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SAWAI LOJANASUPAREUK : CHARACTERISTICS OF GENERAL PURPOSE PILOT
LABORATORY FOR BIOTECHNOLOGICAL PROCESSES. THESIS ADVISOR :

ASSO. PROF. SURAPONG NAVANKASATTUSAS, Ph.D. 340 PP.

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The purposes of this thesis are, to integrate guidelines and to develop method in establishing characteristics of a general purpose pilot laboratory for biotechnological processes. The conclusion is that the major factors influencing the building configuration are sterility and containment. The basic method consists of functional classification and grouping of working area, definition of the cleanliness in each area, area planning base on the level of cleanliness, analysis of the functional relationship between each area, and final arrangement of the area to suit operational needs. There are three main types of area in the pilot laboratory, namely, the general process area which is a closed building with 6 metre height and a full height open area in the middle with 12 sq.m. per unit operation, the sterile area which is a module of clean room class 10,000 with 3 - 4 metre height and area sizing of 30 sq.m. per unit operation, the containment area, similar to clean room module of sterile area with negative pressure system consisting of at least 2 conjugating modules with sterilization system for sterilizing all output, filter with incinerator for aerosol, kill tank and autoclave. The major characteristic of equipment is hygienic design features. The basic equipments are, a set of standard fermenter sizing 1 - 10, 11 - 100 and 1,000 litre, mixing tanks, continuous sterilizers, centrifuges, membrane separation equipments, and homogenizers. Each equipment has maximal equivalent capacity of 1 cu.m. per operation. The utility per 1 cu.m. substrate are, production and distribution system of, purified water capacity 3.34 cu.m, ultra purified water capacity 2 cu.m., clean steam at temperature 135 °C pressure 45 psig capacity 640 kg. per hour, electrical power for processing 27 kw., clean compressed air capacity 2 cu.m. per minute.