

77.1

HEATING AND COOLING PLANTS
AND DISTRIBUTION SYSTEM
MANUAL

AK-66-04

MANUEL DES INSTALLATIONS DE
CHAUFFAGE ET DE RÉFRIGÉRATION
ET DES SYSTÈMES DE DISTRIBUTION

DRAFT

TRANSPORT CANADA

Airports and Construction Services Directorate
Airport Facilities Branch
Utilities Division

Direction générale des services des aéroports et de la construction
Direction des installations aéroportuaires
Division des services utilitaires

OPR: DGK/DKF/KFUM

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HEATING AND COOLING PLANTS AND DISTRIBUTION SYSTEM MANAGERIAL SUMMARY

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1.00 INTRODUCTION

A central heating and/or cooling plant and distribution system provides heating and/or cooling services that are generated in a central location and distributed to various buildings and structures within an airport complex.

Transport Canada is responsible for planning, design, construction, operation and maintenance of heating and cooling facilities and for providing these services at an optimum cost.

2.00 POLICY

A central plant shall be provided if, and only if, a comprehensive cost benefit analysis indicates that a central system will yield a higher benefit-cost ratio than any other means of providing the same services.

If the central plant system proves to be most attractive, the following conditions shall be met.

- (a) The design, operation and maintenance of the plant system shall provide a level of service consistent with the functional requirements and at an optimum cost. All design analyses, as required for the design of a central plant and stipulated within this manual, shall be carried out on the basis of life cycle cost and engineering merit.
- (b) The capacity of the plant shall be adequate in accordance with the criteria established in this manual.
- (c) In order to ensure a safe operation, the central plant shall be operated and maintained in accordance with the Canada Labour Code, ASME Boiler and Pressure Vessel Code, applicable Provincial Pressure Vessels Act and Operating Engineers Act.
- (d) Buildings or structures that are owned or leased by third parties and included in the cost benefit analysis in justifying the central plant system, shall not have individual plants and must receive services from the central plant on a cost recovery basis.

3.00 PURPOSE OF MANUAL

The purpose of this manual is to assist in planning, designing, installing, operating and maintaining a central plant facility. It provides information on the state of the art and possible alternatives as related to various systems and equipment and indicates what is considered to be good engineering practice.

4.00 ORGANIZATION OF MANUAL

The manual is divided into five chapters as follows.

(a) Chapter AK-66-04-100 General

This chapter deals with the planning or pre-design activities and certain other subjects that are generally applicable to the central plant as a whole. It establishes the terms of reference for justifying a central plant system and provides standards and guidelines on issues a planning engineer is faced with during the conceptual stage of the plant.

(b) Chapter AK-66-04-200 Heating Equipment

This chapter is aimed at the engineers involved with the design, procurement, product engineering and installation of systems and equipment that are related to the generation of heat and housed in a central heating plant. It is arranged in a chronological order and offers standards and guidelines that will apply to a central heating facility from conception to completion.

(c) Chapter AK-66-04-300 Cooling Equipment

This chapter is very similar to the previous chapter and provides technical information with highlights on good engineering practices as related to a central chilled water cooling plant. References have been made to the appropriate sections in the previous chapter for standards and guidelines on auxiliary facilities that are common to both heating and cooling.

(d) Chapter AK-66-04-400 Heating and Cooling Distribution System

This chapter describes the planning, design and installation of various types of distribution systems. The factors that are to be considered in conjunction with different types of distribution systems are also identified in this chapter.

(e) Chapter AK-66-04-500 Operation and Maintenance

This chapter is to supplement the DKF manual (AK-74 "Maintenance Management" and will deal with specific issues that are directly related to the operation and maintenance of a central plant facility.

5.00 RECOMMENDATION

- (a) Basis for Contract - In view of the size and complexity of this engineering undertaking, the contract for a central plant should be awarded to a mechanical prime contractor.
- (b) Requirements for Engineering Group Doing Design Work -
 - (i) It should have demonstrated successful experience in the design of a central plant system of the type and size under consideration.
 - (ii) It should have qualified and experienced personnel with specialized knowledge required for designing a central plant.
 - (iii) It should be willing and able to provide supervision during construction/installation if such services are considered necessary.
- (c) Requirements for Engineering Group Having Design Authority -
 - (i) It should have demonstrated successful past performance in similar engineering undertakings in order to comprehend various design implications associated with a central plant system.
 - (ii) It should have the actual authority to enforce an effective coordination between the design of the central plant and that of the individual building heating and/or cooling systems, and further, to enforce adherence by the building system designers to the design criteria established by the central plant designer.
- (d) Involvement of Staff Responsible for Plant Operation and Maintenance During Design and Installation

It is considered necessary for a successful plant operation to have an effective communication between the group responsible for plant operation and maintenance and the group responsible for design and installation.

6.00 SUPERSEDED AO STANDARDS

This manual supersedes the relevant information in the existing CATA policies, standards and guidelines as identified by the following AO numbers: 2, 2.1, 7, 12.4, 58.1, 74 and 74.1.