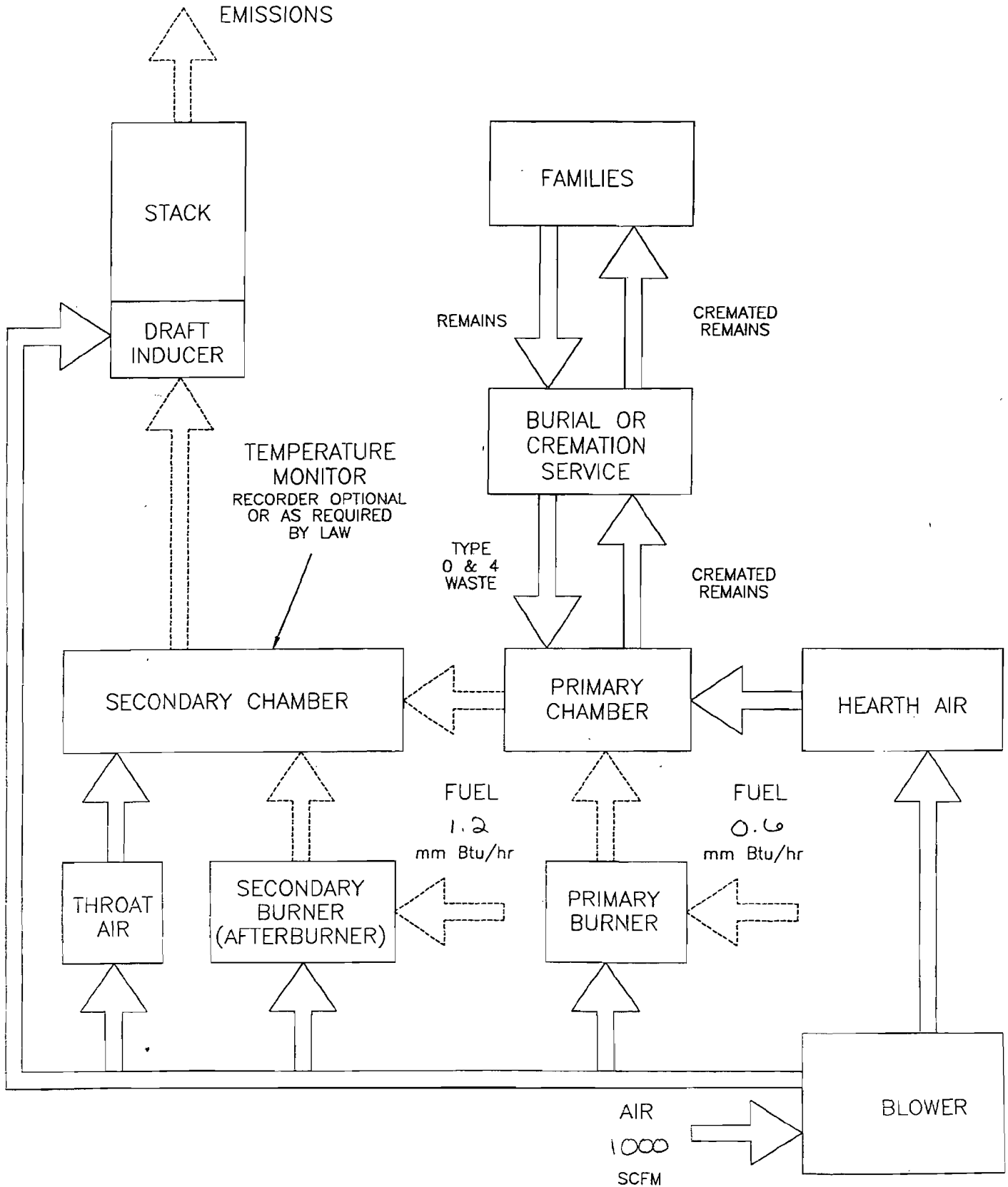
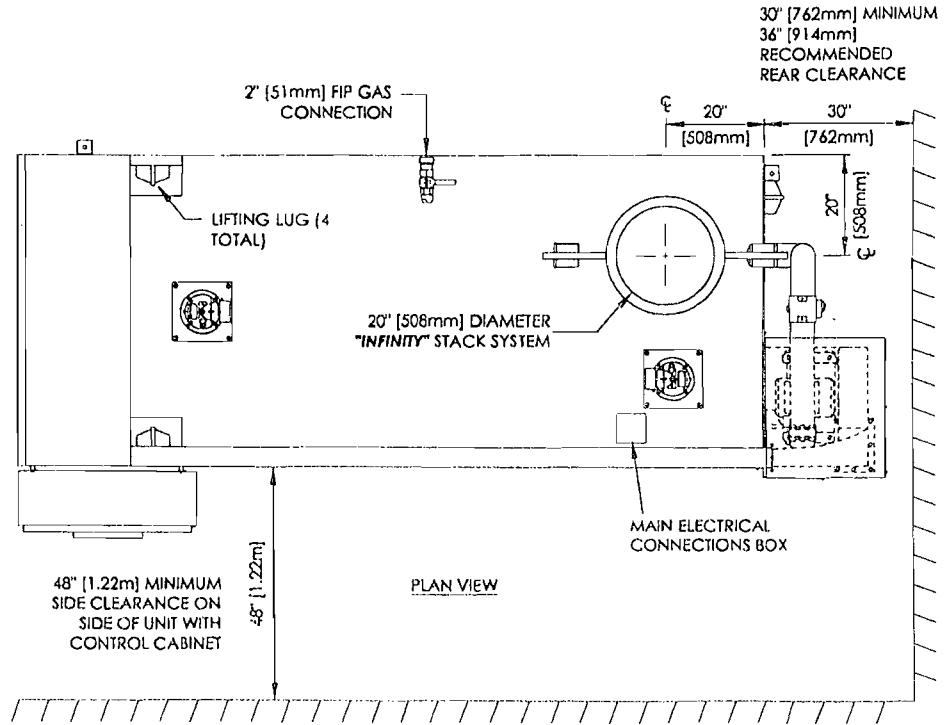
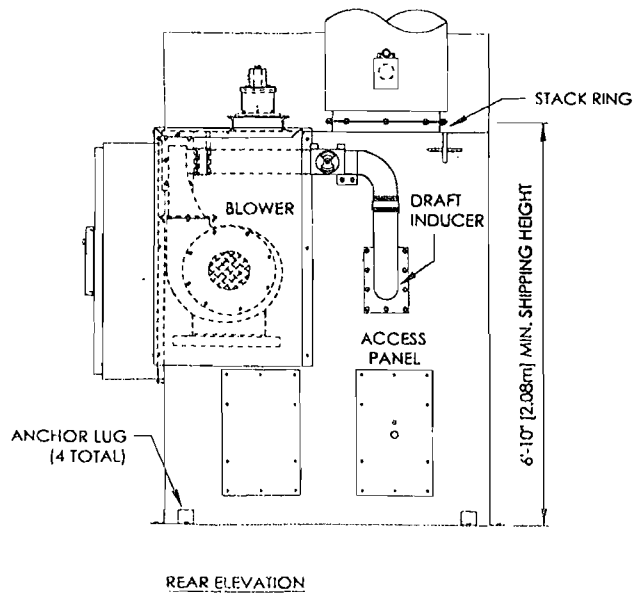
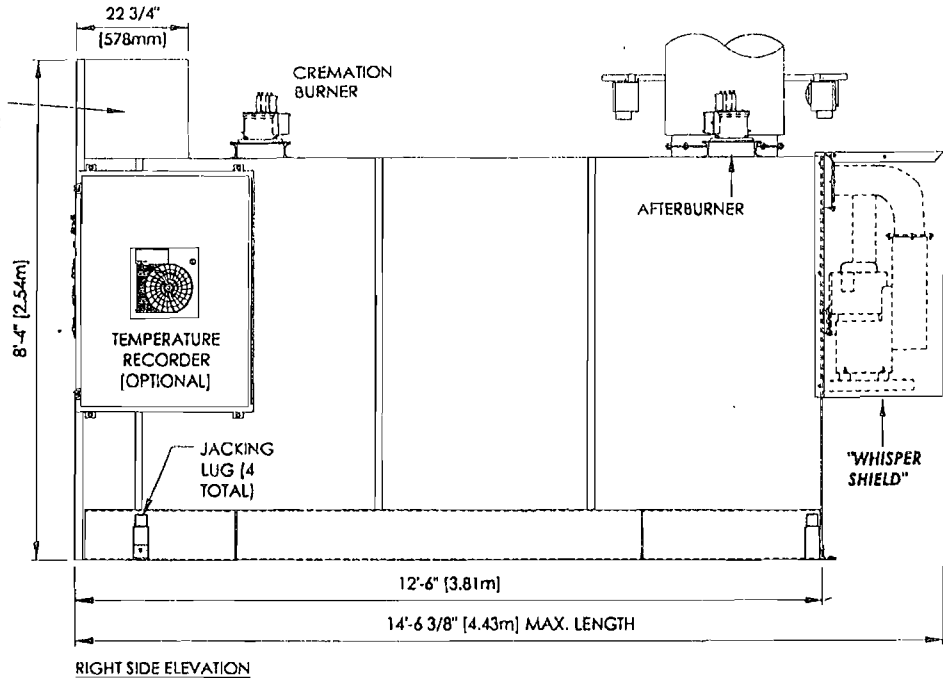
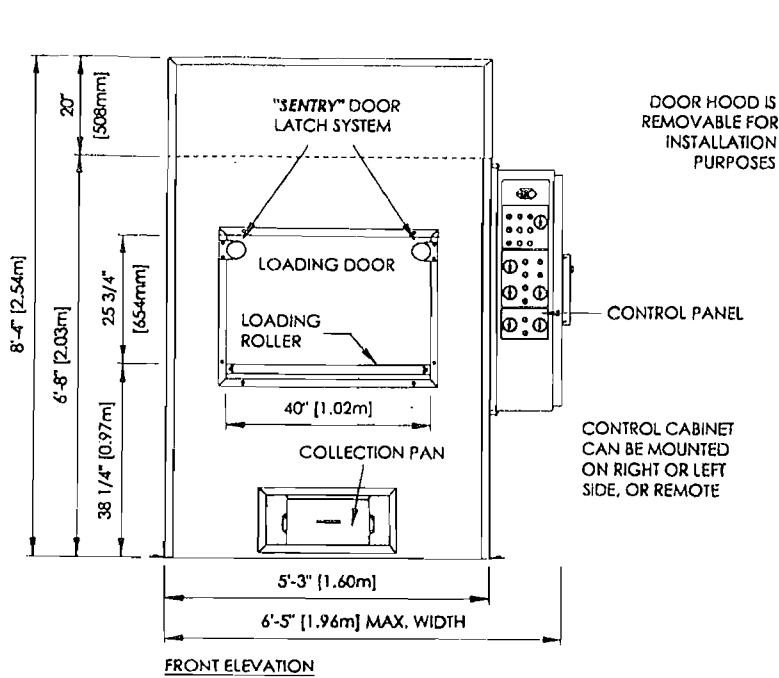


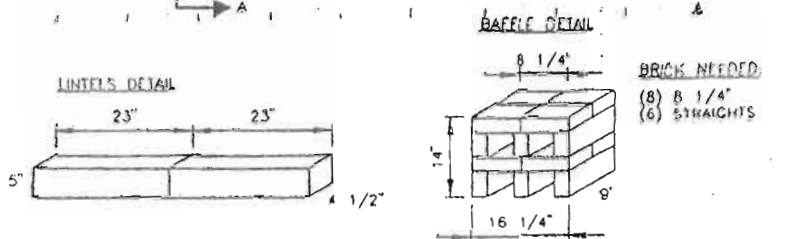
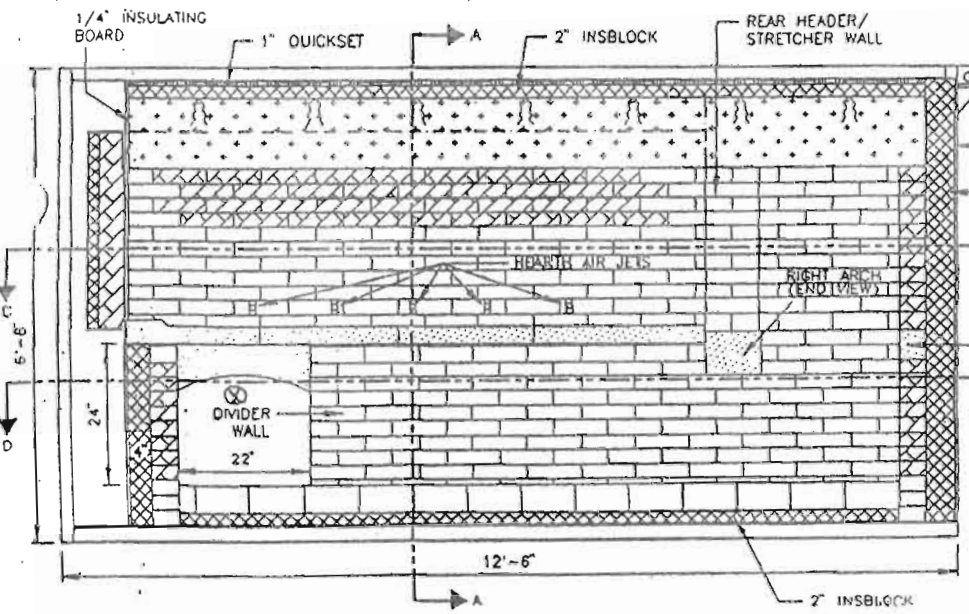
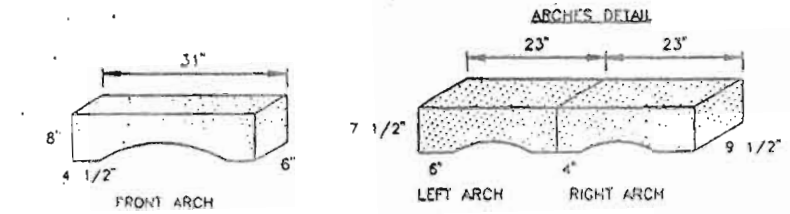
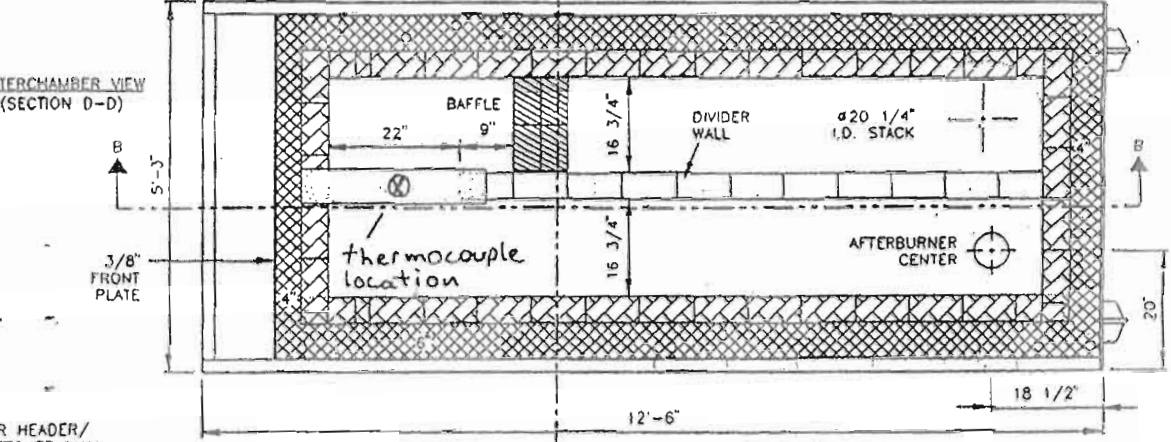
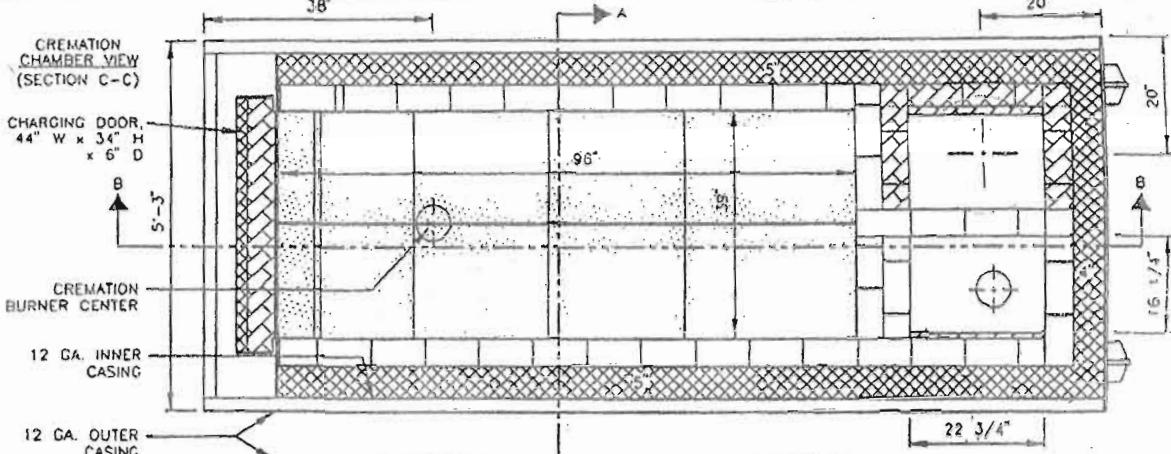
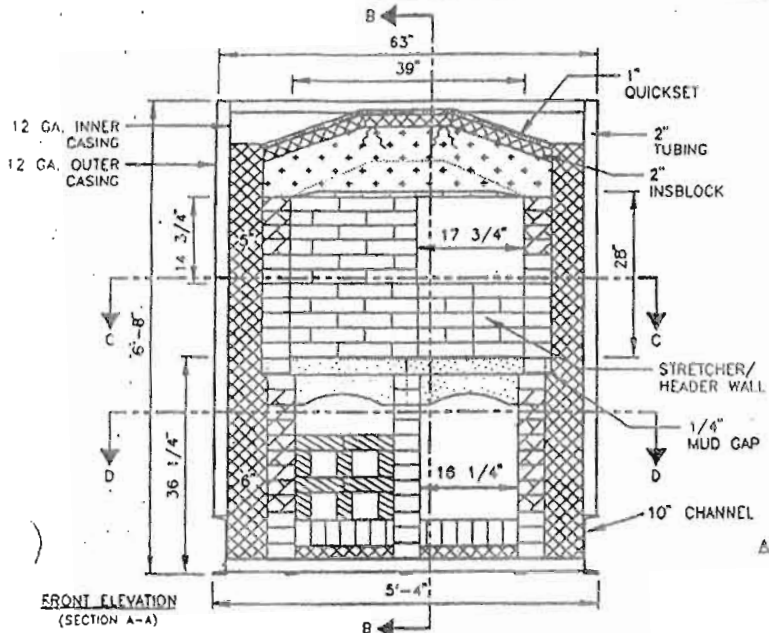
Lowthier

III

PROCESS FLOW DIAGRAM CREMATOR







MATERIALS LEGEND

	FIREBRICK		CASTABLE KS-4		INSULATED BLOCK
	INSULATED FIREBRICK		CASTABLE MC 25+		QUICKSET INSULATION

INDUSTRIAL EQUIPMENT & ENGINEERING COMPANY

P.O. BOX 547796
ORLANDO, FLORIDA

Power-Pak II

Refractory
Eclipse Packaged Burners

DESIGNED BY: E. HADGE FILE NO: P2-BRKPE SHEET NO: 3

CHECKED BY: E. THOMAS DATE: 10-20-95

CREMATOR MASS BALANCE

Industrial Equipment & Engineering Company
Model IE43-PPII Cremation Incinerator, Fired on Natural Gas

THESE CALCULATIONS HAVE BEEN PREPARED TO EVALUATE THE COMBUSTION PROCESS IN THE MODEL IE43-PPII (POWER-PAK II) CREMATORY INCINERATOR AT A WORST CASE CONDITION WITH RESPECT TO RETENTION TIME.

THE INCINERATOR INSTITUTE OF AMERICA HAS PUBLISHED THE FOLLOWING SPECIFICATIONS COVERING AVERAGE WASTES.

WASTE TYPE	TYPE 0	TYPE 4
BTU PER POUND	8500	1000
POUND ASH PER POUND WASTE	0.05	0.05
POUND MOISTURE PER POUND WASTE	0.1	0.85
POUND COMBUSTIBLES PER POUND WASTE	0.85	0.1
HOURLY CONSUMPTION OF WASTE (LBS)	20	80

1. MASS OF PRODUCTS OF COMBUSTION FROM CONTAINER

A. COMBUSTION AIR

$$\frac{8500 \text{ BTU/LB}}{100 \text{ BTU/CF OF AIR}^*} \times 0.075 \text{ LB/CF OF AIR} = 6.38 \text{ LB/LB BURNED}$$

B. COMBUSTIBLES AND WATER VAPOR FROM CHART ABOVE 0.95 LB/LB BURNED

C. TOTAL FLUE PRODUCT MASS PER LB BURNED 7.33 LB/LB BURNED

2. MASS OF PRODUCTS OF COMBUSTION FROM BODY

A. COMBUSTION AIR

$$\frac{1000 \text{ BTU/LB}}{100 \text{ BTU/CF OF AIR}^*} \times 0.075 \text{ LB/CF OF AIR} = 0.75 \text{ LB/LB BURNED}$$

B. COMBUSTIBLES AND WATER VAPOR FROM CHART ABOVE 0.95 LB/LB BURNED

C. TOTAL FLUE PRODUCT MASS PER LB BURNED 1.70 LB/LB BURNED

SPECIFICATIONS	
PRIMARY BURNER FUEL CONSUMPTION (MMBTU/HR)	0.5
SECONDARY BURNER FUEL CONSUMPTION (MMBTU/HR)	1.2
ADDITIONAL SECONDARY AIR SUPPLIED (CFM)	200
SEC. CHAMBER TEMPERATURE (°F)	1800
SECONDARY CHAMBER VOLUME (CU. FT)	70.7
SEC. CHAMB. CROSS-SECTIONAL AREA (SQ. FT)	2.44
FLAME PORT AREA (SQ. FT)	2.95
MIXING BAFFLES AREA (SQ. FT)	1.36

< = = = ACTUAL OPERATING TEMP. IS 1600°F MINIMUM

*AIR AT STANDARD CONDITIONS

3. TOTAL FLUE PRODUCT:

A. MAXIMUM PRIMARY BURNER NATURAL GAS USAGE

$$500000 \text{ BTU/HR} \times \frac{0.045 \text{ LBS/CF}}{1000 \text{ BTU/CF}} = 22.5 \text{ LBS/HR}$$

B. COMBUSTION AIR FOR PRIMARY BURNER

$$\frac{500000 \text{ BTU/HR}}{100 \text{ BTU/CF AIR}} \times 0.075 \text{ LB/CF AIR} = 375 \text{ LBS/HR}$$

C. MAXIMUM SECONDARY BURNER NATURAL GAS USAGE

$$1200000 \text{ BTU/HR} \times \frac{0.045 \text{ LBS/CF}}{1000 \text{ BTU/CF}} = 54 \text{ LBS/HOUR}$$

D. COMBUSTION AIR FOR SECONDARY BURNER

$$\frac{1200000 \text{ BTU/HR}}{100 \text{ BTU/CF AIR}} \times 1.75 \text{ (75\% E.A.)} \times 0.075 \text{ LB/CF AIR} = 1575 \text{ LBS/HOUR}$$

E. PRODUCTS FROM TYPE 0 WASTE (CONTAINER)

$$7.33 \text{ LBS/LB BURNED} \times 20 \text{ LB/HR BURN RATE} = 147 \text{ LBS/HOUR}$$

F. PRODUCTS FROM TYPE 4 WASTE (TISSUE)

$$1.70 \text{ LBS/LB WASTE} \times 80 \text{ LB/HR BURN RATE} = 136 \text{ LBS/HOUR}$$

G. ADDITIONAL SECONDARY CHAMBER COMBUSTION AIR (THROAT AIR)

$$12000 \text{ CF/HR}^* \times 0.075 \text{ LB/CF AIR} = 900 \text{ LBS/HOUR}$$

H. TOTAL FLUE PRODUCTS

3209 LBS/HOUR

2. VELOCITY AND TIME CALCULATIONS

A. SCFM CALCULATION

(PRODUCTS ASSUMED TO HAVE DENSITY CLOSE TO AIR)

$$3209 \text{ LBS/HR} \times \frac{13.35 \text{ STD. CU. FT/LB}}{60 \text{ MIN/HR}} = 714 \text{ SCFM}$$

B. TOTAL PRODUCTS ACFM

@ 1800 °F

$$\frac{2260 \text{ °RANKINE}}{530 \text{ °RANKINE}} \times 714.0 \text{ CFM} = 3045 \text{ ACFM}$$

C. RETENTION TIME

$$\frac{70.7 \text{ CU. FT}}{3045 \text{ ACFM}} \times \frac{60 \text{ SECONDS}}{1 \text{ MINUTE}} = 1.39 \text{ SECONDS}$$