Q8

Information on payment, travelling and accommodation will be provided upon registration.

Feel free to contact mjose.jimenez@psa.es to be added to the mailing list and you will receive updates.

The Summer School (SS26) is organised in the framework of the IEA-EBC Annex 94: *Validation and verification of in-situ building energy performance measurement techniques*. The focus of SS26 will be on the assessment of the Heat Transfer Coefficient (HTC) using measurement data from experiments.

Audience. HTC could be a valuable metric for builders, designers, and other professionals. Using measurement data from dedicated experiments (such as the Aggregate Heat Loss test), but also monitoring data from test houses, case studies and large-scale measurement campaigns, the thermal performance of the building envelope can be determined.

The Summer School, as organised by DYNASTEE for more than 12 years, focuses on the assessment of the heat transfer of building components and whole buildings. DYNASTEE has developed tools and high-quality benchmark data to support the training of students and professionals.

What is new in the Summer School? First of all, the data that will be used. The training will discuss the quality of the data, e.g. what information is available of the thermal conditions of the building and hence, the various analysis methods that could be applied. Data from a well-controlled experiment will be used and studied in stepwise increasing complexity while taking into account the expected HTC value and uncertainty. Secondly, the analysis methods. Depending on the experimental conditions and data, the used methods will range from steady state methods based on average techniques or linear regression, to dynamic models.

Organisation. The five-day Summer School will take place at the University of Almería, in collaboration with the Spanish Centre for Energy, Environmental and Technological Research (CIEMAT). The course concept will remain the same as in previous years, which means that during the week about half of the time is devoted to lectures and the other half to performing exercises using benchmark data.

Several lecturers from different universities will present specific information on measurement conditions, equipment, standards, etc. In addition, several methods will be explained and, by using high quality data series, the practical side of the analysis will be demonstrated.

Further reading. HTC is a measure of the heat loss rate per degree temperature difference between inside and outside. It is expressed in units of Watts/Kelvin (or Celsius). The benchmark against which new techniques to determine the HTC are evaluated, is typically the Aggregate Heat Loss Test result. The standards EN 17887-1 and -2 prescribe the measurement methods and analysis techniques to be used for these experiments. The test comprises a quasi steady-state method of measuring the in-situ aggregate heat loss (both thermal envelope and air infiltration and exfiltration) in an unoccupied building. It involves the use of electric heaters to reach an elevated mean internal setpoint temperature over a specified period of time (typically a minimum of 15 days), while external climate conditions are also recorded.

Announcement of the CIEMAT – DYNASTEE Symposium on Thermal transfer of building envelopes; from different stakeholder perspectives towards energy efficient buildings.

When: Tuesday 27th October 2026, 9:30 - 16:30

Where: CIEMAT Madrid, Avenida Complutense, 40, 28040 Madrid

Language: English

The focus of this one-day event will be on novel building performance measurement with guest speakers from the EU and Spain to take us through the most innovative ways of measuring and analysing the energy performance of domestic and non-domestic buildings.

Apart from introductions of CIEMAT and the DYNASTEE Network, all IEA-EBC Annex 94 Subtasks (1 to 5) will contribute with a project progress presentation.

The Symposium topics will include the following:

- Novel measurement of whole house heat loss. What could be a feasible duration for on-site measurement and analysis of the Heat Transfer Coefficient (HTC)?
- Ongoing research on the Heat Transfer Coefficient with related research activities on the methods themselves and applications in the framework of research projects.
- What are HTC values useful for? And for whom; building design, energy providers?
- Implementation of EPBD recast
- Updates on latest EU and Spanish legislation, available guidance and standards around the EPBD
- Identify possible roles of experimental procedures in the implementation of the National Plan for Building Renovation by different stakeholders.

Preliminary programme

09:30 – Start

- Introduction by CIEMAT, DYNASTEE and Annex 94
- Annex 94 Subtask Leaders on project progress
- Three presentations from EU organisations (Ireland, UK and France)

12:30 – Lunch Break

14:00 – Afternoon Session

- Three to four presentations from governmental bodies on EPBD, certification, and industry and academic contributions
- Three to four presentations on applications and novelties

16:30 – End

During the coming months, there will be more detailed information on the DYNASTEE website.

The Symposium will be followed by the 3rd working meeting of IEA – EBC Annex 94 on 28-29 October.

A previous DYNASTEE Symposium was held on 28 April 2023, jointly organised by the University of Salford (UK), including a visit to the impressive Energy House 2.0. By organising this second Symposium at CIEMAT in Madrid on 27 October, DYNASTEE aims to continue bringing people together to build networks and to discuss some genuinely novel methods that are cost effective and beneficial for clients/ stakeholders in the construction industry. It is a great chance to hear about the latest developments in technology and methods of measuring building energy performance.

IEA-EBC Annex 94 subtask updates

Subtask 1

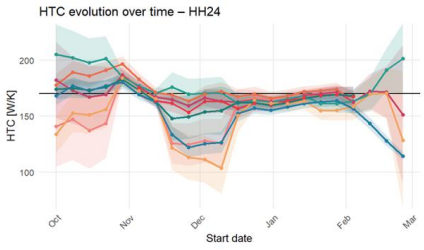
By Mark Collett & Liesje van Gelder

The IEA-EBC Annex 94 Stakeholder Survey *"How Do We Measure Up?"* closed on May 20 after collecting over 280 responses from 20 different countries and across a broad range of professions. We would like to thank readers of the DYNASTEE newsletter who completed the survey. Subtask 1 will now be focused on the analysis and write up of the responses to understand how measurements of building energy performance are practically being used by industry.

Subtask 2

By Katia Ritosa & María José Jiménez

The activities of Subtask 2 currently focus on investigating time as a critical variable in HTC estimation procedures. Recent studies indicate that HTC estimates exhibit seasonal variability, generally linked to underlying measurement conditions, with differences also arising from the choice of applied methods. Consequently, one of the key objectives of ST2 is to disentangle genuine variability in HTC from the uncertainty introduced by differing estimation methodologies. In parallel, ST2 is systematically evaluating the influence of analysis-related choices, including period selection, measurement frequency, and signal processing techniques, on the resulting HTC estimates. The figure which follows illustrates the temporal evolution of HTC over a single heating season, as modelled by multiple participants (different colours) applying different data filtering approaches, all using the Siviour model.



Subtask 3

By Sarah Juricic & Frances Hollick

What would future validation of HTC measurement methods look like?

Past benchmark tests comparing different HTC measurement methods have shown that test results don't systematically align. While slightly variable results may be expected, no consensus has been found on assessing and comparing unaligned test results. In addition, methods, whether they be from the industry or from academia, have been individually validated against heterogeneous experiences on different building types which prevents straightforward comparison.

Subtask 3 aims therefore at defining, providing and testing a common framework to compare and validate HTC measurement methods. First, a glossary of HTC, uncertainty and validation terms has been completed as to spread a common vocabulary among researchers and industry. A template has also been finalised to provide a common structure of test reporting and is currently being applied to existing commercialised methods. Three scientific papers are actively in preparation with (1) a longitudinal review of validation practices in our field and beyond, (2) a review and classification of sources of uncertainty and (3) a paper examining the critical issue of the existence and definition of an HTC ground truth. Next steps include

developing a library of use cases and exploring the feasibility of validation of an HTC measurement method based on its accuracy to predicting energy use.

Subtask 4

By Grant Henshaw & Richard Jack

Subtask 4 has developed a set of building pathology flowcharts that will be iteratively refined throughout the Annex to form a standardised diagnostic method. These flowcharts are designed to underpin a structured yet practical approach to diagnosing building performance issues, supporting users in identifying performance concerns, selecting appropriate diagnostic techniques, interpreting results, and ultimately informing remedial design. To develop the framework, the team has compiled a comprehensive catalogue of current building diagnostic methods. This includes key information on each method's outputs, accuracy, duration, and level of invasiveness, providing a consistent evidence base for structuring diagnostic decision pathways.

The current flowcharts cover four main domains: thermal performance, moisture and indoor air quality, overheating risk, and building system performance. Each diagnostic pathway is driven by defined threshold values; when these thresholds are exceeded, they indicate potential performance deficiencies and trigger appropriate in-situ diagnostic investigations to quantify and confirm issues. It is imagined that the threshold values could be set regionally to fit with local regulations, guidelines, and contexts. The diagnostic process is structured into five stages: survey, remote investigation, detailed investigation, remedial action, evaluation, and prevention. A cross-cutting requirement has also been identified to systematically capture and share learning across both research and industry, ensuring continuous improvement of methods and outcomes.

The next phase of work will focus on testing the practicality of the flowchart approach in both controlled test facilities and real-world buildings. Field trials in occupied dwellings are being planned for later in 2026, in close collaboration with Subtask 2, with the intention of sharing test dwellings so that whole-house HTC measurements and fabric pathology diagnostics can be conducted concurrently in the same properties. This coordinated approach will maximise the value of each field visit and generate paired datasets to support the verification and validation work of Subtask 3. The trials will also assess how effectively the diagnostic process supports decision-making in practice and help identify enabling tools. A key emerging concept is the development of an AI-informed chatbot to support building professionals in applying the methodology. The Annex plans to develop and trial a beta version of this tool as part of its ongoing work programme.

Subtask 5

By Matthew Li & Joshua Cooper

Activities in subtask 5 have focused on identifying the data requirements of activities planned in subtasks 2–4, the extent to which these may be met by existing datasets, and the capacity of participants to procure or generate additional datasets to satisfy remaining needs. In parallel, work is underway to review and establish best practice for gathering, curating and disseminating in-use building performance datasets. The findings will feed into plans for collating sufficient data to both serve the needs of the Annex and to provide a legacy dataset for future use in validation and verification of building energy performance measurement techniques.

ABOUT DYNASTEE

The objective of the DYNASTEE network is to be a global network of excellence on dynamic testing and evaluation of Energy Performance of Buildings. We aim to bring together academic, industry and governmental experts having knowledge on the **test environment and experimental setup** as well as on **data analysis** and **performance prediction** to consolidate, disseminate and further develop the knowledge that has been developed in this field in the past decades.

We make sure that the expertise developed in European research projects over a long period (1986-2004), and more recently the IEA-EBC Annexes 58 and 71 (2010-2022), remains available to the community of builders, designers, industrial developers, scientists and public authorities. The DYNASTEE platform continues to act as an information exchange medium and focuses on training exercises and events (such as the annual Summer School on **Dynamic Methods For Whole Building Energy Assessment**), the development of analysis software and the collection of high quality data.

IEA-EBC Annex 94

The aim of the Annex 94 project is a global collaboration in the EBC-context to develop the necessary knowledge and tools to achieve reliable *in-situ* **dynamic testing** and **data analysis methods** that can be used to characterize and label the effective **energy performance** of building components and whole buildings. DYNASTEE has been working on these topics for over 30 years and has been training numerous people during workshops, the system identification competition and training events (summer schools).

Summer Schools

In the annual DYNASTEE Summer School, participants are trained in the use of dynamic methodologies to assess thermal characteristics of building components and assess whole building energy performance. The approach is dealing with building physics as well as applied mathematics and statistics. Experience in the past has shown that knowledge of both disciplines is a must in order to be successful for making decisions in the analysis process. In the past 12 years, around 250 people have participated in DYNASTEE Summer Schools.

Datasets

Over the past decades, the network has collected high quality measurement and simulation data. These datasets are used in training exercises and events. The available benchmark high quality data contains:

- Simulated data homogenous wall
- Simulated data from homogenous wall
- In-situ data from homogenous wall
- In-situ data from composition wall
- Data from Round Robin box (research project)
- In-situ data from an air gap building envelope
- Data from a whole building
- Data from a co-heating test experiment

Two tools are promoted by DYNASTEE that will be trained and applied using the aforementioned benchmark data. These are LORD; lumped parameter model and CTSM-R; continuous time model.

See for an extended description on the Dynastee website the document Software techniques applied to thermal performance characteristics.

Summer School 2026

In support of the IEA-EBC Annex 94, DYNASTEE is looking forward to organize a next (11th) physical Summer School in 2026.

Support 2022 – 2026

Industry could be interested in qualified people and support our network. Please contact Aimee.Byrne@TUDublin.ie for more information how to help us further.