

ASHRAE 227P – Passive building design standard

An update





Motivation, ETA

- An ANSI-approved consensus passive building standard could be adopted as mandatory in some jurisdictions, or made a requirement for federal incentives -> much greater adoption.
- First public review ~ May 2022
- Publication ~ July 2023

INITIATED BY WALTER GRONDZIK - JUNE 2018

FIRST OFFICIAL MEETING - OCTOBER 2019





Title, Purpose, Scope

This is the full text

Passive Building Design Standard

PURPOSE: This standard provides requirements for the design of buildings that have exceptionally low energy usage and that are durable, resilient, comfortable, and healthy.

SCOPE:

2.1 This standard is applicable to all new and existing buildings intended for human occupancy.

2.2 This standard provides requirements for the design, construction and plans for operation of the:

- building envelope,
- heating and cooling equipment and systems,
- ventilation systems,
- service hot water systems,
- interior and exterior lighting systems, and
- plug and appliance loads.

2.3 This standard does not provide requirements for the use of buildings.

2.4 This standard does not apply to process related systems or equipment.

2.5 This standard shall not be used to circumvent any safety, health, or environmental requirements.





Current Working Chapter Titles

FOREWORD

1. PURPOSE
2. SCOPE
3. DEFINITIONS AND SYMBOLS
4. ADMINISTRATION AND ENFORCEMENT
5. PASSIVE MEASURES / SPACE CONDITIONING
6. WHOLE BUILDING ENERGY/CARBON LIMITS
7. BUILDING ENCLOSURE
8. HVAC SYSTEM

AIR-TIGHTNESS
REQUIREMENT LIVES
HERE

9. LIGHTING SYSTEMS

10. DURABILITY AND RESILIENCE

11. REPORTING REQUIREMENTS

INFORMATIVE ANNEX – BIBLIOGRAPHY

NORMATIVE ANNEX – ASTM E779-19

NORMATIVE ANNEX – ASTM E3155-15

NORMATIVE ANNEX – HEAT ISLAND MITIGATION

INFORMATIVE ANNEX – COMPACTNESS GUIDELIN





Opinion 1

It is not a great mystery what causes energy use in buildings. It results from the combination of:

- How the envelope is made
- The properties of all the energy using devices in the building
- The patterns of occupancy and utilization of the devices
- The weather

A design standard can't control the last two, but it can regulate the energy use with rules about the properties of the envelope and all the energy-using equipment including their controls.

It shouldn't be necessary to make a lot of categorical distinctions between "building types"





Opinion 2

It is not a great mystery what the main improvement opportunities are for codes to match passive building performance:

- Air-tightness
- Thermal bridge reduction and windows
- Duct leakage
- Ventilation heat recovery





Framework for the development

For any property, aspect, or part of the building:

- What is the Building Characteristic being regulated
- Definition of a performance metric, if any
- Mandatory measures, if any
- Validation of performance
 - Criterion on the metric
 - Calculation / measurement protocol
 - E.g. Baseline; Proposed
- Design documentation
- Field verification





Compliance paths

Space conditioning (Ch5) and overall energy (Ch6) pursue a “two-model” approach whereby:

- There are two compliance paths.
- One of the paths is an overall performance tradeoff path, to meet an EUI-type overall performance requirement.
 - The required performance target is project-specific.
- It is determined by calculating the performance of a reference building, derived from the proposed building, that is loaded up with all kinds of good stuff.
- The other path is the prescriptive or subsystem-performance path. This requires implementing all the specific good stuff in the reference building.
 - Using “subsystem” performance metrics in the “prescriptive” path allows for some tradeoffs in certain areas without forcing one onto the overall tradeoff path.

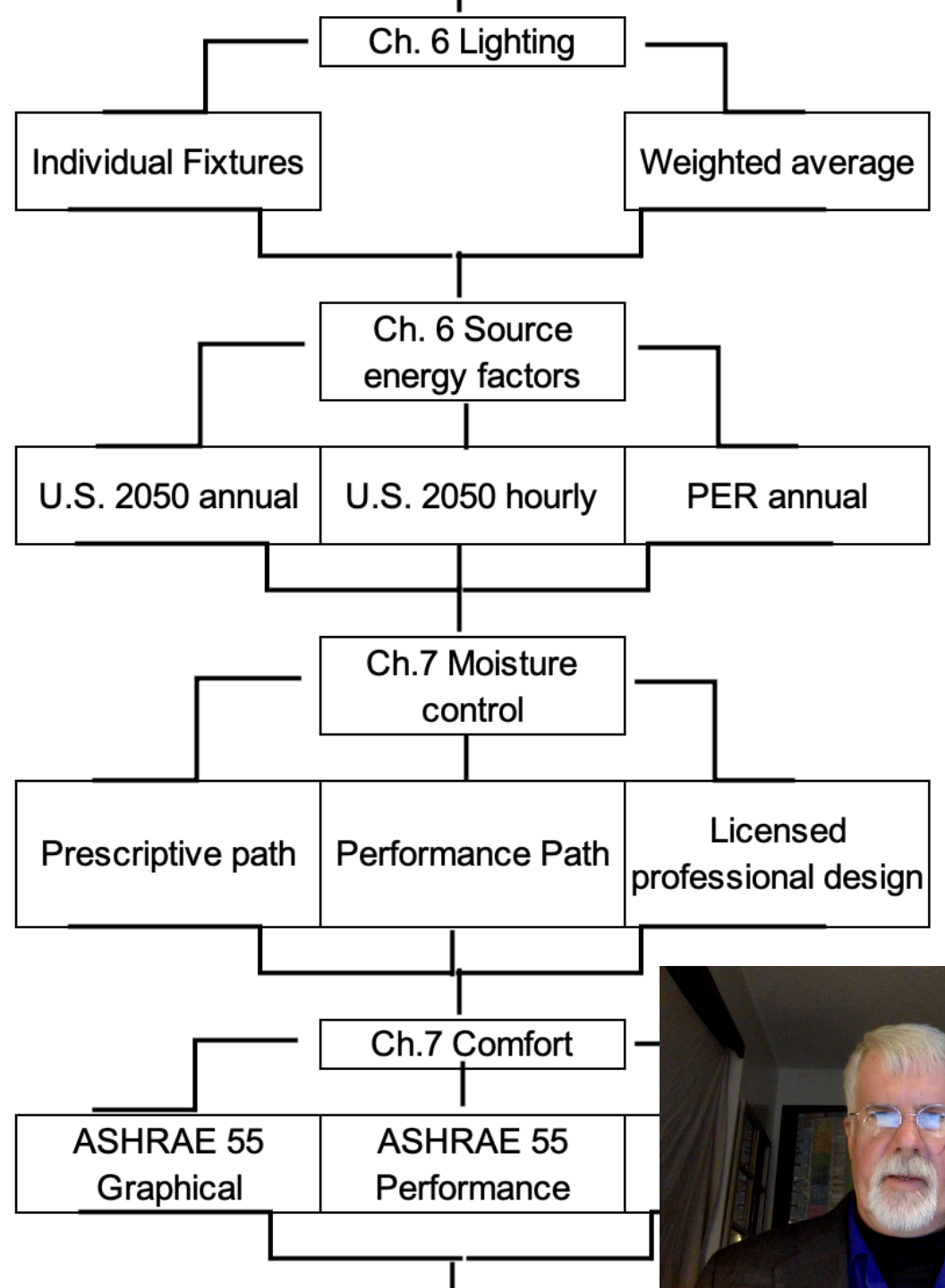
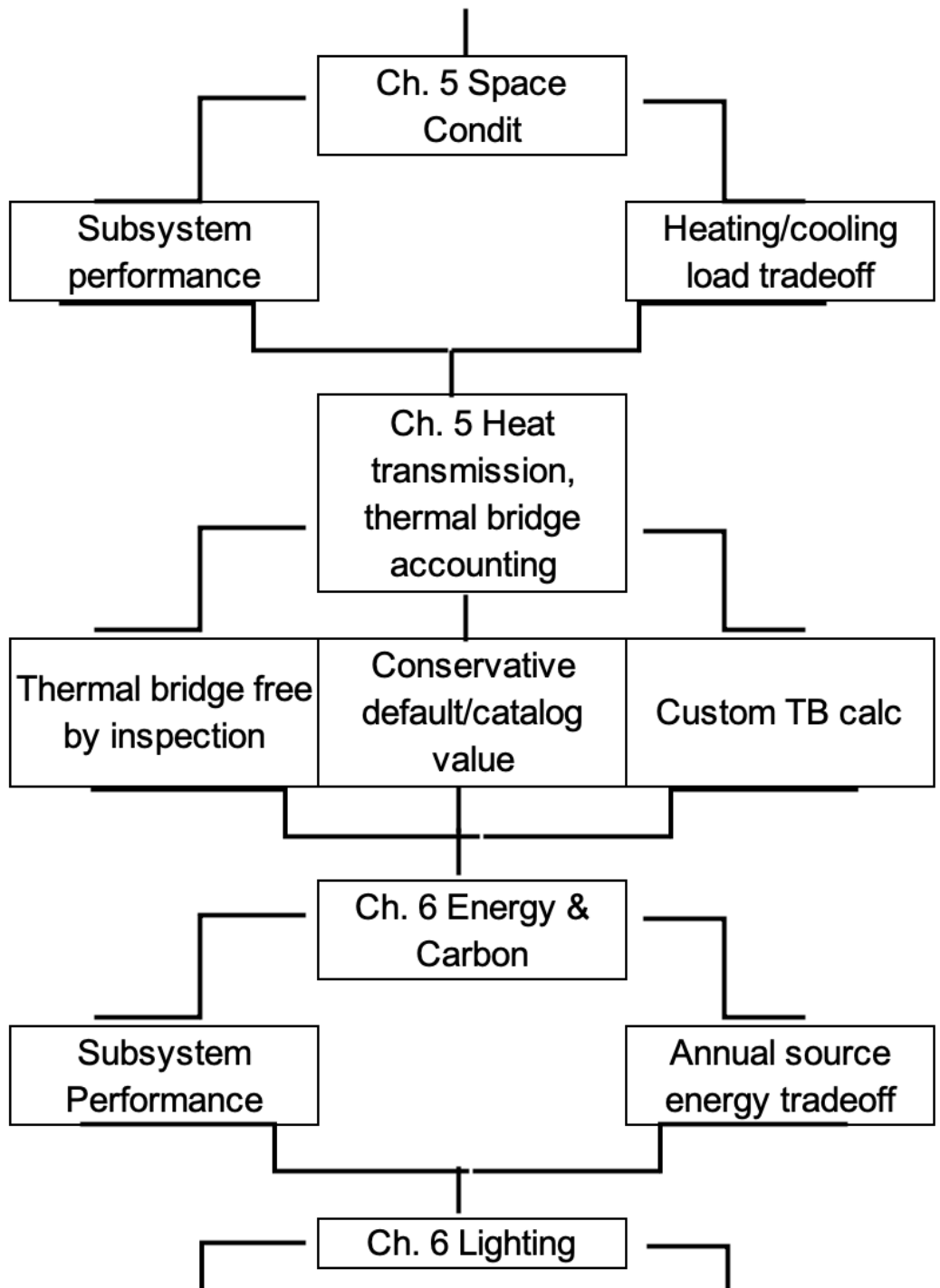




Advantages of the two-model approach

- Offers a choice of a simpler but more restrictive path, or a more complex but more flexible path.
- Both paths have equivalent stringency in terms of overall performance.
- Best software independence for the performance path
- Nuanced criteria for the performance path – project-specific





Preferred outcome

Everything is “powered by
ASHRAE 227”



Thank you and
Stay tuned..
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