

#4584

**FIRST RESULTS OF THE
CEC-AERECO DEMONSTRATION
PROJECT ON A HUMIDITY
CONTROLLED NATURAL
VENTILATION SYSTEM**

**P. Wouters
B.B.R.I.**

PARTNERS IN THE PROJECT

AERECO

EDF

CETIAT

TNO/MT

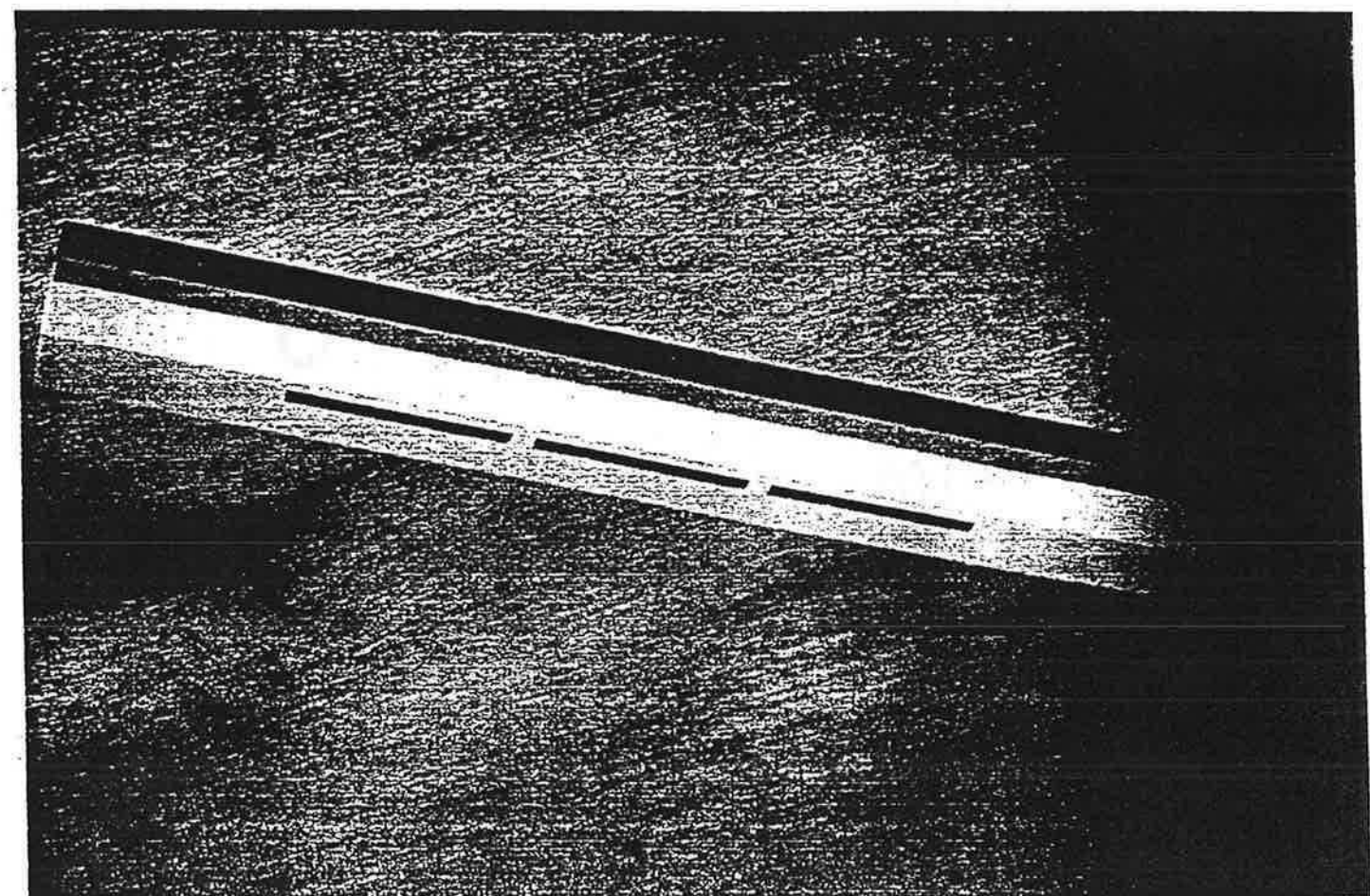
B.B.R.I.

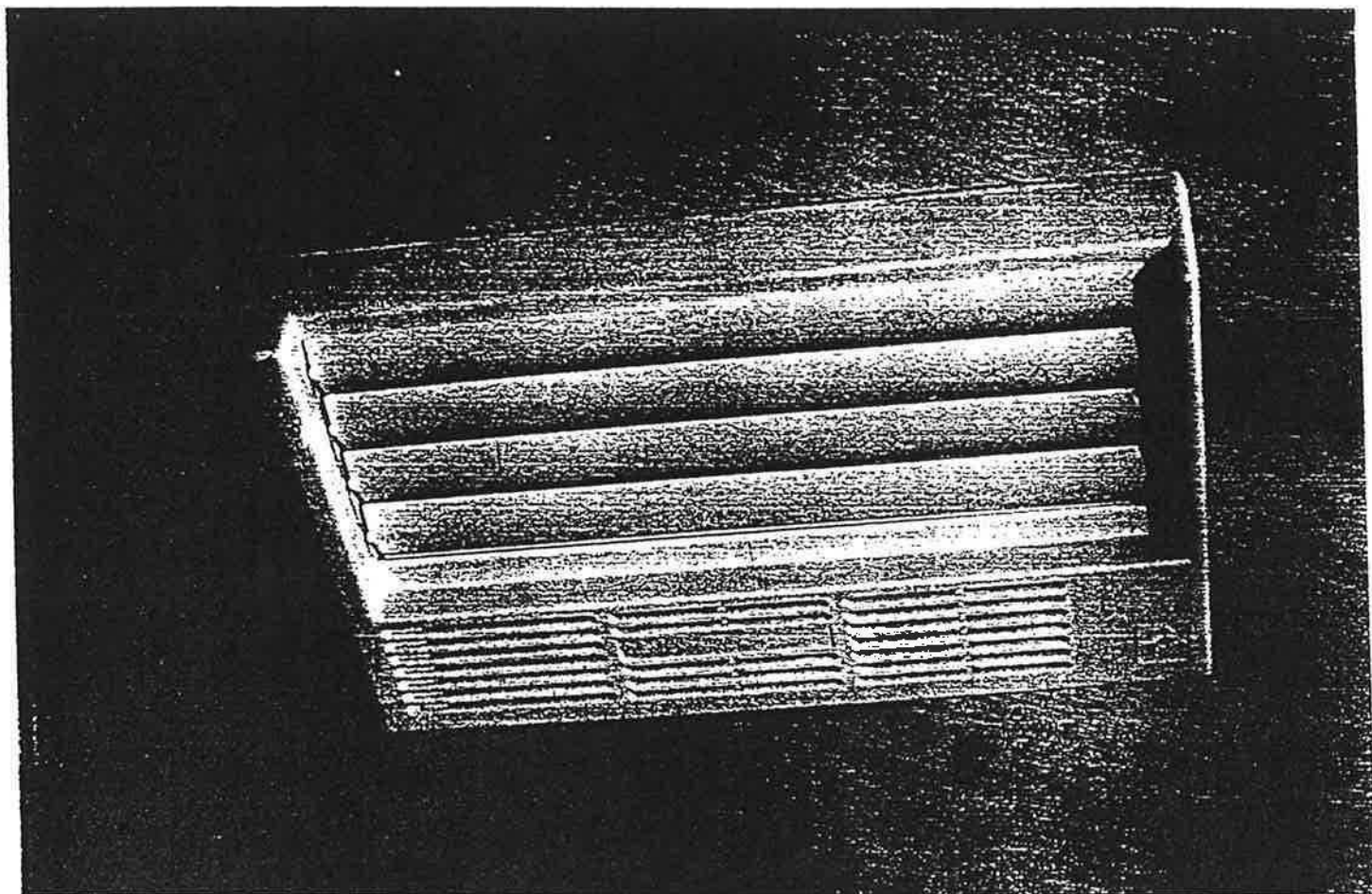
BUILDINGS UNDER INVESTIGATION

ORSAY (PARIS,F)

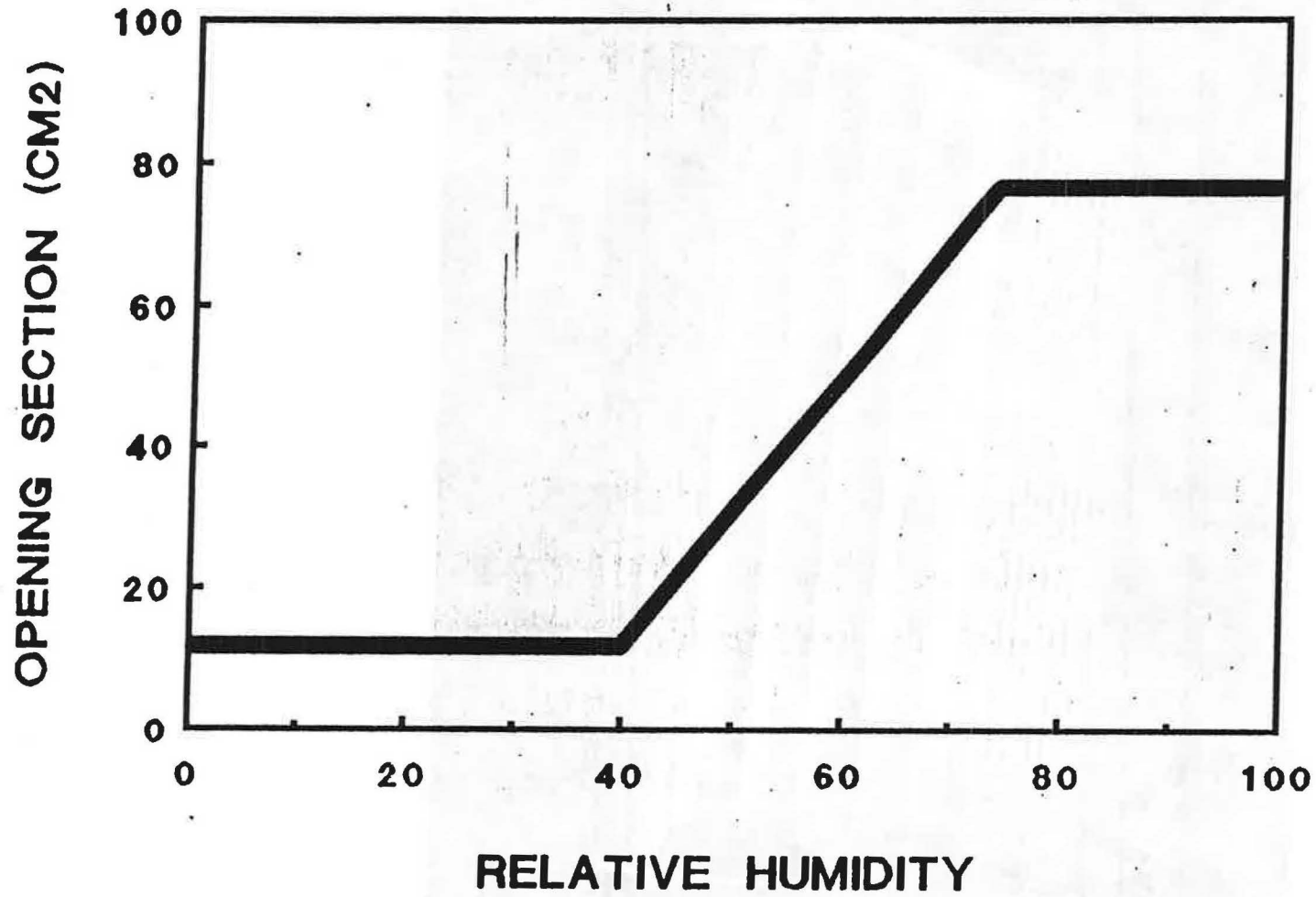
SCHIEDAM (NL)

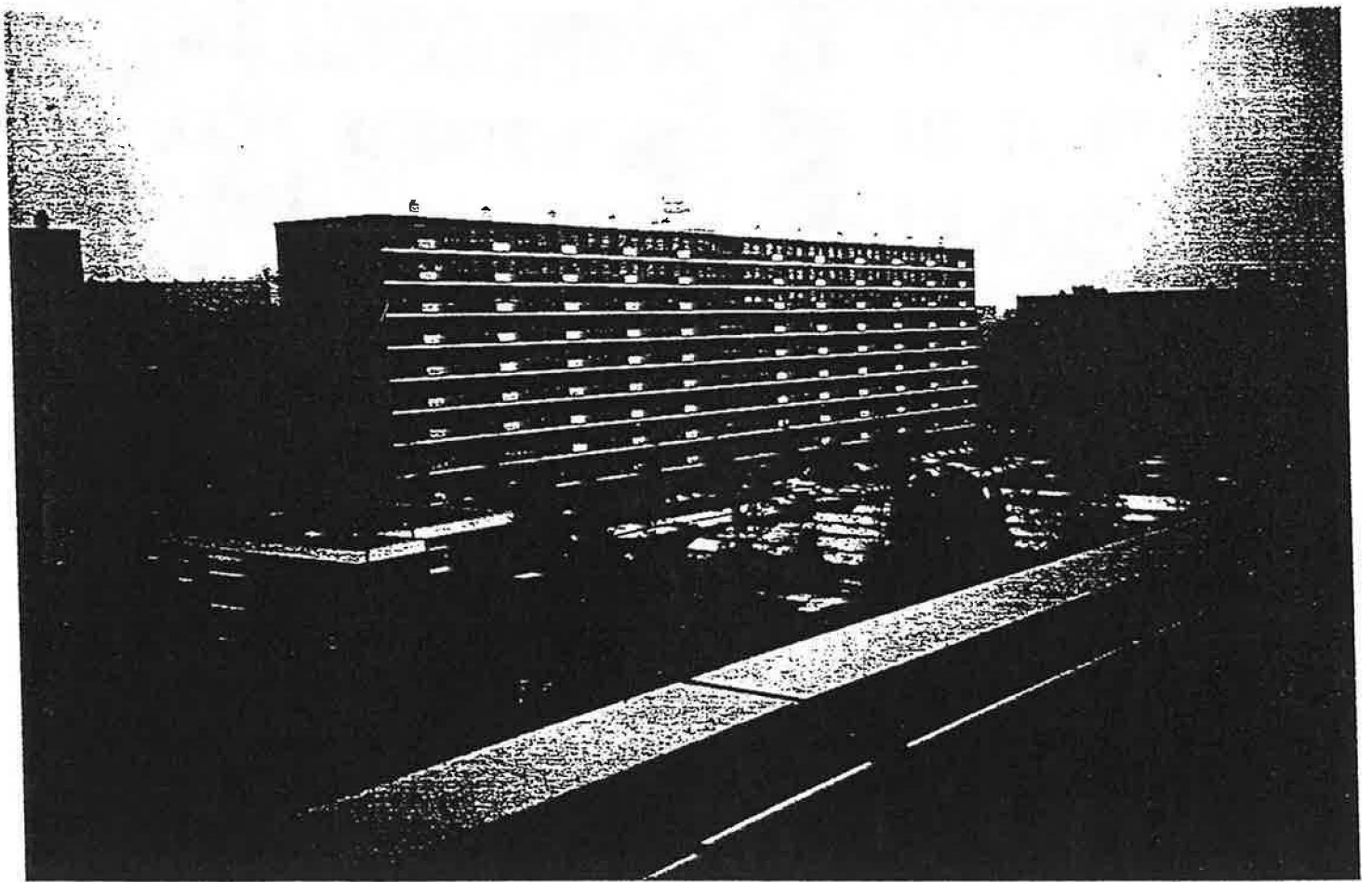
NAMUR (B)



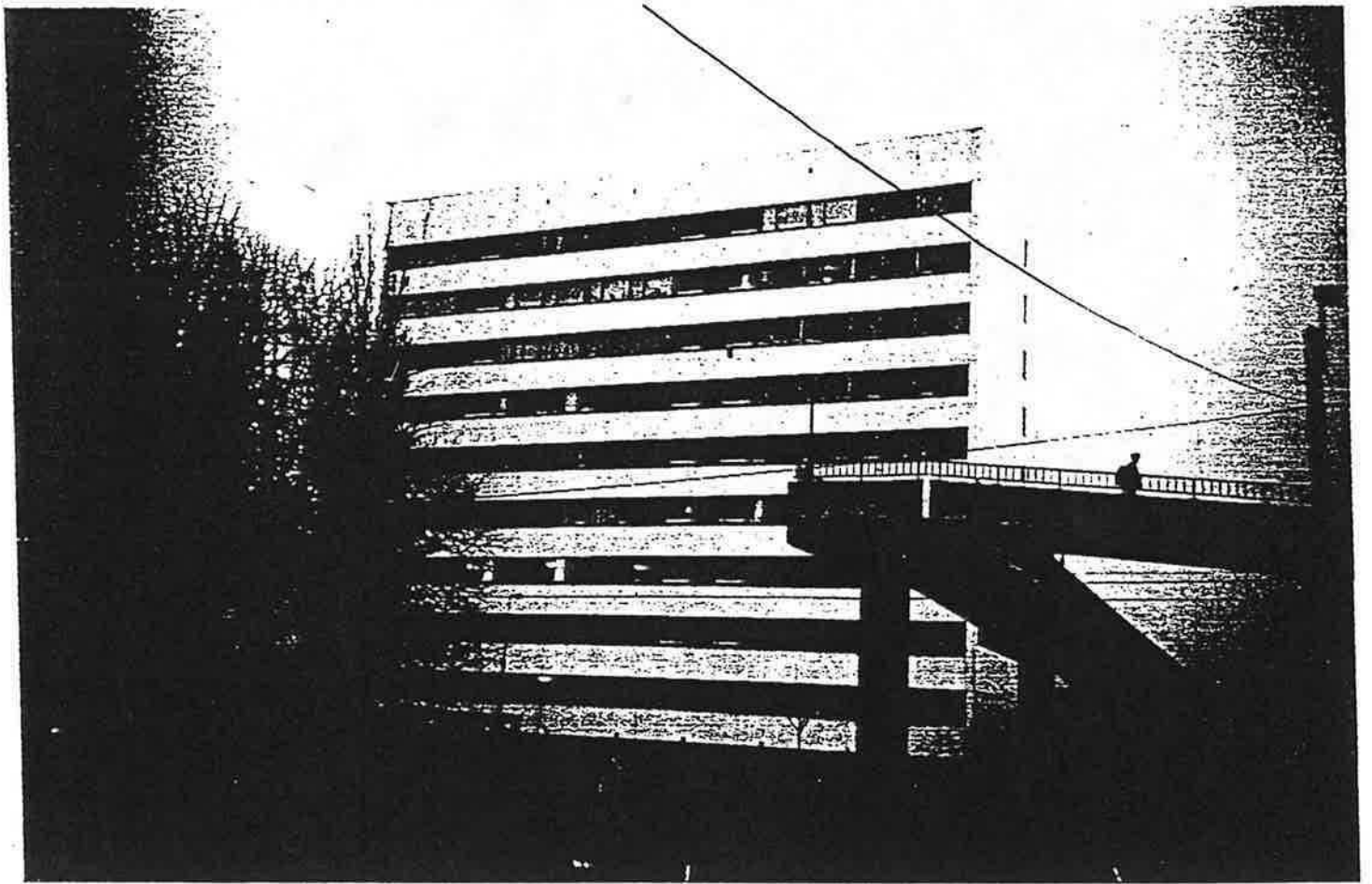


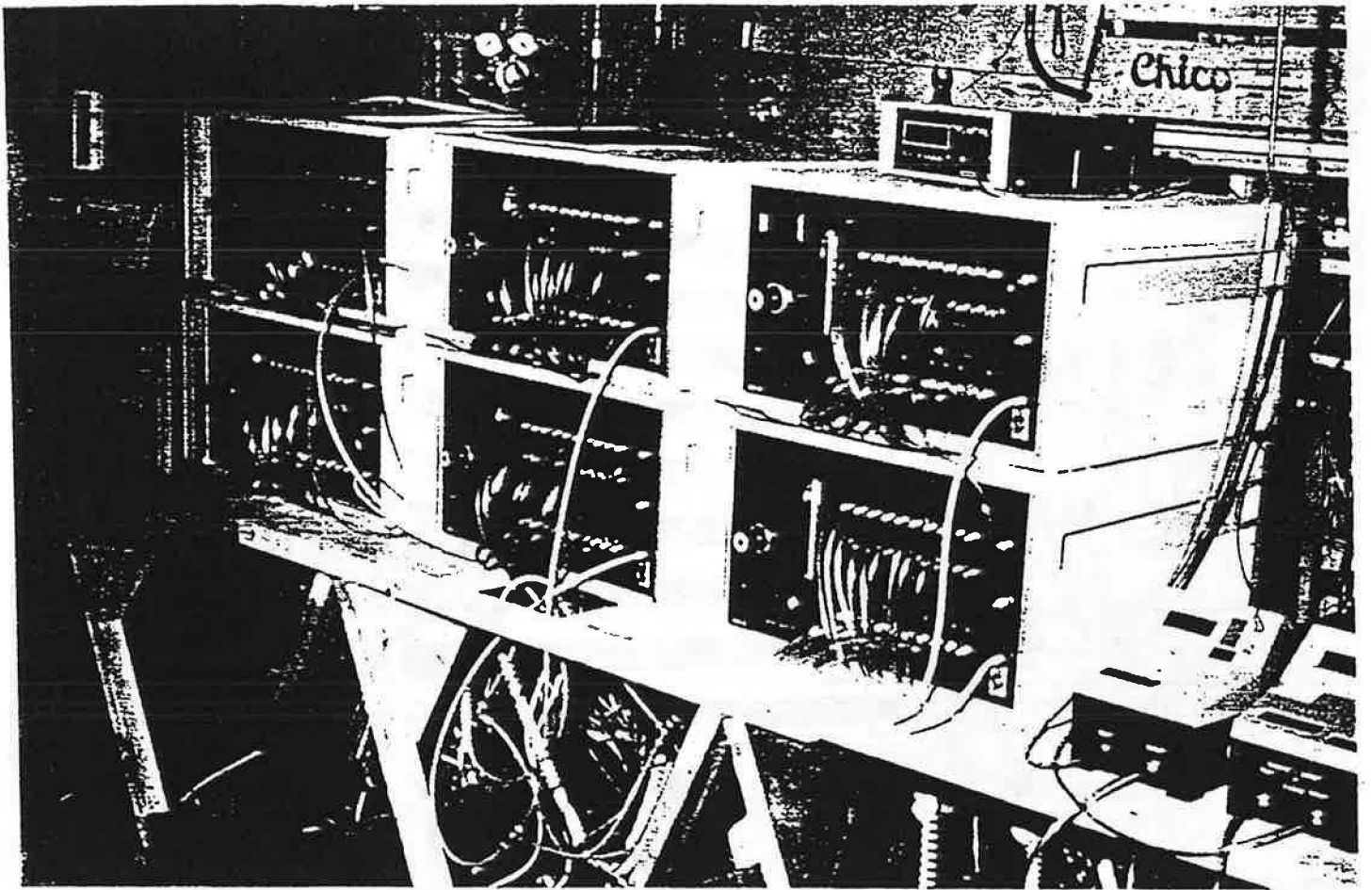
AIR OUTLETS CHARACTERISTICS







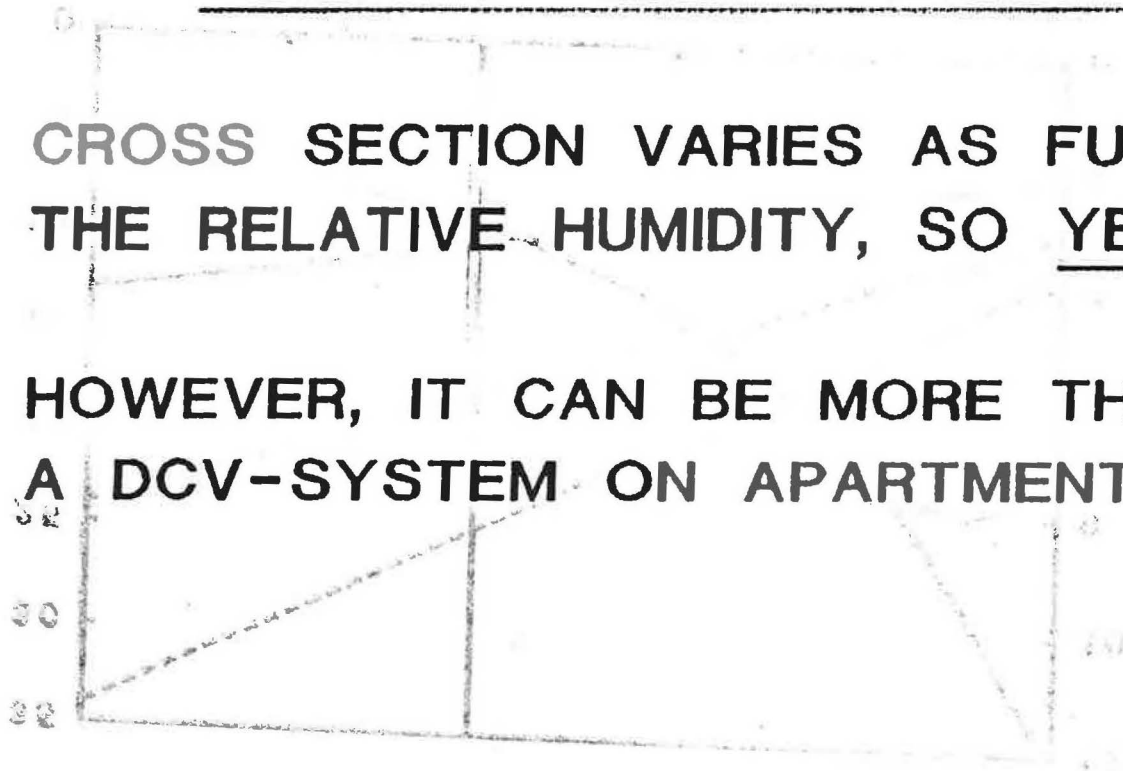




IS IT A DEMAND CONTROLLED VENTILATION SYSTEM ?

* CROSS SECTION VARIES AS FUNCTION OF THE RELATIVE HUMIDITY, SO YES

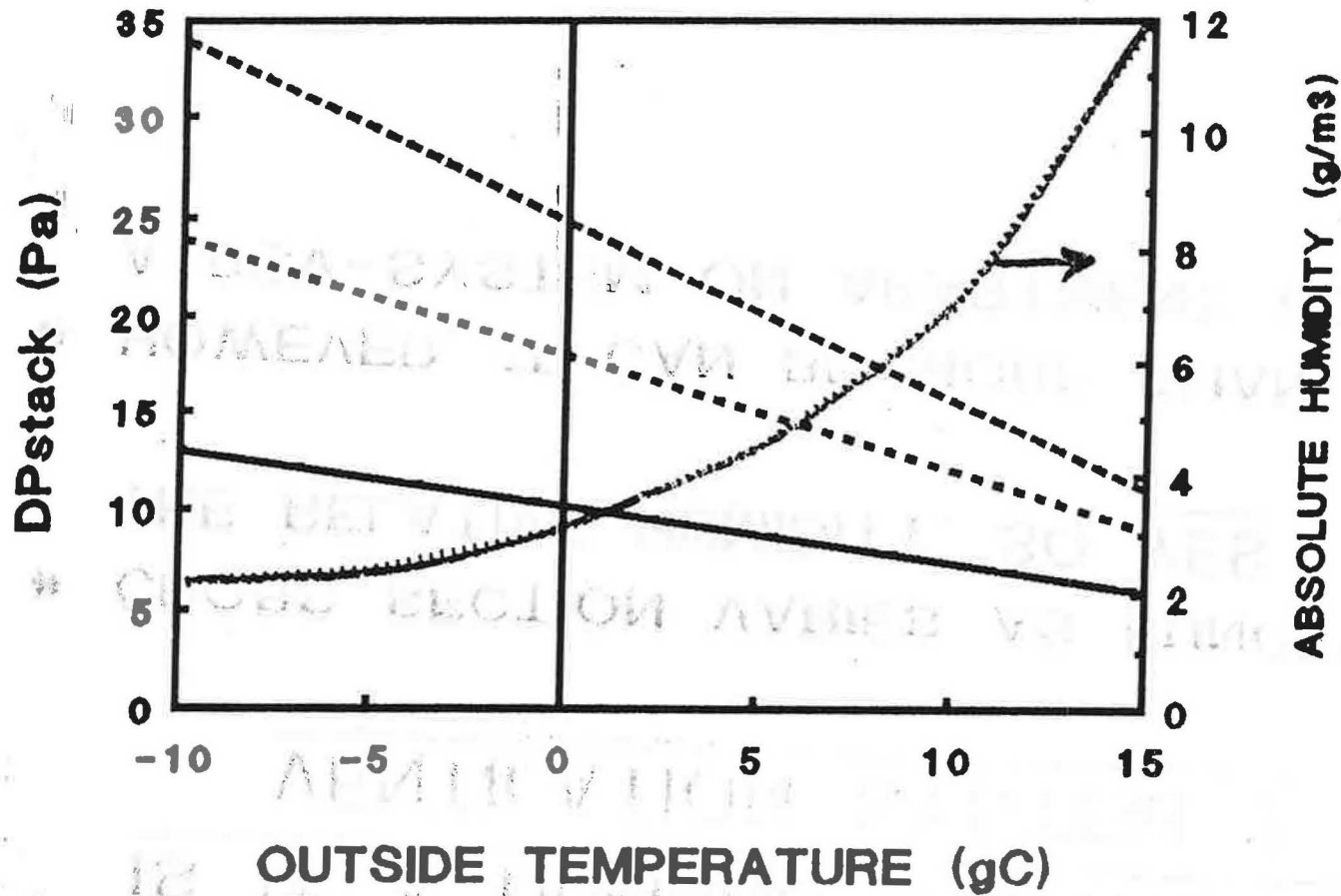
* HOWEVER, IT CAN BE MORE THAN JUST A DCV-SYSTEM ON APARTMENT LEVEL



VENTILATION SYSTEM

VARIATION STACK EFFECT - HUMIDITY VERSUS OUTSIDE TEMPERATURE

— 7 3 - - - - 0 HUM.



CONTRACT PREPARATION



GENERAL DISCUSSIONS



MEASUREMENT PRINCIPLE



PRODUCTION EQUIPMENT



TESTING



1TH CAMPAIGN



ANALYSIS-MODIFICATIONS



2nd CAMPAIGN



FINAL REPORTING



MAJOR AIM OF THE PROJECT

* TO EVALUATE THE PERFORMANCES OF THE SYSTEM WITH RESPECT TO ENERGY CONSUMPTION AND AIR QUALITY IMPROVEMENTS

* THE MAJOR AIM IS NOT TO COLLECT INTERESTING RESULTS ON VENTILATION AND AIR QUALITY IN-BUILDINGS

RESEARCH DEPARTMENT

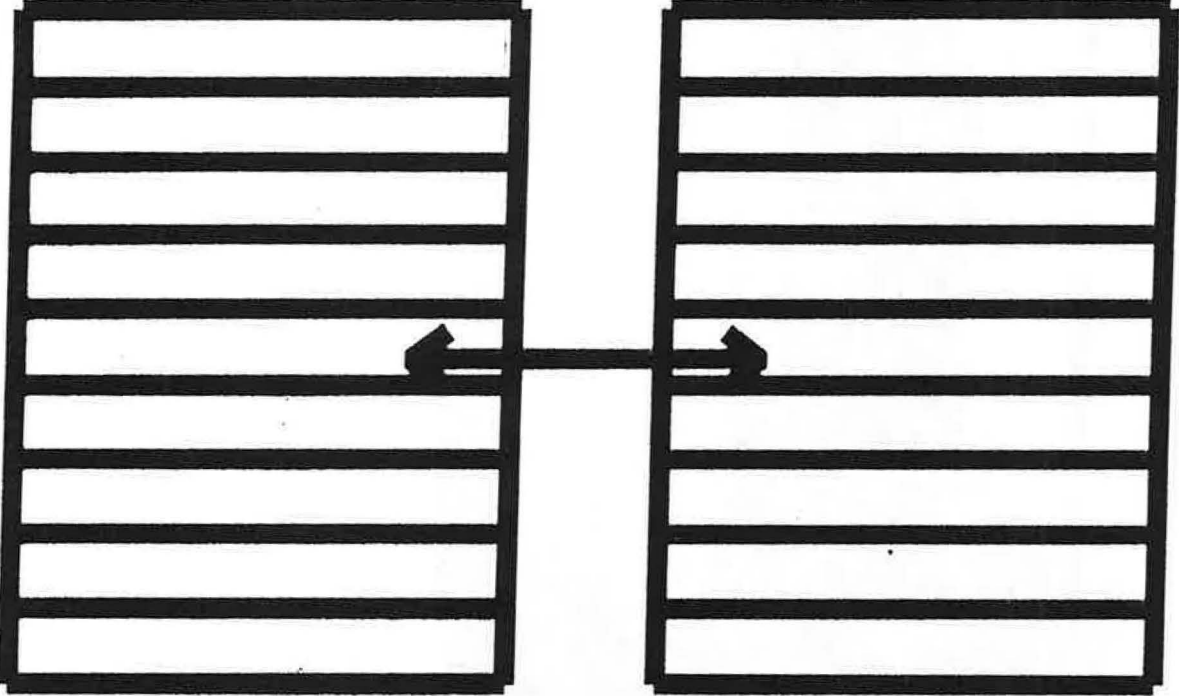
TECHNICAL REPORT

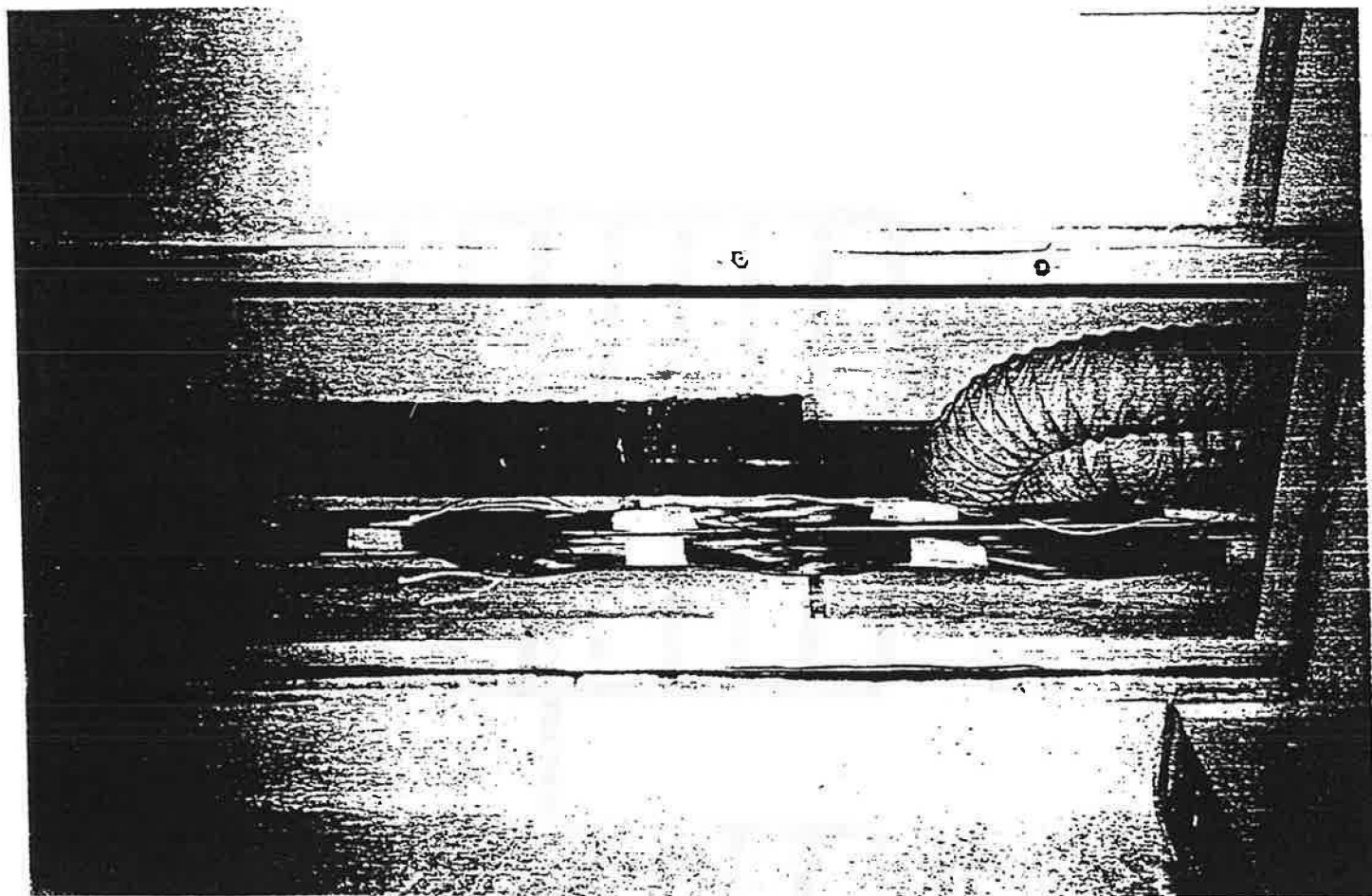
1980

CONSTRUCTION

**REFERENCE
APARTMENTS**

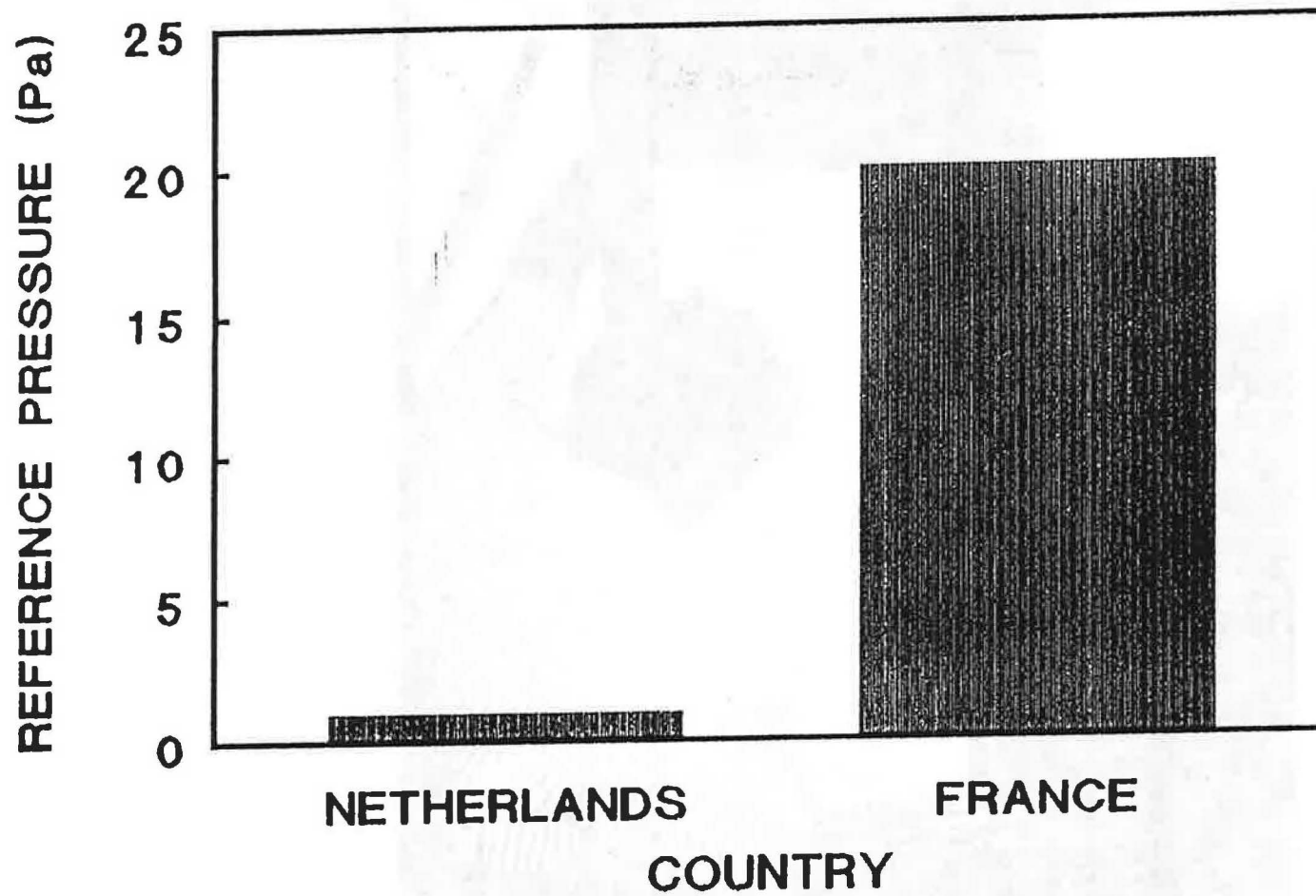
**HUMIDITY
CONTROLLED
APARTMENTS**







NATURAL VENTILATION REFERENCE PRESSURE





DETAILED INFORMATION

EXTRACTION FLOW RATE: APPROX. 10 L/min



RECORDING USE: APPROX. 10 L/min

ENQUIRY ON: APPROX. 10 L/min



OVERVIEW OF MEASUREMENT ACTIVITIES

DETAILED PRESSURIZATION MEASUREMENTS

EXTRACTION FLOW RATES AND 'I.A.Q.'

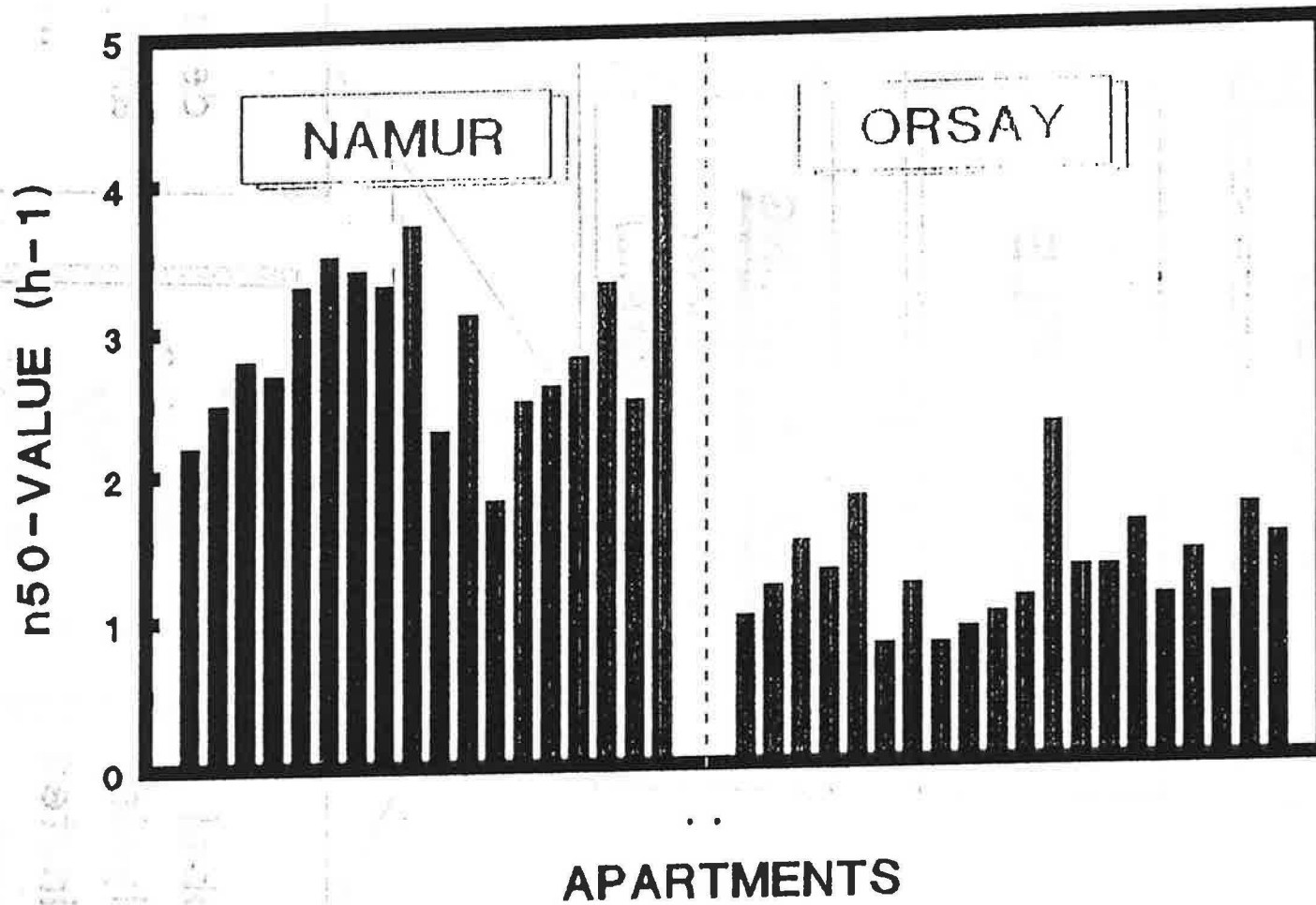
RECORDING USE AIR INLETS

ENQUIRY ON VENTILATION APPRECIATION

PRESSURES ON FACADE

DETAILED MEASUREMENTS IN 1 APARTMENT

PRESSURIZATION MEASUREMENT RESULTS



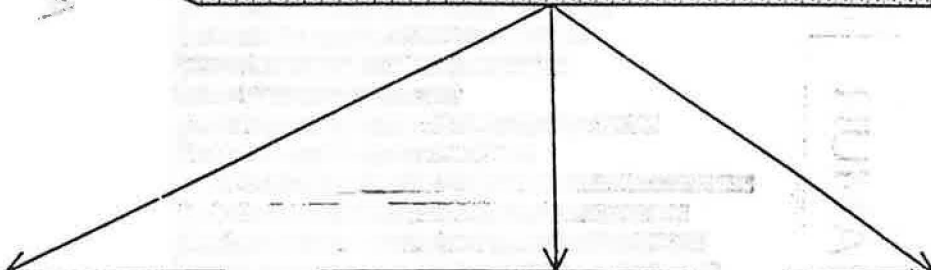
**MEASURED DATA
HP BASIC**



LOTUS FILE



**DATA CHECKING
(reverse flow,
bad sensors,...)**

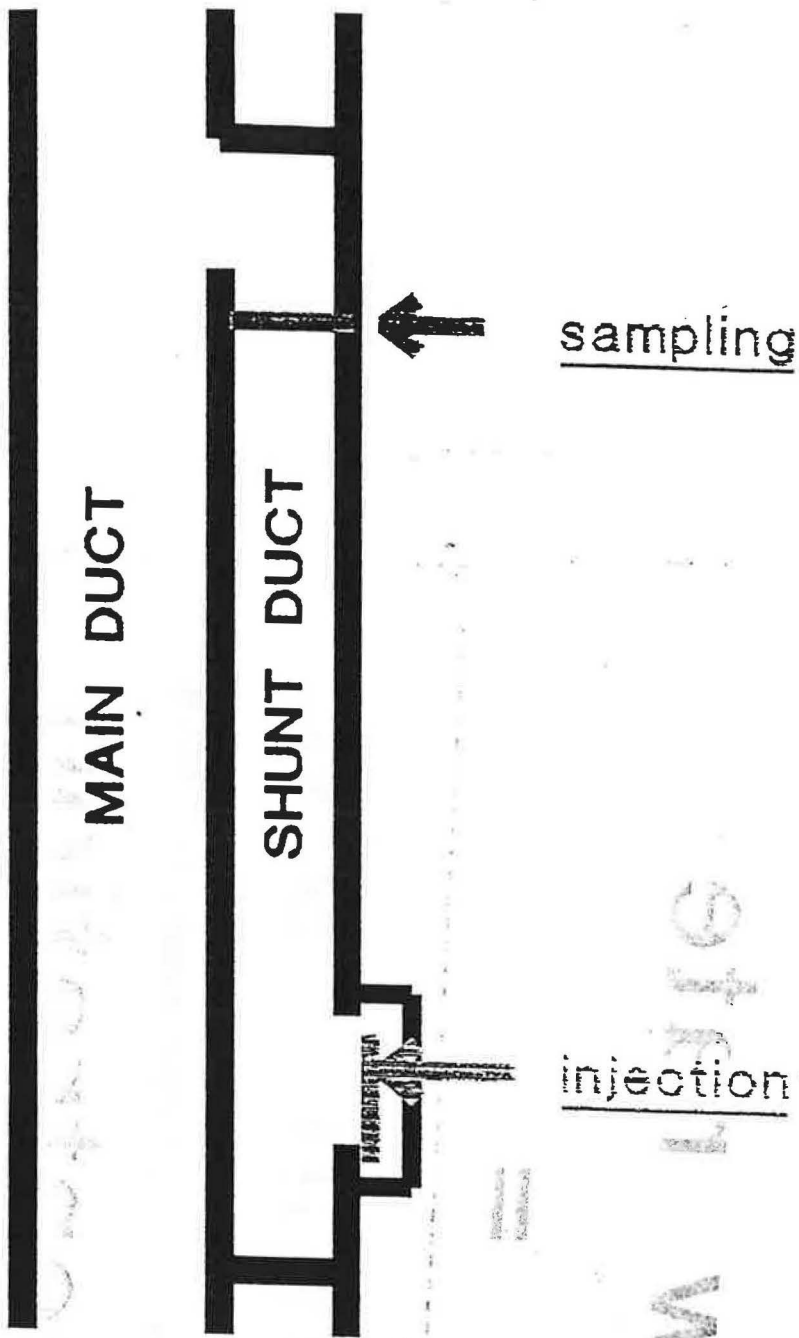


**global
analysis
20 minutes-
level**

**global
analysis
daily
average
level**

**detailed
analysis**

....
....



$$\text{FLOW RATE} = \frac{\text{INJECTION RATE}}{\text{CONCENTRATION}}$$

CALCULATION

flow rate

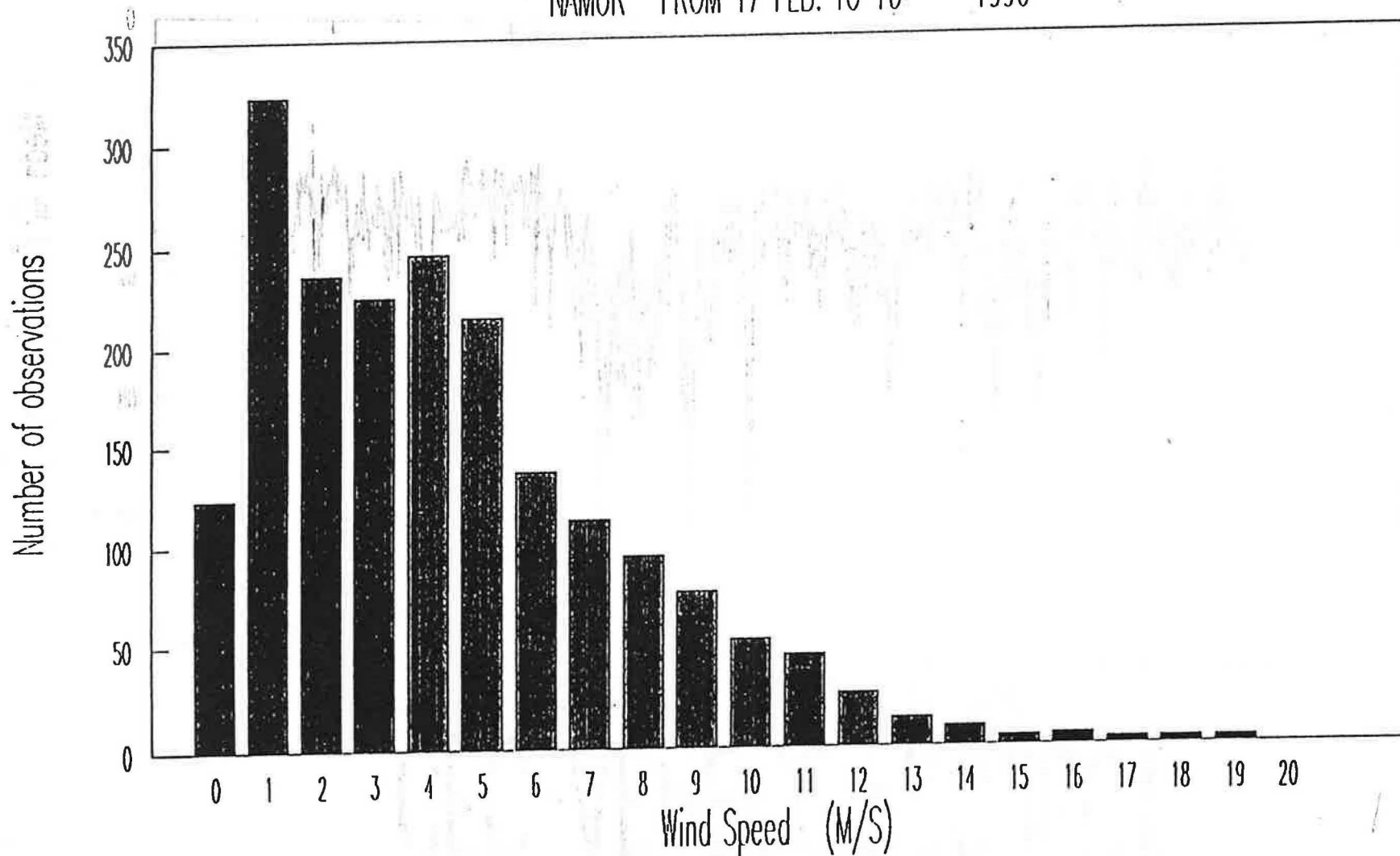
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injection rate

concentration

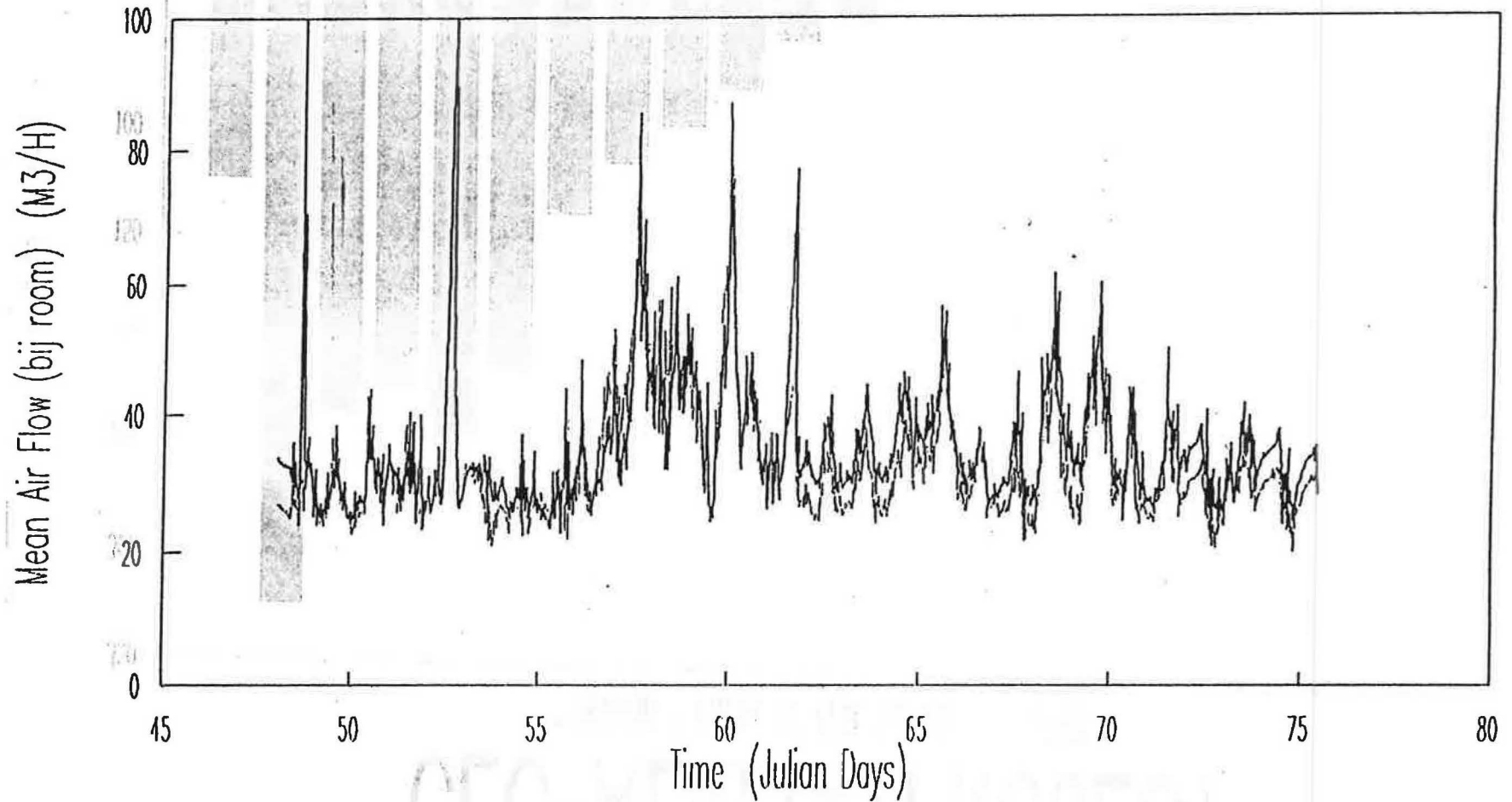
CEC-AERECO PROJECT

" NAMUR " FROM 17 FEB. TO 16 1990



CEC-AERECO PROJECT

"NAMUR" FROM 17 FEB. TO 16 MAR. 1990



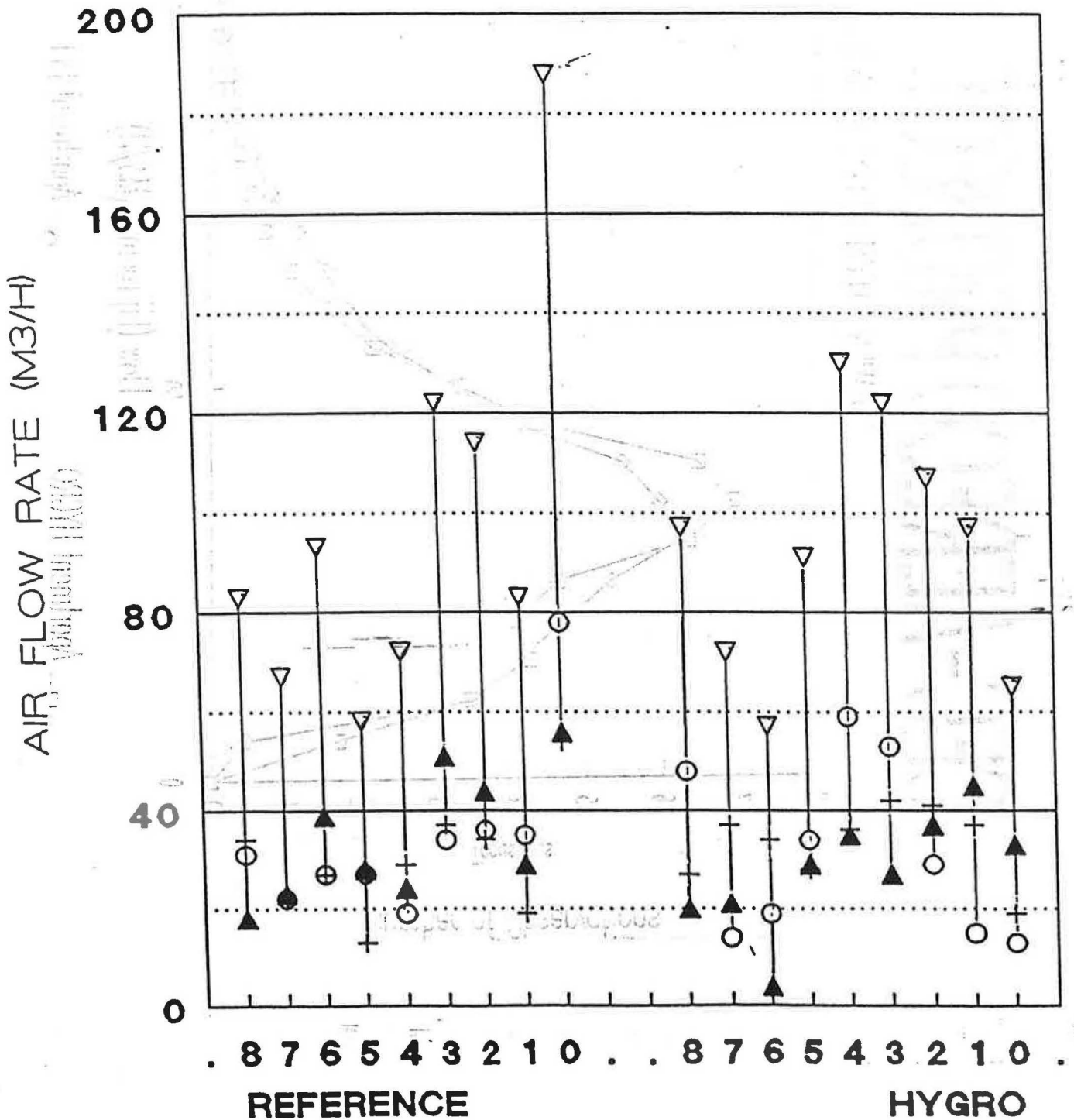
— Apartment HYGRO.

— Apartment REF.

CEC-AERECO

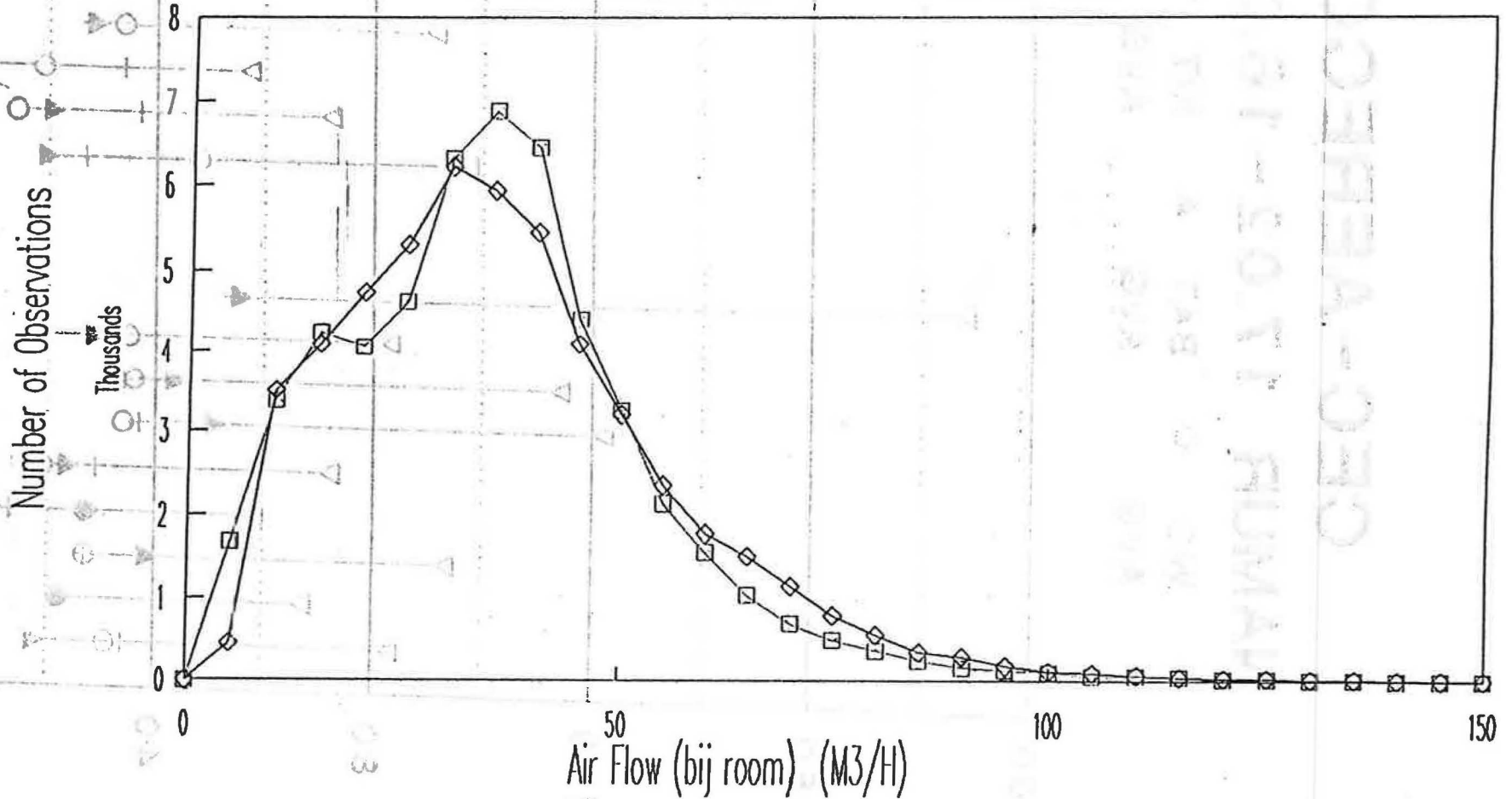
NAMUR 17.02-16.03.90

+ WC ○ BAT ▲ KIT ▽ TOT
 AVG AVG AVG AVG



CEC-AERECO PROJECT

" NAMUR " FROM 17 FEB. TO 16 MAR. 1990



□ Apartment HYGRO.

◇ Apartment REF.

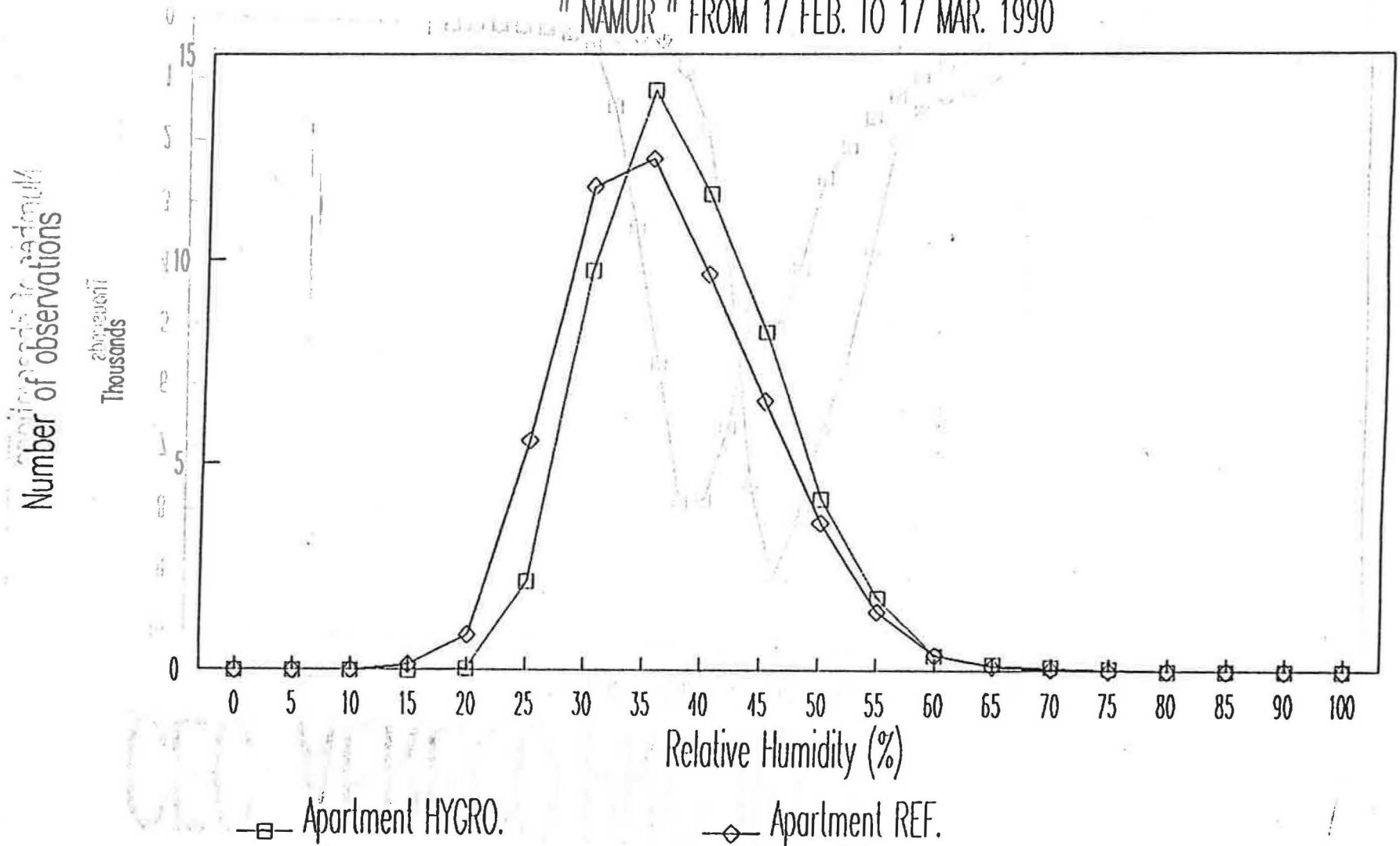
REFERENCE

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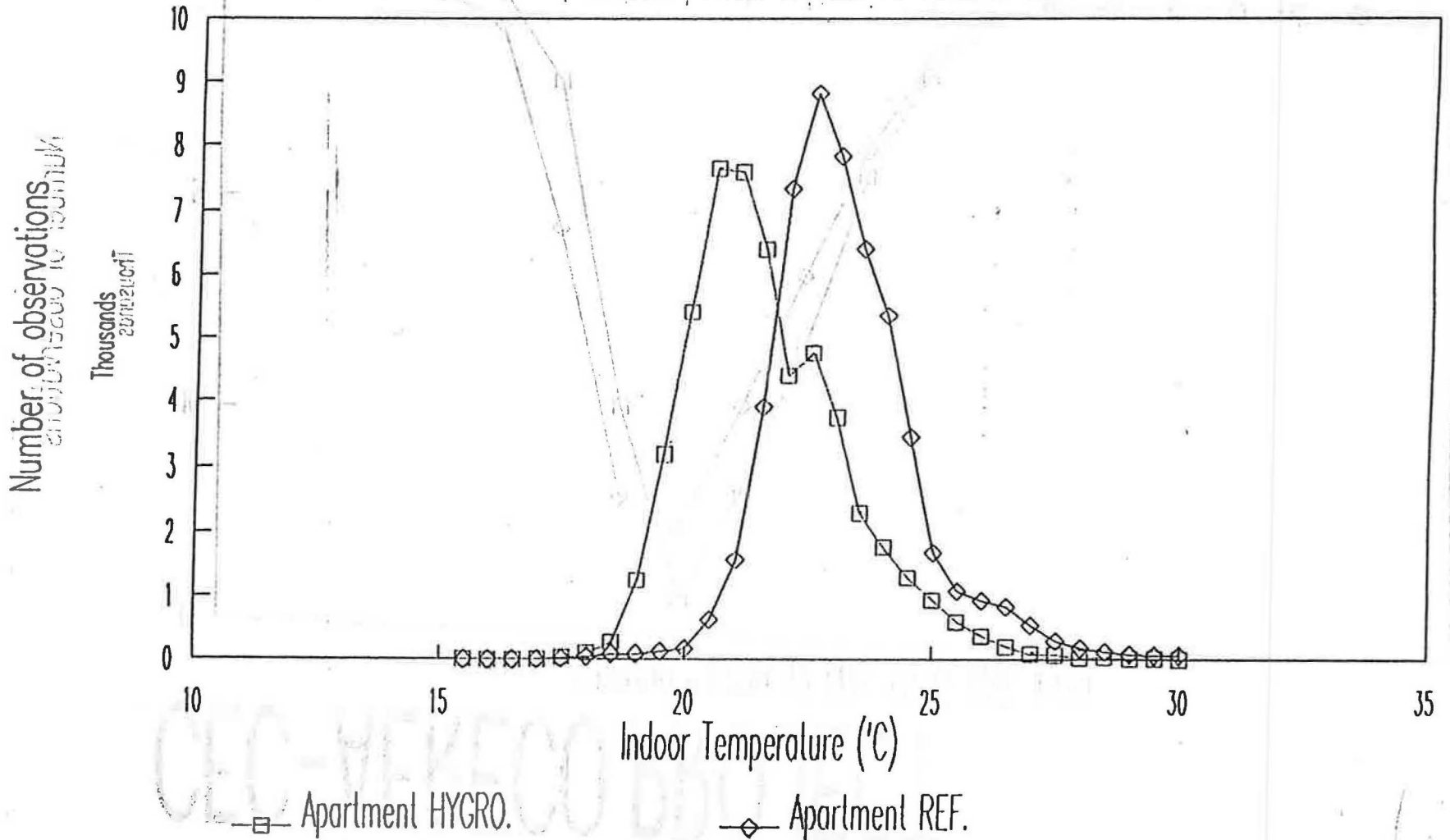
CEC-AERECO PROJECT

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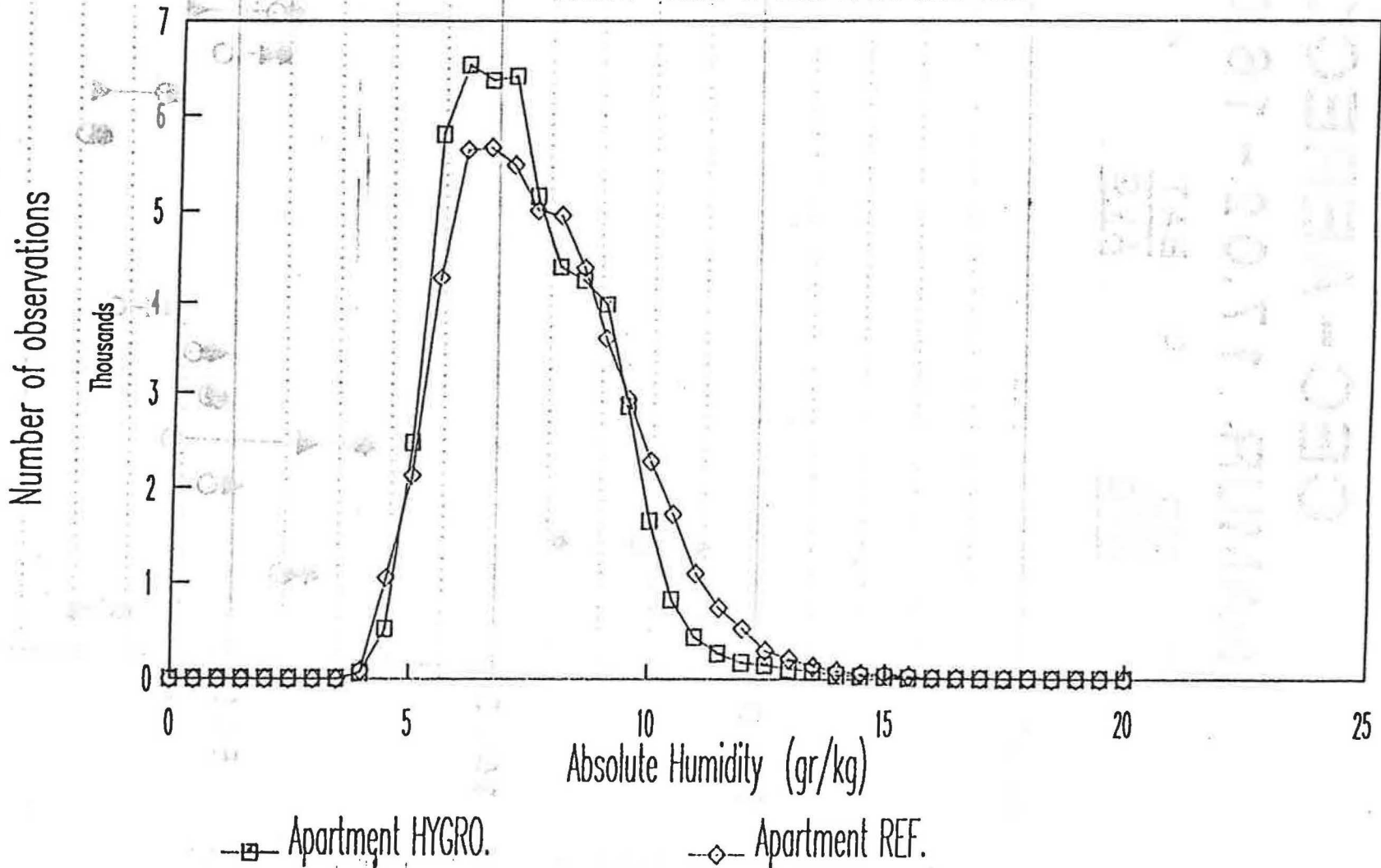
CEC-AERECO PROJECT

"NAMUR" FROM 17 FEB. TO 16 MAR. 1990



CEC-AERECO PROJECT

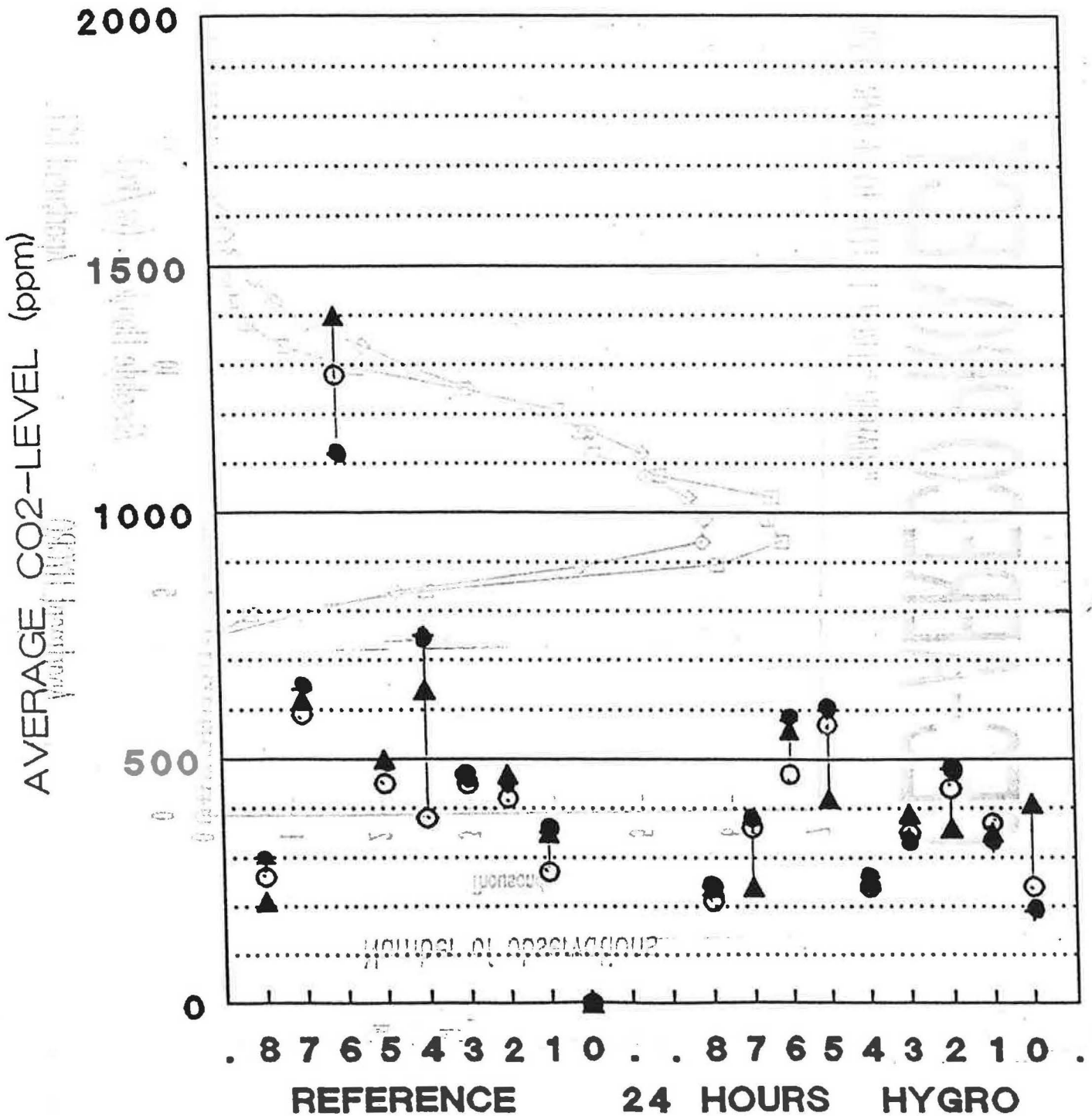
" NAMUR " FROM 17 FEB. TO 16 MAR. 1990



CEC-AERECO

NAMUR 17.02-16.03.90

● WC ○ BAT ▲ KIT
AVG AVG AVG



MEASUREMENT OF POLLUTANT FLOW RATES (P.F.R.)

P.F.R.

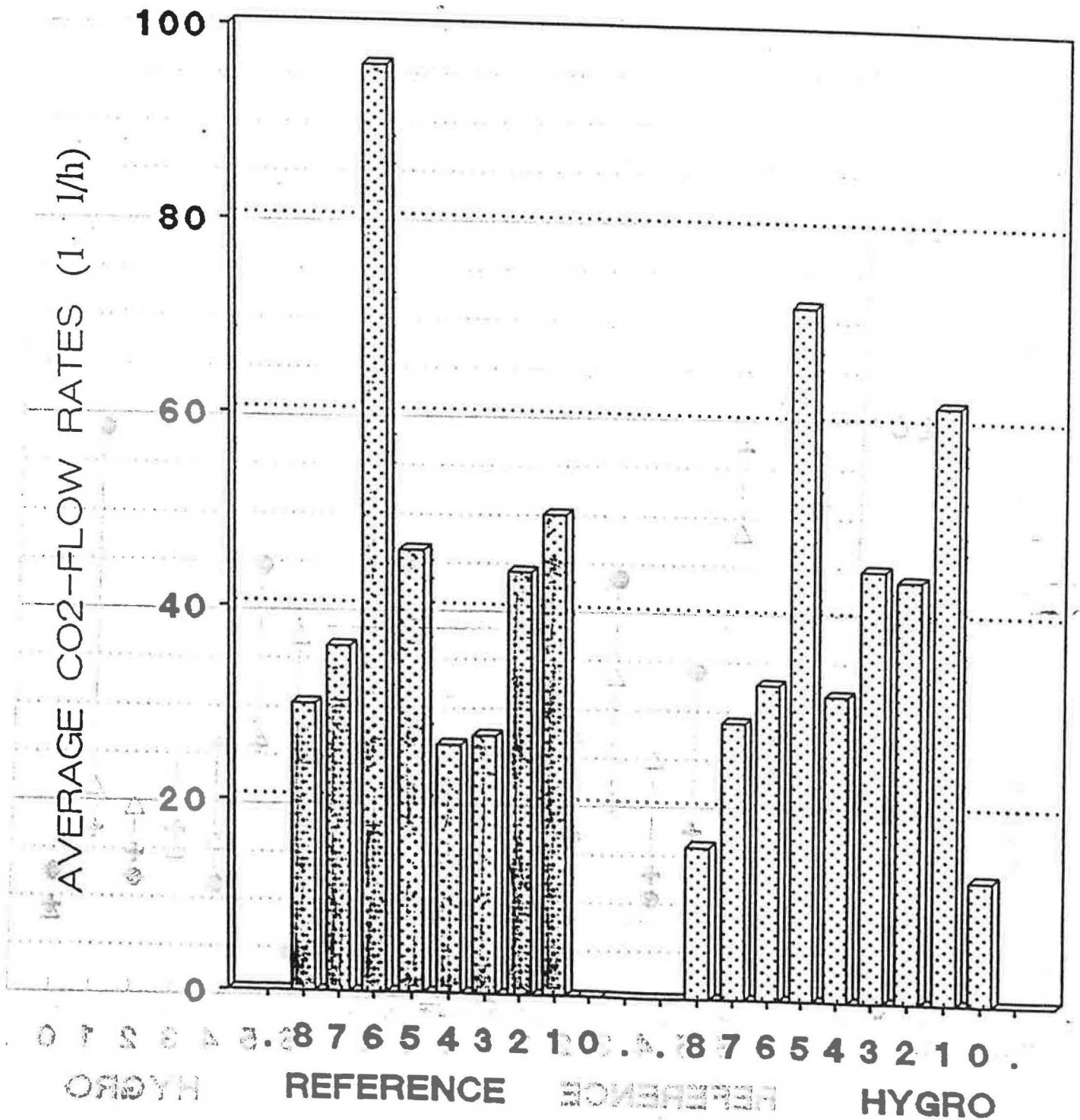
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AIR FLOW RATE * (C_{in} - C_{out})

CEC-AERECO

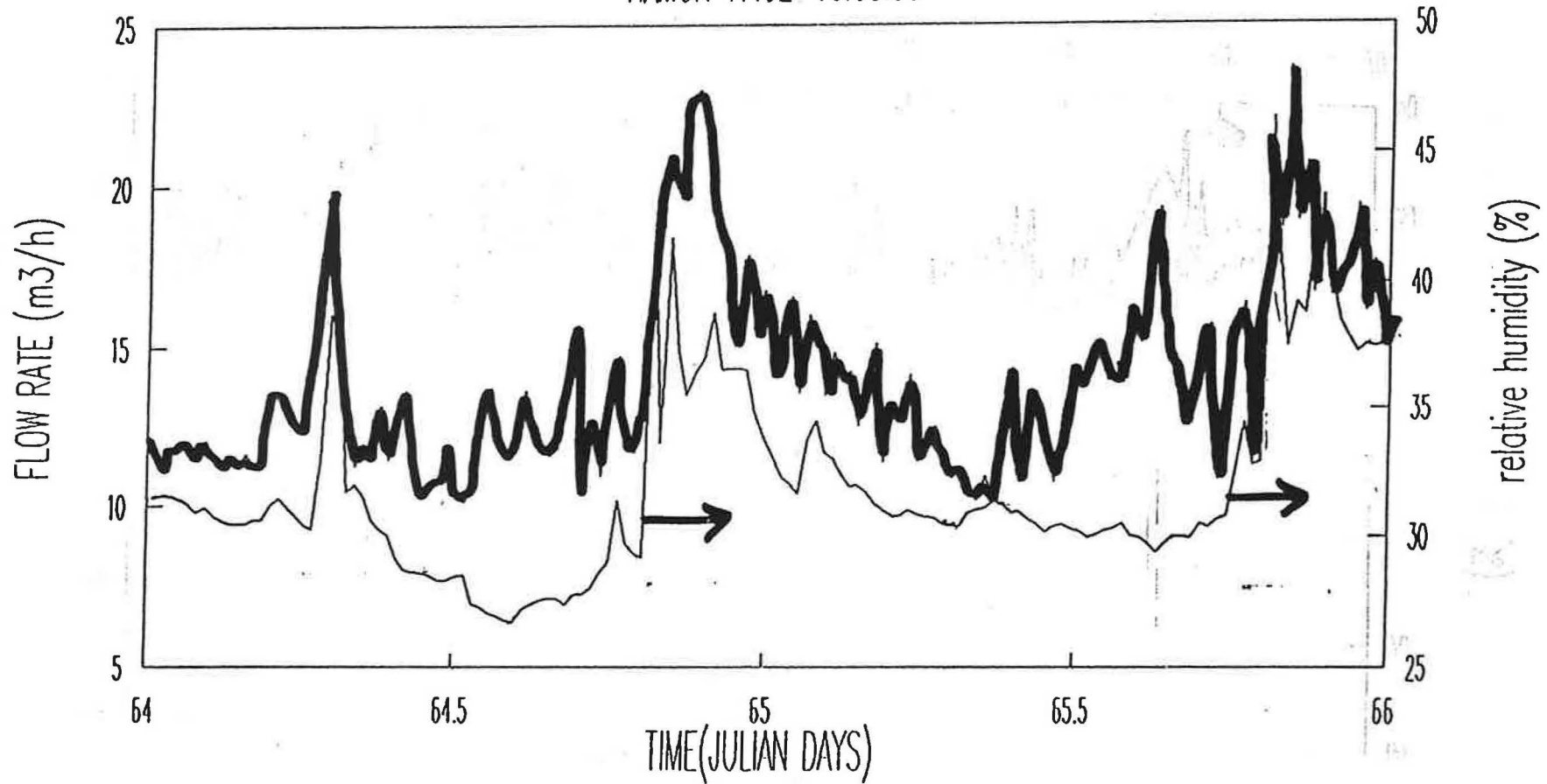
NAMUR 17.02-16.03.90

TOT
AVG



CEC-AERECO

NAMUR 17.02-16.03.90



flow rate

rel. hum.

level 1 hygro bathroom

PRELIMINARY CONCLUSIONS

- * MEASUREMENTS SEEM TO BE RELIABLE
- * PROBABLY RATHER UNIQUE DATASET FOR THESE COUNTRIES ON NATURAL VENTILATED BUILDINGS
- * FIRST CONCLUSIONS ON GLOBAL VENTILATION ARE AVAILABLE
- * CLEAR INDICATIONS THAT HUMIDITY CONTROLLED AIR OUTLETS FUNCTION
- * FURTHER STUDY NEEDED WITH RESPECT TO QUANTITATIVE INFORMATION ON IMPACT HUMIDITY CONTROLLED VENTILATION

