SECTOR:
HVAC ANALYSIS

OFFERINGS:
DESIGN APPROVAL STUDIES

TECHNOLOGY:
FLUID DYNAMICS

IMPACT OF TEST ENVIRONMENT ON AIR DELIVERY OF CEILING FAN

Our customer is a NGO that furthers public interest in the energy sector through research and intervention in policy and regulations. They took initiative in framing policies for incentivizing manufacturers for developing energy efficient ceiling fans, i.e. high air delivery at low power consumption. Measurement of air delivery is done following IS 374 standard. It was being reported by manufacturers that environmental effect has major effect on air delivery measurement and hence, standardization is difficult. In view above reports, customer commissioned a technical study to evaluate the extent of variation due to environmental factors.

Zeus Numerix used standard fan laws and gas equations to conduct a theoretical analysis to quantify the effect of ambient temperature and humidity on air delivery. The study analyzed (a) effect on air delivery at constant power and (b) effect on power at constant RPM. Considering the seasonal and geographical variation, maximum 5percentage variation was predicted. CFD simulations were performed to study the impact of test chamber dimensions on air delivery as these dimensions were not clearly specified in IS 374. Study showed that they affect air delivery by 4.5percentage.

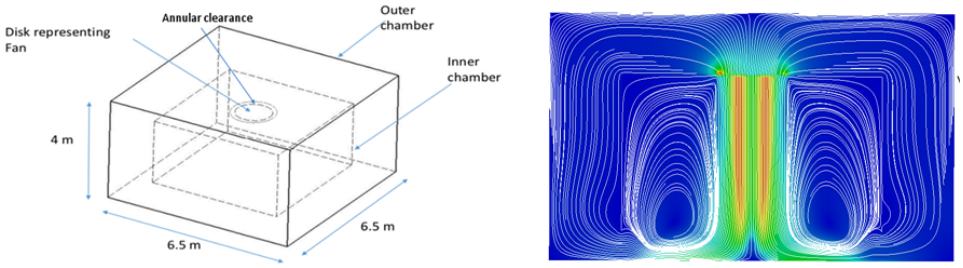

Figure 100: (a) Test chamber for air delivery measurement (b) Simulated flow pattern in test chamber

Zeus Numerix delivered detailed study reports which in turn were published by customer as policy papers. The predicted variations were accounted in the efficiency targets for manufacturers to avail incentive. The study helped in resolving a contentious issue between manufacturers and regulators.

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