

# **NATURAL LIGHTING**

Energy Systems & Renewables

CITY : Lucknow, Uttar Pradesh.

PG01 - DAYLIGHT FACTOR (DF)

PG02 - USEFUL DAYLIGHT ILLUMINANCE (UDI)

PG03 - DAYLIGHT AUTONOMY (DA)

Harshit Chaurasia

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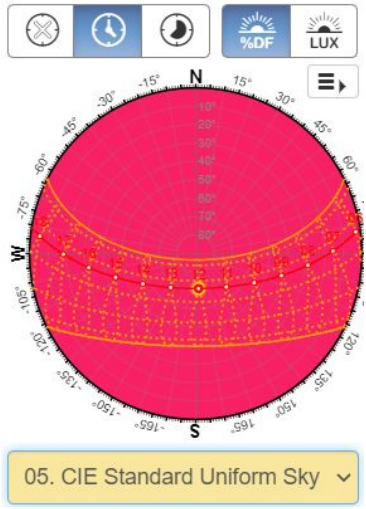
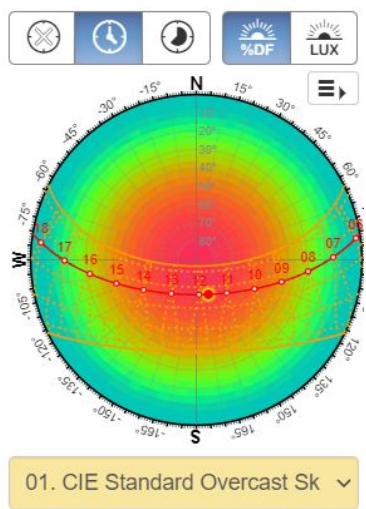
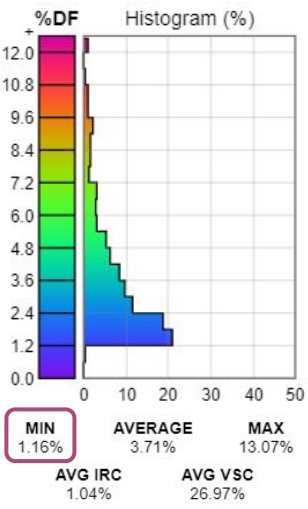
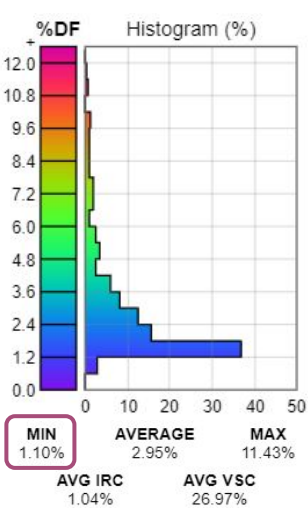
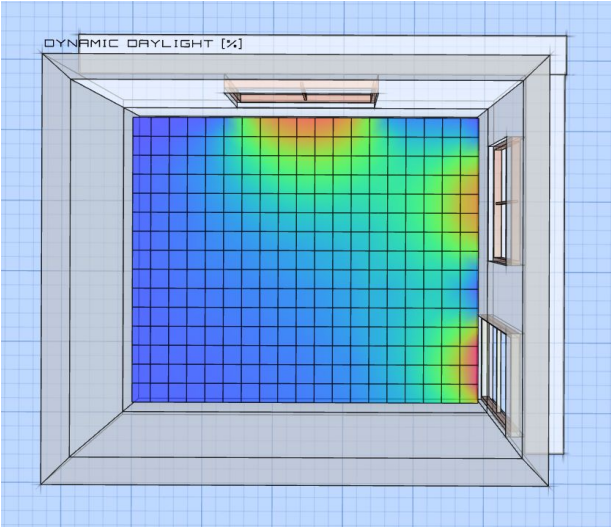
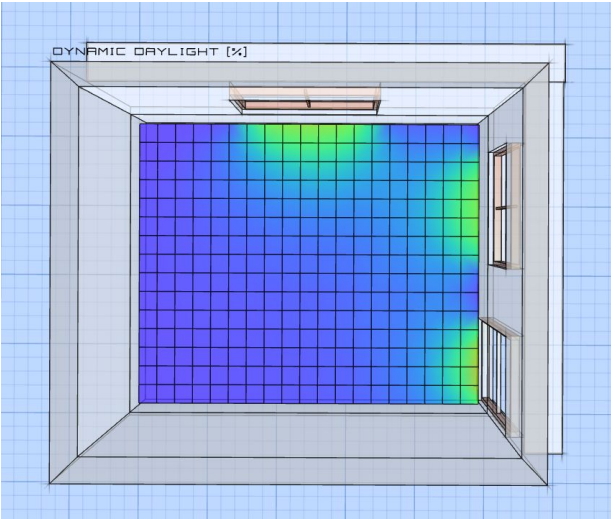
III-C

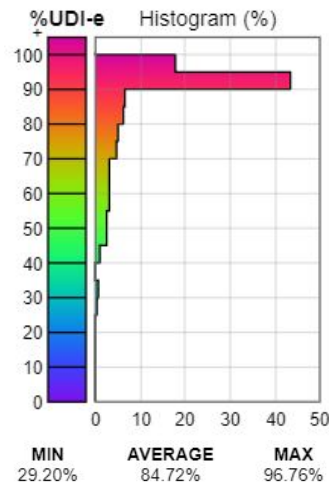
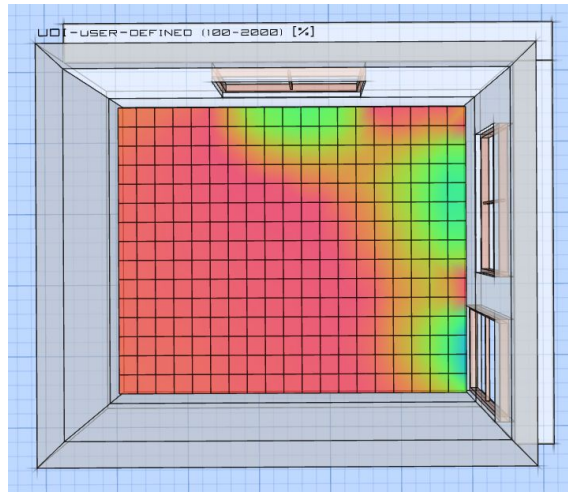
The room has 1.5 m wide and 1.2m high windows on north and east facade along with balcony door facing east.

TABLE 2 RECOMMENDED DAYLIGHT FACTORS FOR INTERIORS		
(Clause 3.4)		
(1 percent DF = 80 lux)		
Sl. No.	LOCATION	DAYLIGHT FACTOR, PERCENT
i) Dwellings	Kitchen	2.5
	Living room	0.625
	Study room	1.9
	Circulation	0.313
ii) Schools	Class room desk top, black board	1.9-3.8
	Laboratory	2.5-3.8
iii) Offices	General	1.9
	Drawing, typing	3.75
	Enquiry	0.625-1.9
iv) Hospitals	General wards	1.25
	Pathological laboratory	2.5-3.75
v) Libraries	Stack room	0.9-1.9
	Reading room	1.9-3.75
	Counter area	2.5-3.75
	Catalogue room	1.9-2.5

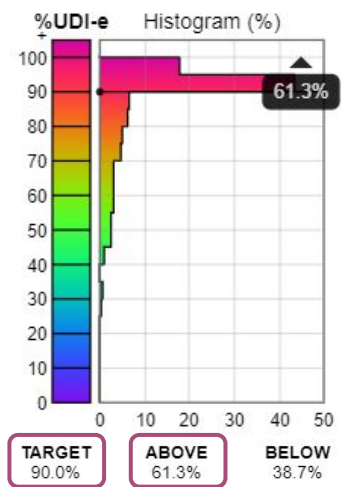
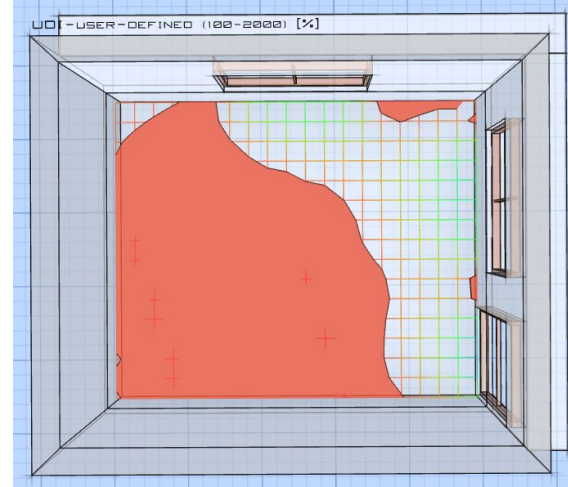
SOURCE: SP 41:1987

- In both sky distribution models it is examined that the minimum DF surpasses the recommended DF in Table 2 - SP 41:1987.  
- This holds true as there is sufficient daylight and no need of artificial lighting until 17:00 in winters and 17:30 - 18:00 in summer months.





1. UDI % FOR ILLUMINATION BETWEEN 100 AND 2000 lux



2. AREA WHICH RECEIVES TARGET ILLUMINATION FOR 90% OF THE ANNUAL DAYTIME HOURS.

TABLE 10.3c: UDI benchmarks for percentage of above grade floor area for different building typologies<sup>15</sup>

UDI Benchmarks for Different Building Typologies							
Points	Office	Retail*	Residential	Healthcare	Hospitality	Institutional	Transit Terminal
Mandatory	40%	10%	45%	30%	45%	40%	10%
2 Points	50%	15%	55%	40%	55%	50%	20%
4 Points	60%	20%	65%	50%	65%	60%	30%

SOURCE: GRIHA VERSION 2019 - VOL 1

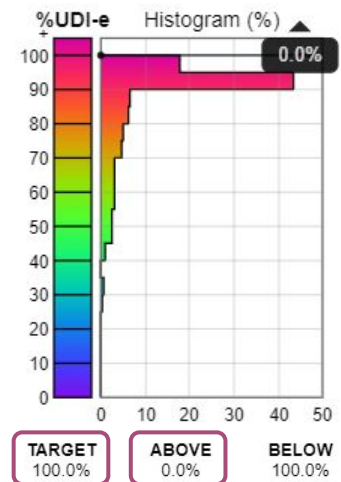
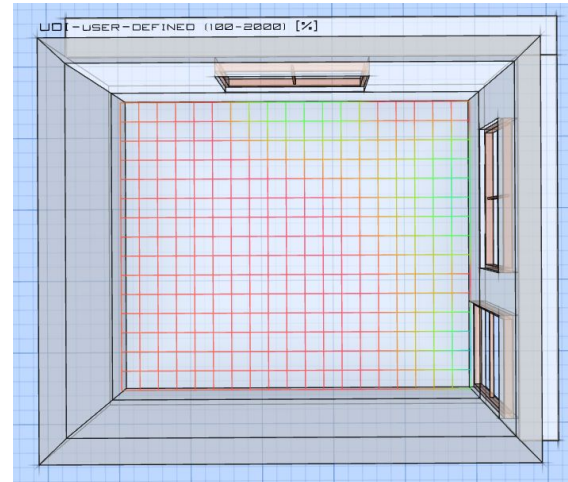
1. The is average of 84.72% UDI that is 84.72% hours of annual daytime the illuminance level inside the room lies between 100 and 2000 lux.
2. 61.3% of the floor area receives illuminance level between 100 lux and 2000 lux for 90% of the annual daytime hours.
3. No part of the room receives the target illumination all throughout the year.

Useful Daylight Illuminance

User-Defined (UDI-u)

Lower Threshold: 100 Lux

Upper Threshold: 2000 Lux



3. AREA WHICH RECEIVES TARGET ILLUMINATION FOR 100% OF THE ANNUAL DAYTIME HOURS.

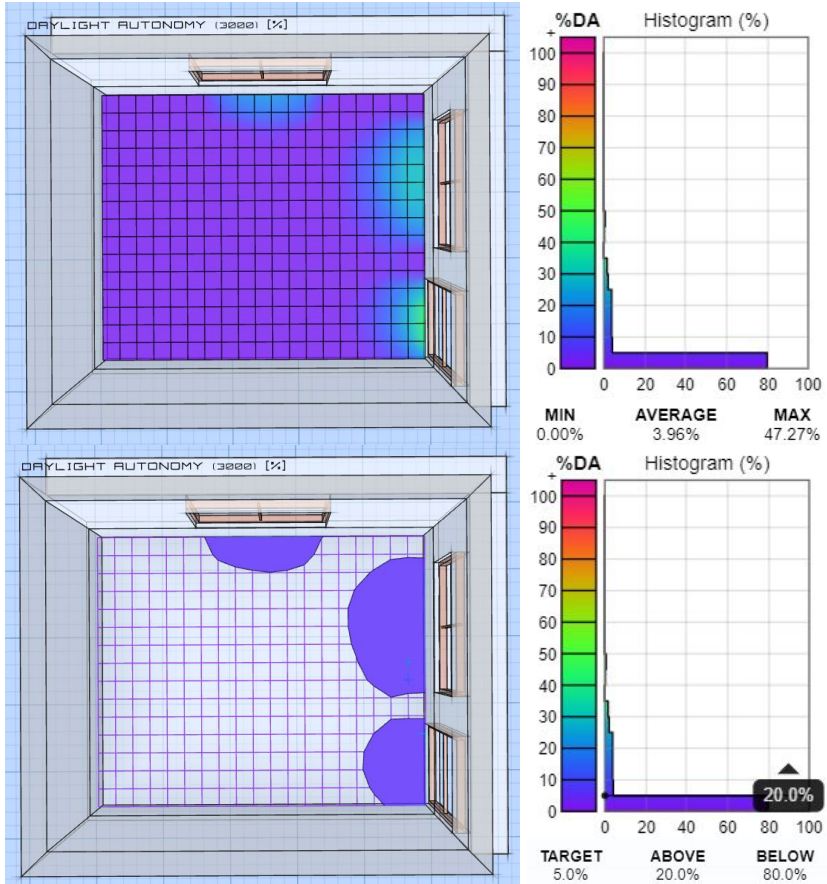


10.1.1 Demonstrate through simulation<sup>11</sup> that mean DA requirement (<3000lux) is met for 100% of the annual analysis hours for 100% of the regularly occupied areas.

– Mandatory

SOURCE: GRIHA VERSION 2019 - VOL 1

Condition not met. 20% of floor area receives illumination of more than 3000 lux for 5% of the annual daytime hours.



10.1.2 Demonstrate through simulation that mean DA requirement (>300lux) is met for the annual analysis hours as listed in Table 10.1c for 100% of the regularly occupied areas.

**TABLE 10.1c:** Daylight autonomy benchmarks for percentage hours exceeding 300lux for different building typologies

Daylight Autonomy Annual Analysis Hours Benchmarks for Different Building Typologies							
Points	Office	Retail*	Residential	Healthcare	Hospitality	Institutional	Transit Terminal**
Mandatory	25%	5%	25%	20%	25%	25%	10%
2 Points	30%	10%	30%	25%	30%	50%	20%
4 Points	35%	15%	35%	30%	35%	60%	30%

SOURCE: GRIHA VERSION 2019 - VOL 1

Condition met. 100% of the floor area receives more than 300 lux of illumination for 42.5% of annual daytime hours.

