Version: 1.0 DRAFT
Date: 3/20/2019

BOPTEST Reference Test Case Peer Review Document

This document serves a peer review template for an emulation model that is to be a reference test case. There are four sections:

I. General Information
II. General Comments
III. Model Checks
IV. Test Case Checks

Section I is to be completed by the Model Developer. The remaining sections are to be completed by the designated Model Reviewer, and returned to the Model Developer so that they may make the appropriate edits. This process should be repeated until all concerns of the reviewer are addressed. Each review should be documented using a separate version of this document, specified by the Review # in Section 1 below.

I. General Information

Reference Case	Single Zone Residential Hydronic
Current Location	IDEAS/Examples/IBPSA/SingleZoneResidentialHydronic.mo
Model Developer (Name, Institution, Email)	Filip Jorissen, KU Leuven filip.jorissen@kuleuven.be
Model Reviewer (Name, Institution, Email)	David Blum, Lawrence Berkeley National Laboratory dhblum@lbl.gov
Review #	1

II. General Comments

List each comment in separate row with number. Additional rows may be added as needed. They should be supported by the responses in Sections III and IV.

#	Comment
1	Add occupancy schedule
2	Assign units to model inputs and outputs
3	Make water heater capacity finite

4	Add pressure drops to water flow network so pump power consumption can be computed
5	IDEAS.Buildings.Components.Interfaces.ZoneInterface has Tsensor and ppm output graphics on top of eachother, making the TZone output look like it is connected to the ppm output of the room model.
6	All features for test case not included. To be discussed.

III. Model Checks

Criteria	Reviewer Response
Reference Case Representation	
Does the model represent overall intent of reference case? Are the relevant thermal systems, heat loads, and control signals accounted for?	Yes
Climate	
Complete weather data file, similar to TMY?	Yes - Uccle.TMY
Sufficiently long period, e.g. one year?	Yes
Internal Gains	
Occupancy schedule?	No - Fixed to 0.
Occupancy gain values reasonable for building type?	Yes - Represents seated, very light work with low air velocity according to ASHRAE Handbook-Fundamentals Ch 30. Sensible 73 W/person, Latent 45 W/person, radFrac 0.6.
Lighting schedule/control?	No - Fixed to 0.
Lighting gain values reasonable for building type?	No - Fixed to 0.
Equipment schedule?	No
Equipment gain values reasonable for building type?	No
Envelope Modeling	
Are IDEAS, Buildings, or AixLib component models used for building envelope and window modeling?	Yes – IDEAS Case 900 template.
If not IDEAS, Buildings, or AixLib component models, are dynamic wall heat transfer models used?	NA
If not IDEAS, Buildings, or AixLib component models, are complex fenestration models used?	NA
It not IDEAS, Buildings, or AixLib component models, is latitude and longitude consistent with intended region or weather file?	NA
It not IDEAS, Buildings, or AixLib component models, are convection models for inside and outside nonlinear?	NA
Are window surface areas reasonable?	Yes
Are insulation levels reasonable?	Yes

Are all surfaces accounted for? (e.g. the roof is not forgotten)	Yes
Which of the following is used for modeling air infiltration? *None* *Constant* *Pressure-driven flow* *Buoyancy-driven flow* *Mixed pressure and buoyancy-driven flow*	Constant - 0.018 kg/s (0.41 ACH).
Inter-zone airflow and common wall heat transfer properly accounted for?	NA
Are the inside and outside radiation models appropriate?	Yes, linear for interior and exterior windows. Nonlinear for exterior walls.
HVAC Modeling	
Are moisture and condensation effects properly accounted for?	Yes - Uses IDEAS.Media.Air for room air, though HVAC is radiator heat only.
Are fluid components such as ducts, pipes, actuators, pumps, fans, and heat exchangers modeled with pressure-flow relationships? Are pressure drops reasonable?	No – No pressure drops modeled so pump does not have power consumption.
Is the heat transfer performance of other equipment such as heat exchangers and plant equipment modeled reasonably?	Yes - IDEAS radiator model with discretized heat exchange with room air and surfaces.
Are equipment capacities reasonable?	No – water heater capacity is inf
Are equipment efficiencies such as COP, heating, hydraulic, and motor reasonable?	No – pump does not have power consumption calculated
Is a reasonable level of control provided such that the model can simulate without use of external controller?	Yes – Constant supply water temperature.
External control Input Signals	
Reasonable given state of the art actuation?	Yes - Common in Europe to have constant circulation pump for radiator.
Units assigned?	No
Measurement Output Signals	
Reasonable given state of the art sensors?	Yes - Temperature sensor is actually measuring operative temperature, which is hard to measure in reality - OK for simple model.
Are all equipment power/fuel consumptions computed and measured for KPI calculations?	No – pump power not computed.

Are all zone temperatures measured for KPI calculations?	Yes
Units assigned?	No
Compilation and Simulation	
Uses official library release versions (with Modelica “Uses” statement)?	No
Can be compiled into FMU free of commercial licensing?	Yes - Compiled using JModelica v2.2 into FMU-ME v2.0 for linux.
Simulates for full year?	Yes - Simulated in Dymola using Lsodar and CVode and with JModelica v2.2 using CVode.
Compatible with variable time-step solver? Otherwise, minimum timestep acceptable?	Yes - Simulated with CVode.

IV. Test Case Checks

Criteria	Response
Documentation	
Building Design and Use (including architecture, constructions, occupancy schedules and comfort, internal loads and schedules, climate)	No
HVAC System Design (including primary and secondary system designs, equipment specifications and performance maps, rule based and/or local loop controllers)	No
Additional System Design (such as lighting, shading, onsite generation and storage)	No
Points List (including control inputs signals and measurement output signals with descriptions and meta-data)	No
Important Model Assumptions (such as infiltration models, moist/dry air assumptions, well-mixed assumptions)	No
Scenario Information (including energy pricing and emission factors)	No
HTML template followed?	No
KPI Calculations and Scenario Information	
JSON map for matching output signals to KPI calculation provided?	No
Reference comfort temperature(s) for each zone provided?	No
GHG emission factors provided?	No
Pricing scenario 1 (constant) provided?	No
Pricing scenario 2 (dynamic) provided?	No
Pricing scenario 3 (highly dynamic) provided?	No