

Guidelines for Submitting Dew Point Analysis Reports for Green Buildings Ordinance Reroof Projects

This guide represents the minimum information necessary when submitting dew point analysis reports for roof replacement and roof recover projects that must comply with Denver’s Green Buildings Ordinance. As every project is unique, additional information may be requested of you to show compliance with current codes and policies. This guide should not be used as a substitute for codes, standards, or regulations. The applicant is responsible for complying with all codes and rules whether or not described here.

Prescriptive versus Alternate Roofing Assembly

There are two pathways available to demonstrate compliance with the Green Buildings Ordinance (GBO) cool roof requirements for low-sloped roofs when a roof replacement or recover project introduces a cool roof in a location where one did not exist before in order to meet the requirements of [GBO Rules + Regulations](#) Article III Section 3.03(b)(i):

1. Provide the prescriptive assembly [GBO R+Rs Article III Section 3.03(b)(i)(2)] – when providing the prescriptive assembly, a minimum Class III vapor retarder **and** air barrier must be installed at the roof deck. A single layer may be used to provide both preventative measures.
- OR -
2. When providing any alternate assembly [GBO R+Rs Article III Section 3.03(b)(i)(3)] – provide one of the dew point analysis options below by a registered professional.

Dew point analysis report submittal requirements

(1) EXISTING and PROPOSED ROOFING ASSEMBLIES

The dew point analysis report shall include a drawing or sketch of the existing and proposed roofing assemblies and a statement which describes the intended condensation control mechanism for the system (air barrier, vapor retarder, and/or ventilation, or none).

(2) CALCULATION PACKAGE

The report shall include a calculation package for each roof system included in the project scope which includes the following information:

- A. Location / weather data set used for evaluation:
 - i. **‘DEW POINT METHOD’ Report** – The required weather data set to use is the 2021 ASHRAE Handbook of Fundamentals Coldest Month Heating DB (99%) and Average Dry Bulb (DB) Conditions for Monthly Climatic Design Conditions (values provided in degrees Celsius below) using the Denver Central Park (Stapleton), CO, USA location.
This information is available online: <http://ashrae-meteo.info/v2.0/>

Annual Heating, Humidification, a		
Coldest Month	Heating DB	
	99.6%	99%
12	-18.6	-14.9

Monthly Climatic Design Conditions													
	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DBAvg	10.8	0.2	1.3	5.7	10.0	15.1	20.7	22.8	21.9	17.4	10.9	3.8	-0.9
DBStd	9.75	5.84	6.77	5.31	5.21	4.12	3.67	2.81	2.72	4.09	5.16	5.87	6.44

- ii. **SIMULATION MODEL** – Selected location/weather data set used for the evaluation within a recognized software platform.
- B. Summer and winter design temperature and relative humidity for the interior with applicable summer/winter dewpoint temperatures.
- C. R- values utilized for each material/layer in the system
 - i. For tapered insulation, please only provide the average R-value

(3) ROOF DECK PENETRATIONS and PERIMETER CONDITIONS

The report shall include a statement addressing the frequency and condition of penetrations through the roof deck and the perimeter conditions that may present a future condensation risk. Please see Attestation section below.

(4) REPORT FORMAT (DEW POINT METHOD versus SIMULATION MODEL)

The report shall include one of the following, understanding that the simulation model may be required:

'DEW POINT METHOD' Report – A graphic, table, or similar which both shows the calculated temperature at each layer in the system and compares each temperature identified to the interior dewpoint temperature. Please provide a response for both Items A and B below using the following Dry Bulb (DB) temperatures under prescribed conditions:

- A. One (1) extreme / worst-case winter condition utilizing the Heating DB 99%. If the temperature at any point in the roof assembly is less than the interior dewpoint temperature, then dew point analyses for the five (5) coldest months (November through March) and one (1) reference extreme summer month condition (July) must be submitted in accordance with Item B below.
- B. Five (5) coldest months (November through March) and one (1) reference summer condition (July) utilizing the average DB monthly climatic design conditions (“DBAvg”).
 - **Exception:** if the dew point analysis for the extreme condition outlined under Item A above DOES NOT show a dew point in the roofing assembly or shows a dew point on the warm side of an air barrier and vapor retarder layer within the roof assembly, analysis for the five coldest months is not required for the project.

DEW POINT METHOD REPORT RESULTS – If the dew point method shows a dew point in the roofing assembly during any of the five coldest months, there are two options to move forward: (i) provide all dew point method analyses required above AND sign and stamp the attestation paragraph provided below; OR (ii) provide a simulation model report further quantifying conditions over a minimum 3-year time frame AND sign and stamp the attestation paragraph provided below.

NOTE – Per GBO R+Rs Article III Section 3.04(b), in the case of a roof recover of a non-cool roof, where the dew point analysis determines that the existing roof assembly would need to be replaced to control condensation, the roof section analyzed is exempt from meeting the cool roof requirements.

SIMULATION MODEL – Graphical output from a recognized software platform demonstrating the results of a minimum 3-year simulation showing system performance. Graphical output shall be supplemented with tabular output as required to demonstrate the results of the simulation.

NOTE – Per GBO R+Rs Article III Section 3.04(b), in the case of a roof recover of a non-cool roof, where the dew point analysis determines that the existing roof assembly would need to be replaced to control condensation, the roof section analyzed is exempt from meeting the cool roof requirements.

(5) ATTESTATION

The following attestation must be included with the conclusions and recommendations that addresses condensation in the roofing assembly for both Dew Point Method and Simulation Model reports.

Using my best professional judgement by taking into account the building interior conditions and factors such as temperature, relative humidity, and the material composition of the roofing assembly, I have determined that each roof assembly's performance, as outlined in the submitted dew point analysis, will be maintained without significant compromise, accounting for the potential for a loss of insulation R-value for insulation exposed to moisture, the potential for mold growth, and the treatment and conditions of known roof penetrations and perimeter transition details.