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热能工程

# 压缩制冷复合循环间冷机组热经济性分析与虚拟计算

杨善让[1]，陈立军[1]，雷扬[1]，赵波[2]，王升龙[1]，胡亚才[2]

1．东北电力大学节能与测控技术研究中心，2．浙江大学能源工程学系

摘要：

简要回顾以氨气压缩制冷为复合循环间接空气冷却系统的正循环系统(简称“压缩制冷复合循环间冷系统”)的构建及工作原理。基于热力学原理拟订了制冷循环热经济性能评价方法和评价指标；以蒙东某地亚临界600 MW直冷机组为比较基准，进行了同环境、同容量、同型号但不同低压缸的虚拟压缩制冷复合循环间冷机组的热经济性能评价指标的虚拟计算。从理论上导出了制冷循环年累计产/耗电量比大于1的存在必要条件为转捩温度Tt必须高于正/逆制冷循环切换温度Ts，且高得越多，热经济性能越佳；揭示了转捩温度的数值大小与产能和耗能设备的效率密切相关，切换温度与汽轮机排气背压及机组安装地的气象条件有关。

关键词： 复合循环间冷机组 热经济性评价指标 切换温度 转捩温度 虚拟计算

## Analysis and Fictitious Computation on Thermal Economic Performance of Compressed Refrigerating Cycle for Air Cooling Steam Turbine Unit

YANG Shanrang[1], CHEN Lijun[1], LEI Yang[1], ZHAO Bo[2], WANG Shenglong[1], HU Yacai[2]

1. Energy Conservation & Measure-control Center, Northeast Dianli University
2. Department of Energy Source Engineering of Zhejiang University

Abstract: The components and process flow diagram of the positive sequence refrigerating of compound cycle air cooling unit (CCACU) was reviewed briefly (henceforth called ‘compressed refrigerating CCACU’). Based on the law of conservation of energy, the thermal economy of compressed refrigerating cycle for high temperature duration was drawn up, the basic economic evaluations were worked out. By taking a subcritical 600 MW unit with DAC(Direct air cooling) system (DAC unit for short) in eastern Inner Mongolia as a benchmark, a CCACU(fictitious unit in brief) which is in possession of the same environment was fabricated, same capacity and same model but different low pressure casing structure with the DAC unit and performed the fictitious computation of economic evaluations for it. The conclusions are that the production/ consumption energy ratio may be greater than 1 even in high temperature duration, the necessary condition for achieving this object is that Tt >Ts and the higher the better; secondly, the numerical value of Tt is closely related to the efficiency of energy-producing & energy-consuming equipments, but Ts is related to the turbine exhaust back pressure and the weather data of plant site.

Keywords: compound cycle air cooling unit (CCACU) thermal economic evaluation switching temperature transition temperature fictitious computation

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通讯作者: 陈立军

作者简介:

作者Email: chenlj0507@126.com

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