

BENCHMARK YOUR BUILDING'S COOLING LOAD

From the data collected from new buildings design for air-conditioning in commercial buildings, the design peak cooling load is in the range of 100-180 W/m² (~20-35 m²/ton for office buildings), 120-260 W/m² (~14-29 m²/ton for hotels) and 250-350 W/m² (~10-14 m²/ton for retail buildings). The actual operating cooling load is often lower due to the diversity of air-conditioning usage, design assumptions and safety factors to take into account foreseeable peak demand. Most of the time, buildings do not run at the design peak load, so it is important to design the air-conditioning system such that it runs efficiently even when it is operating at part load conditions, for both new buildings or retrofitted existing buildings.

The following cooling load data obtained from the energy audit results during the operating hours, compiled by the Building and Construction Authority (BCA) and National Environment Agency (NEA), show that the average cooling load per air-conditioned floor area of office buildings, Hotels and Retail buildings are in the range of 54-100 W/m², 40-98 W/m² and 93-195 W/m² respectively. Hotels generally operate around the clock. According to measured data, the cooling load at night is typically only 60-70% of the day-time load.

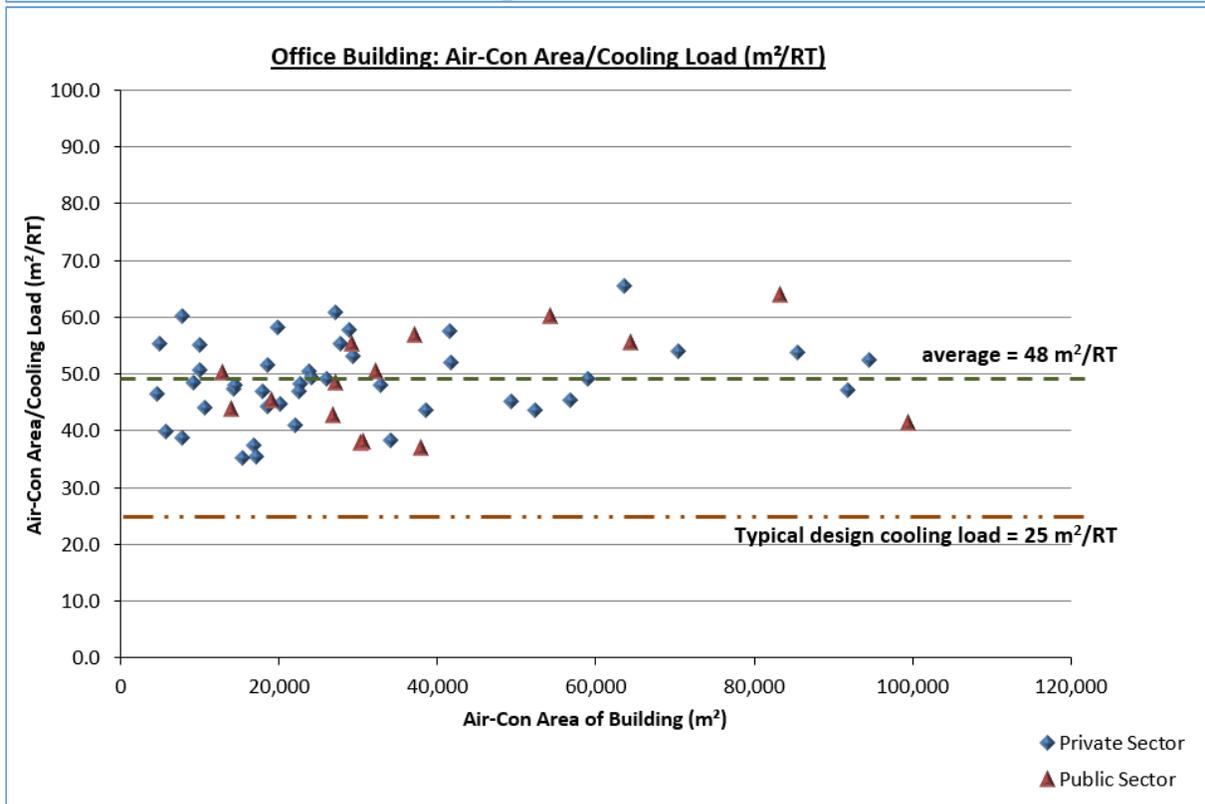
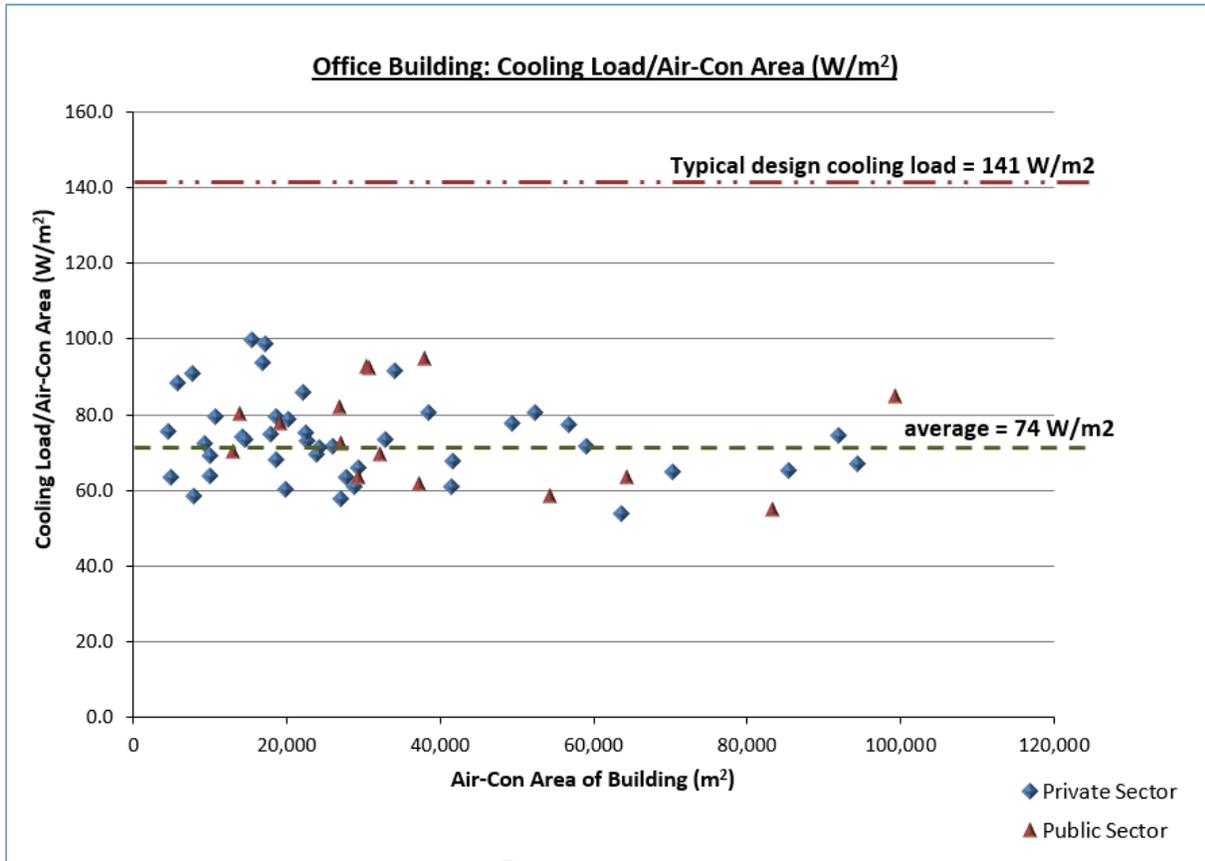
The measured cooling loads might depend on the season or time of day when the measurements were taken. This set of data should only be used as a reference and is not intended to be used in air-conditioning peak load design and sizing. Nevertheless, designer have to take into account various part load conditions, to ensure that the building's cooling system configuration is robust, to operate efficiently.

As Refrigeration Ton (RT) is the widely adopted unit of cooling load in air-conditioning industry, both units W/m² and m²/RT are used to represent the cooling load usage in this article.

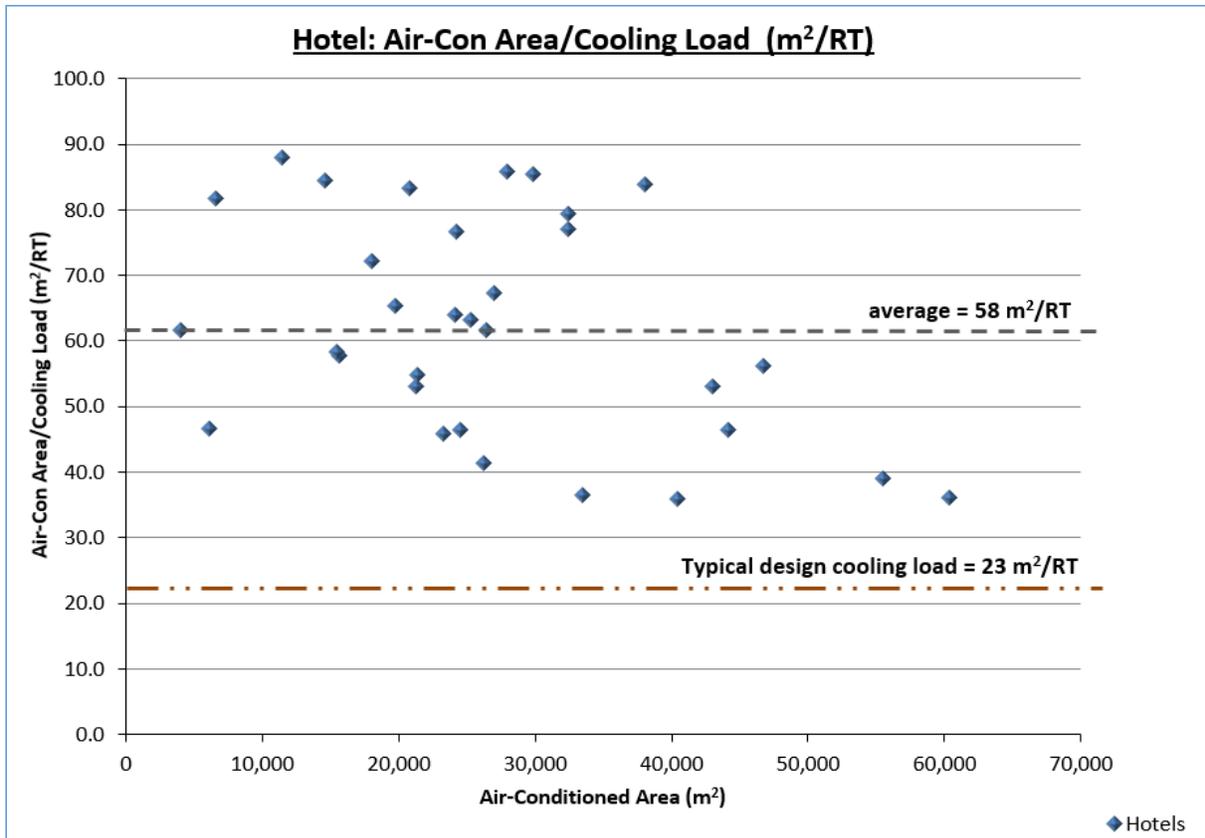
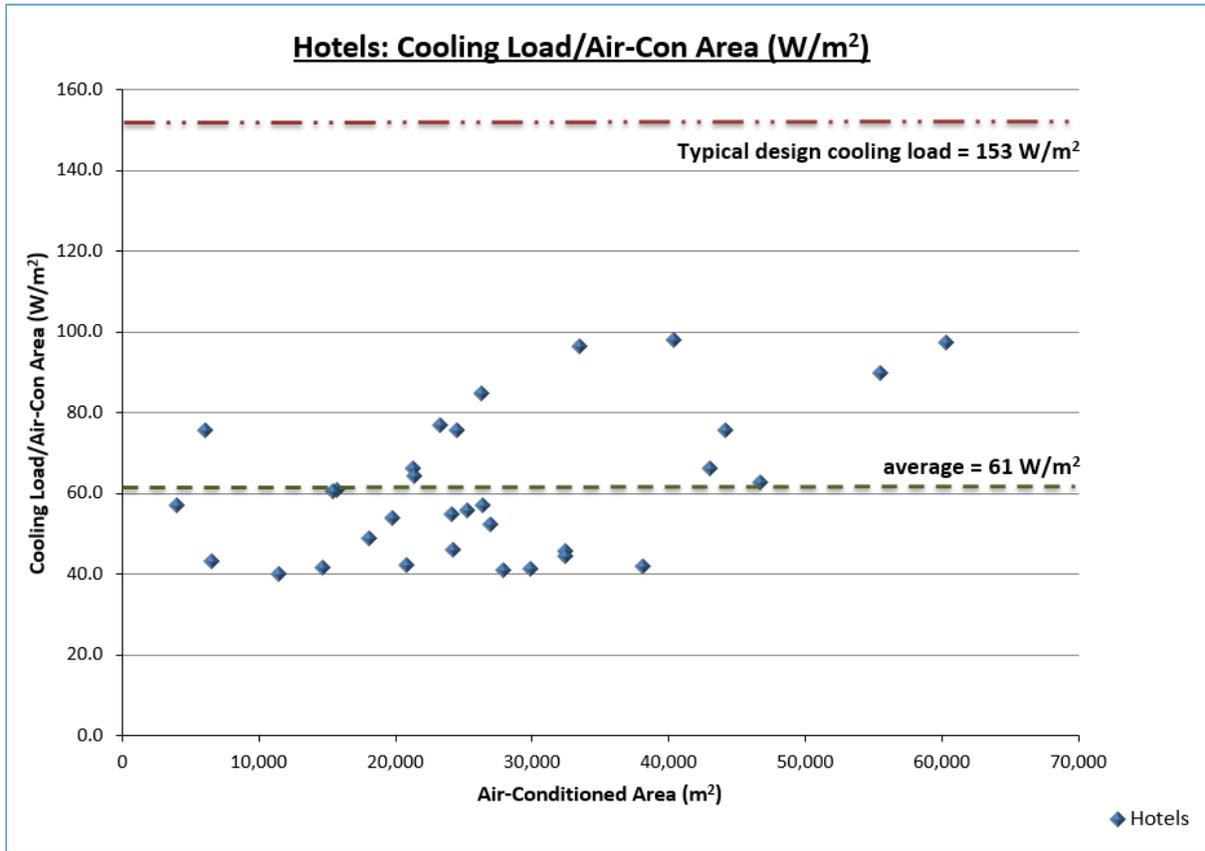
(Conversion: m²/RT = 3517 / W/m²)

	Measured W/m ²	
	Range	Average
Office Buildings (58 projects)	54 – 100	74
Hotels (32 projects)	40 – 98	61
Retail Buildings (28 projects)	93 – 195	130

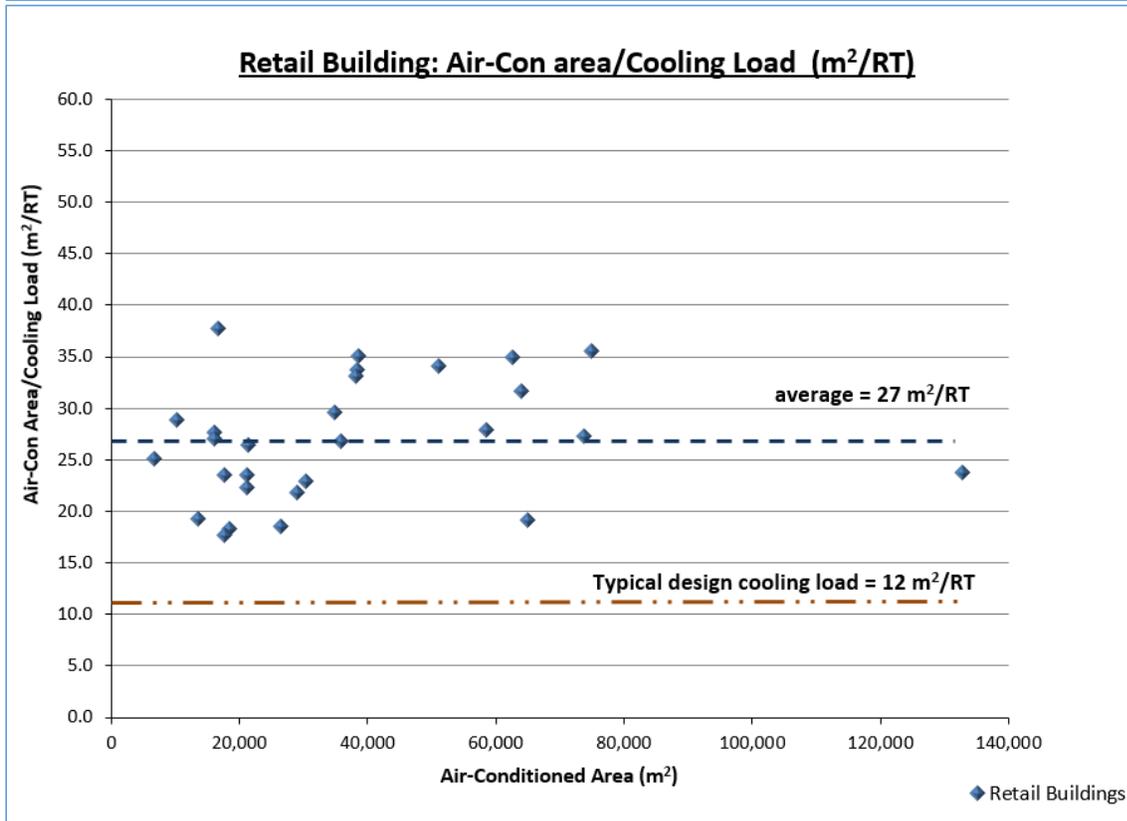
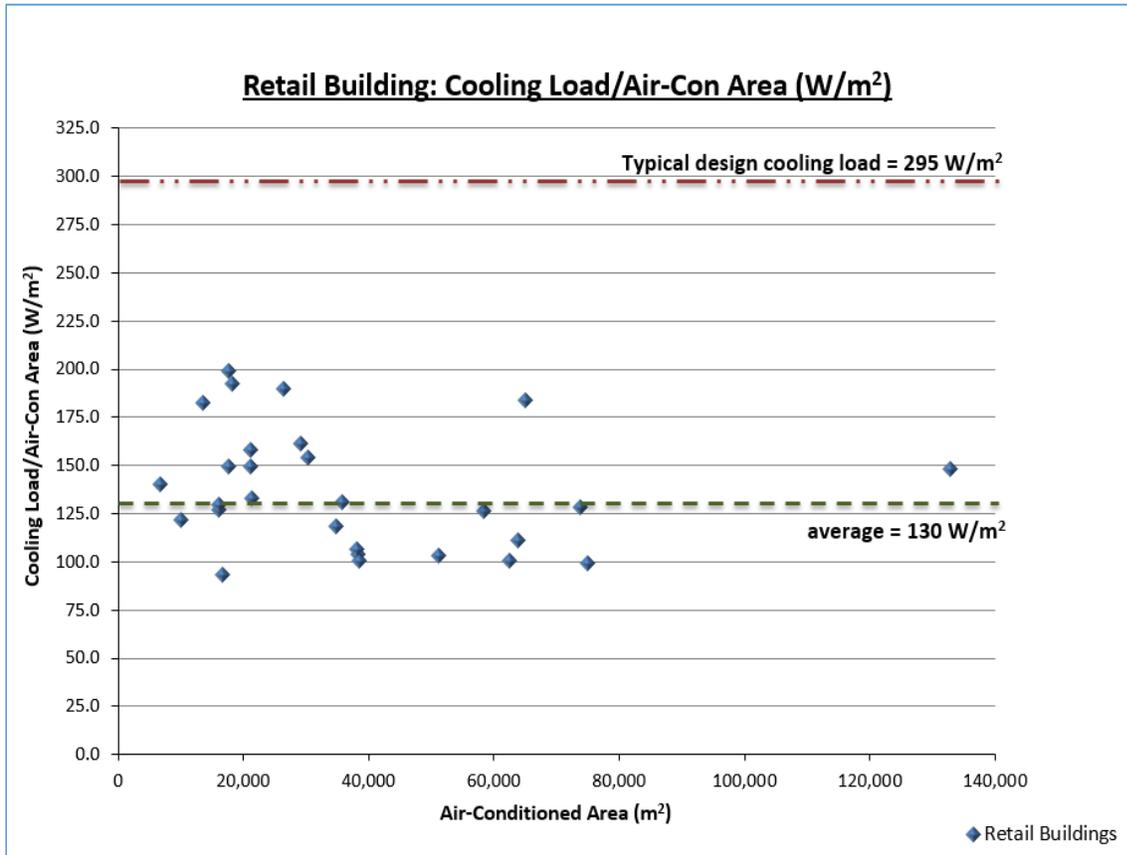
	Measured m ² /RT	
	Range	Average
Office Buildings (58 projects)	35 – 65	48
Hotels (32 projects)	36 – 88	58
Retail Buildings (28 projects)	18 – 38	27



Based on data from Building and Construction Authority and the National Environment Agency



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