

Additional Information

Revision of the approved methodology TH_AM003

“Energy Saving by Introduction of High Efficiency Inverter Type Centrifugal Chiller”

1. Necessity to update the default COP values of the reference chiller

In the approved JCM methodology TH_AM003, the default COP values of the reference centrifugal chiller were set in 2017, when the initial version of the methodology was developed. Since then, it is assumed that the efficiency of centrifugal chiller has been improving with the advance of technology. It means that the emission reductions may be overestimated when the calculation is based on the default COP values determined in 2017.

Therefore, the latest COP values of centrifugal chillers were collected in November 2021 in order to decide whether the default COP values need to be updated to ensure conservativeness and net emission reductions.

2. Market share of chiller manufacturers in Thailand

American chiller manufacturers, such as Company A, Company B, and Company C and Japanese chiller manufacturers, such as Company D and Company E have relatively large share of the chiller market in Southeast Asia, and it is expected to be the same in Thailand.

3. Research on the COP values of inverter type centrifugal chillers in Thailand

Research on the COP values of inverter type centrifugal chillers has been conducted on Company A, C, and D. Company B and E have been excluded from this research with following reasons;

- Company B: Since temperature conditions for COP values are not specified on its product catalogue, COP values are not eligible to be compared with other COP values at the standardized condition.
- Company E: Since COP values are expressed in a range on its product catalogue, COP values are not eligible to be compared with other COP values.

Catalogue COP values of inverter type centrifugal chillers marketed in Thailand have been collected and/or calculated from the catalogue data published by manufacturers. As a result, 36 COP values of inverter type centrifugal chillers with cooling capacities up to 1,500 USRt are obtained and plotted in **Figure 1** below.

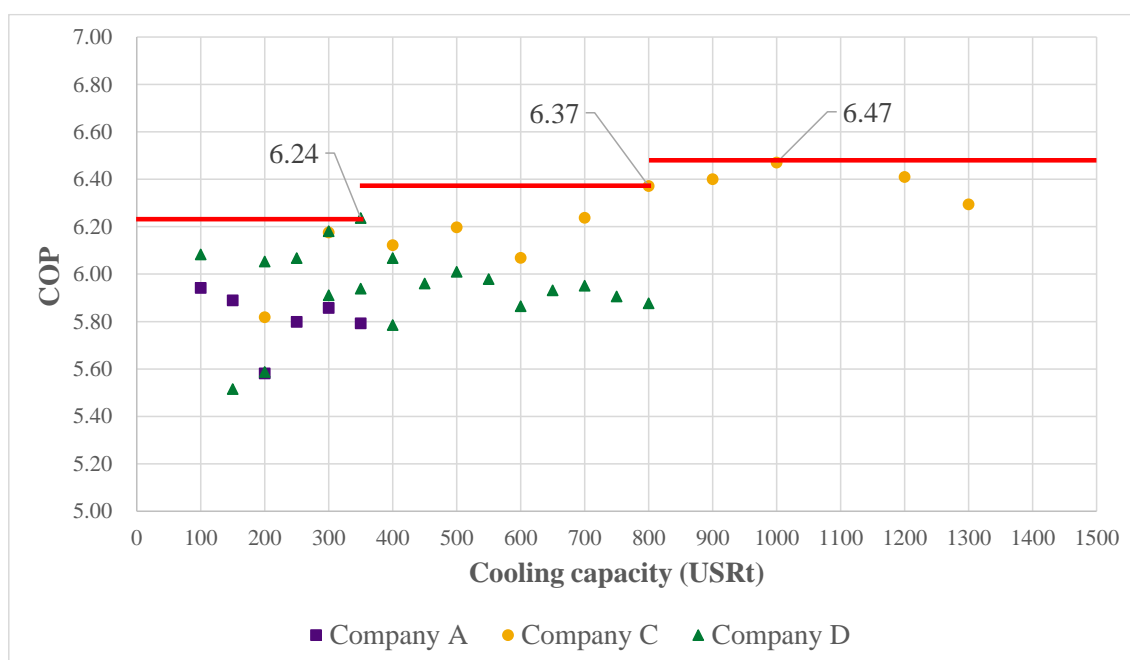


Figure 1: Catalogue COP values of inverter-type centrifugal chillers marketed in Thailand

4. Decision on whether to update the default COP values

Comparing the COP values of inverter type centrifugal chillers recently marketed in Thailand plotted in **Figure 1** with the default COP values which are set in the JCM methodology TH_AM003 version 1.0 shown in **Table 1**, improvement of values can be observed.

Therefore, it is concluded that the default COP values need to be updated to ensure conservativeness and net emission reductions.

Table 1: COP_{RE,i} for TH_AM003 version 1.0

Cooling capacity per unit (USRt)	$300 \leq x < 450$	$450 \leq x < 550$	$550 \leq x < 825$	$825 \leq x \leq 1,500$
COP _{RE,i}	5.59	5.69	5.85	6.06

5. Determination of the default COP values

Figure 1 shows that similar COP values fall into a certain cooling capacity range. In order to ensure the conservativeness, the highest COP values (i.e., COP values of the most efficient inverter type centrifugal chillers) within each cooling capacity range are set as the default COP values as shown in **Table 2** below.

Table 2: Updated $\text{COP}_{\text{RE},i}$ for TH_AM003 version 2.0

Cooling capacity per unit (USRt)	$x \leq 350$	$350 < x \leq 800$	$800 < x \leq 1,500$
$\text{COP}_{\text{RE},i}$	6.24	6.37	6.47