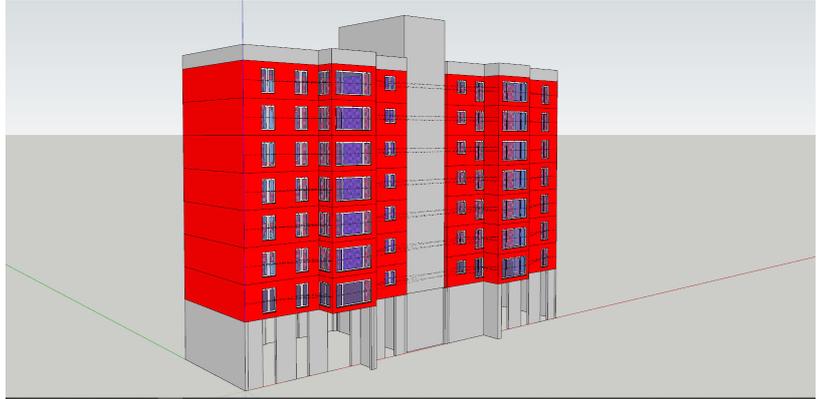


제로에너지건축 외피 시스템 에너지 성능 검토 보고서

검토 대상:

제로에너지 표준형 공동주택



성능 검토 기준: ECO2 외단열 내단열 성능

입력존의 수 : 1

사용프로파일: 18 열람실(도서관)	열저장능력: 90	냉난방공조: 환기
면 적 [m²]: 393.13	열교가산치: 내단열	외기부하처리: 아니오
천장고 [m]: 3.5	침기율 [1/h]: 없음	야간운전방식: 가동정지
실체적 [m²]: 1375.955	냉난방방식: 냉난방	주말운전방식: 가동정지

2) 외기와의 열손실계수 보정 (열교에 대한 일괄 보정)

- 분석 존에서 외기와 접하는 각 구조체들의 전도열손실계수의 합
- 열교에 대한 일괄 보정 ( $\Delta U_{WB}$ )

$$H_{T,D} = \sum(U_j \cdot A_j) + \Delta U_{WB} \sum A_j \quad (3.14-44)$$

$\Delta U_{WB}$ : 외단열의 경우 0.10 W/(m²·K)  
내단열의 경우 0.15 W/(m²·K)

자료출처 : 건축물 에너지 성능의 정량적 평가방법 표준화를 위한 연구(ECO2 엔지니어링매뉴얼), 2014, 한국건설기술연구원

성능 검토 방법: 외벽, 지붕 열교 부위는 열교 가산치를 적용하여 냉·난방에너지요구량 평가

적용 성능 :

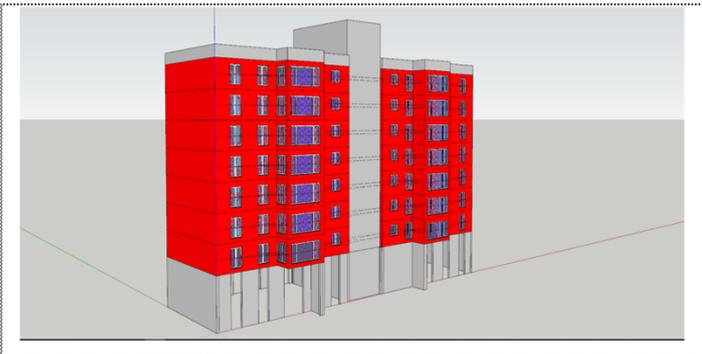
적용 부위		기존 내단열 적용		ALUSTAR 외단열 적용	
		열관류율 [W/m²·K]	열교가산치 [W/m²·K]	열관류율 [W/m²·K]	열교가산치 [W/m²·K]
외벽	구분	0.158	0.150	0.158	0.100
	유효 열관류율[W/m²·K]	0.308		0.258	
지붕	구분	0.148	0.150	0.148	0.100
	유효 열관류율[W/m²·K]	0.298		0.248	

검토 결과 :

적용 부위	기존 내단열 적용	ALUSTAR 외단열 적용	비율
난방에너지요구량[kWh/m²·년]	29.5	26	11.9%
냉방에너지요구량[kWh/m²·년]	25.7	25.3	1.6%
총에너지요구량[kWh/m²·년]	55.2	51.3	7.1%

ALUSTAR 외단열 적용 결과 :

## Passive House Verification



<b>Architecture:</b>	TEST		<b>Building:</b>	ALUSTAR_외 피 기술	
Street:			Street:		
Postcode/City:			Postcode/City:		
Province/Country:			Province/Country:	KR-Korea, Republic of	
<b>Energy consultancy:</b>	RNB 기술연구소		Building type:	Multi social housing	
Street:			Climate data set:	ud-01-중부1_서울	
Postcode/City:			Climate zone:	3: Cool-temperate	Altitude of location: 80 m
Province/Country:	Seoul	KR-Korea, Republic of	<b>Home owner / Client:</b>	TEST	
Year of construction:	2022		Street:		
No. of dwelling units:	14		Postcode/City:		
No. of occupants:	42.0		Province/Country:		
			<b>Mechanical system:</b>	TEST	
			Street:		
			Postcode/City:		
			Province/Country:		
			<b>Certification:</b>	RNB 기술연구소	
			Street:		
			Postcode/City:		
			Province/Country:	Seoul	KR-Korea, Republic of
Interior temperature winter [°C]:	20.0		Interior temp. summer [°C]:	25.0	
Internal heat gains (IHG) heating case [W/m <sup>2</sup> ]:	2.5		IHG cooling case [W/m <sup>2</sup> ]:	3.8	
Specific capacity [Wh/K per m <sup>2</sup> TFA]:	84		Mechanical cooling:	x	

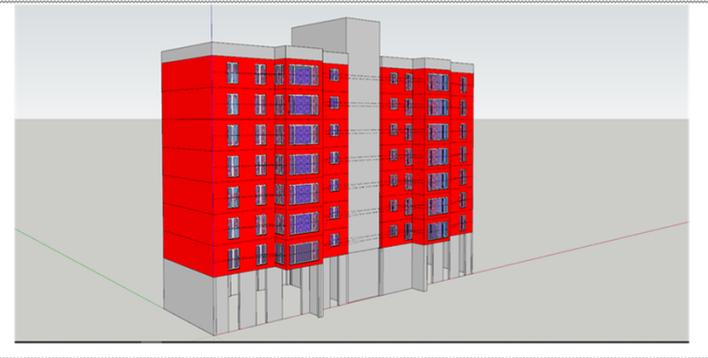
### Specific building characteristics with reference to the treated floor area

	Treated floor area m <sup>2</sup>			Alternative criteria		Fulfilled? <sup>2</sup>
				Criteria	Alternative criteria	
<b>Space heating</b>	Heating demand kWh/(m <sup>2</sup> a)	1965.3	≤	15	-	no
	Heating load W/m <sup>2</sup>	19	≤	-	10	
<b>Space cooling</b>	Cooling & dehum. demand kWh/(m <sup>2</sup> a)	25.3	≤	19	19	no
	Cooling load W/m <sup>2</sup>	10	≤	-	10	
	Frequency of overheating (> 25 °C) %	-	≤	-	-	-
	Frequency excessively high humidity (> 12 g/kg) %	0	≤	10	-	yes
<b>Airtightness</b>	Pressurization test result n <sub>50</sub> 1/h	1.5	≤	0.6	-	no
<b>Non-renewable Primary Energy (PE)</b>	PE demand kWh/(m <sup>2</sup> a)	157	≤	120	-	no
<b>Primary Energy Renewable (PER)</b>	PER demand kWh/(m <sup>2</sup> a)	136	≤	-	-	-
	Generation of renewable energy kWh/(m <sup>2</sup> a)	0	≥	-	-	

<sup>2</sup> Empty field: Data missing; '-': No requirement

기존 내단열 적용 결과 :

## Passive House Verification



<b>Architecture:</b> TEST	<b>Building:</b> ALUSTAR_외피기술
Street:	Street:
Postcode/City:	Postcode/City:
Province/Country:	Province/Country: KR-Korea, Republic of
<b>Energy consultancy:</b> RNB 기술연구소	<b>Building type:</b> Multi social housing
Street:	Climate data set: ud--01-중부1_서울
Postcode/City:	Climate zone: 3: Cool-temperate Altitude of location: 80 m
Province/Country: Seoul KR-Korea, Republic of	<b>Home owner / Client:</b> TEST
Year of construction: 2022	Street:
No. of dwelling units: 14	Postcode/City:
No. of occupants: 42.0	Province/Country:
Interior temperature winter [°C]: 20.0	<b>Mechanical system:</b> TEST
Internal heat gains (IHG) heating case [W/m²]: 2.5	Street:
Specific capacity [Wh/K per m² TFA]: 60	Postcode/City:
Interior temp. summer [°C]: 25.0	Province/Country:
IHG cooling case [W/m²]: 3.8	<b>Certification:</b> RNB 기술연구소
Mechanical cooling: x	Street:
	Postcode/City:
	Province/Country: Seoul KR-Korea, Republic of

### Specific building characteristics with reference to the treated floor area

	Treated floor area m²		Alternative criteria		Fulfilled? <sup>2</sup>	
			Criteria	Alternative criteria		
<b>Space heating</b>	Heating demand kWh/(m²a)	1965.3	≤	15	-	no
	Heating load W/m²	20	≤	-	10	no
<b>Space cooling</b>	Cooling & dehum. demand kWh/(m²a)	25.7	≤	19	19	no
	Cooling load W/m²	10	≤	-	10	-
	Frequency of overheating (> 25 °C) %	-	≤	-	-	-
	Frequency excessively high humidity (> 12 g/kg) %	0	≤	10	-	yes
<b>Airtightness</b>	Pressurization test result n <sub>50</sub> 1/h	1.5	≤	0.6	-	no
<b>Non-renewable Primary Energy (PE)</b>	PE demand kWh/(m²a)	162	≤	120	-	no
<b>Primary Energy Renewable (PER)</b>	PER demand kWh/(m²a)	143	≤	-	-	-
	Generation of renewable energy kWh/(m²a)	0	≥	-	-	-

<sup>2</sup> Empty field: Data missing; '-': No requirement

위 결과서는 ECO2 표준값을 적용하여 반영한 PHPP를 이용 에너지 성능평가 결과입니다.

기술책임자      건축기계설비기술사      성명      박 성 중

2022년      9월      01일

