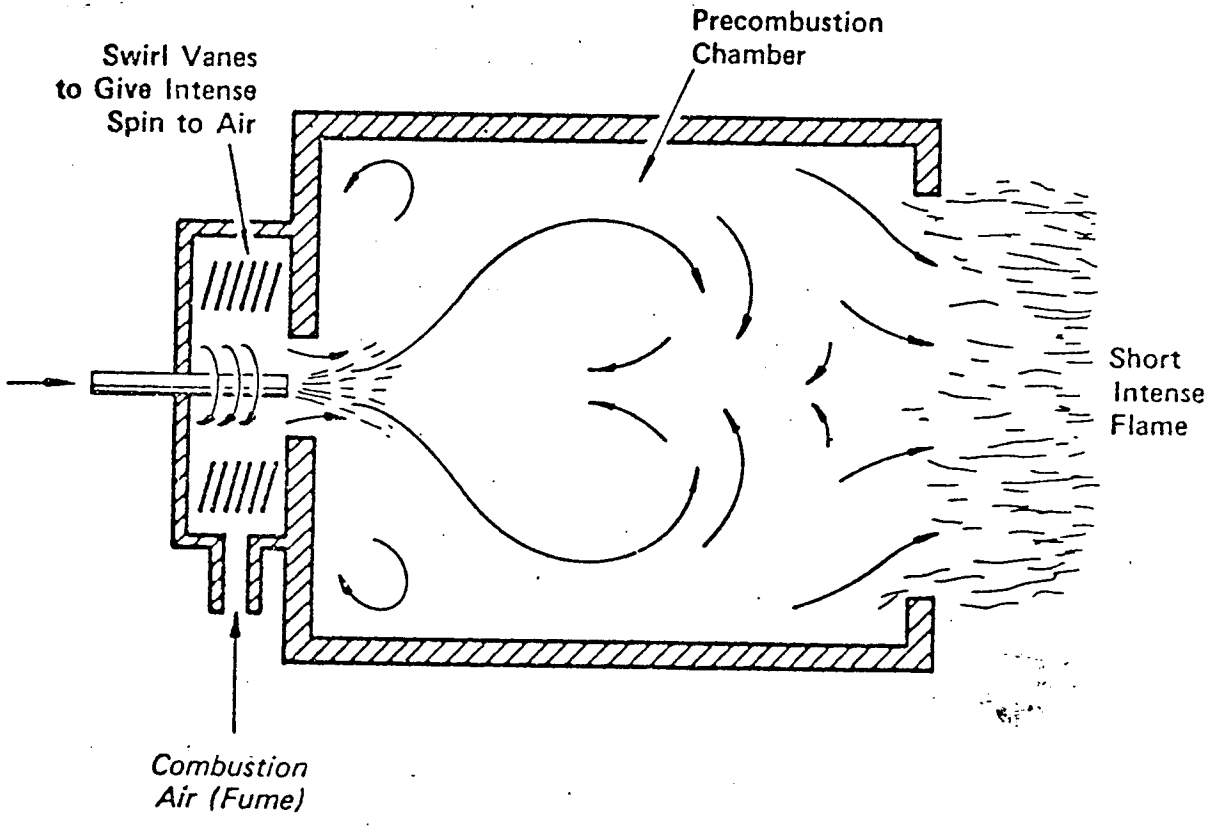

Swirl Vanes
to Give Intense
Spin to Air
Precombustion
Chamber
Short
Intense
Flame
Combustion
Air (Fume)

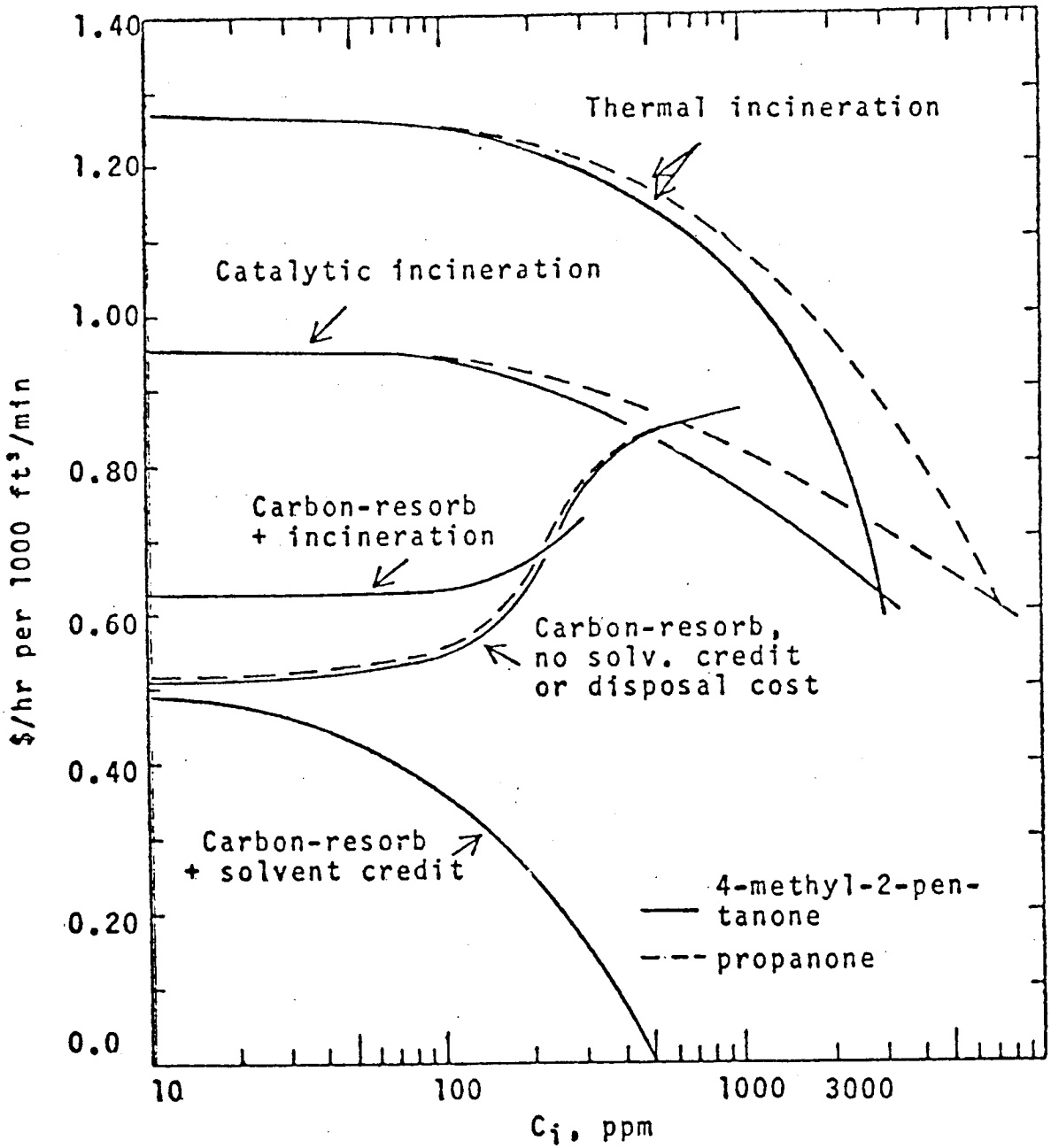


Figure 1. Comparitive Costs of Pollution Control with Carbon Resorb, Catalytic Incineration and Thermal Incineration, 3,800 ft³/min Capacity System, Calculations Based on 4-Methyl-2-pentanone and Propanone, 2080 hr/yr Operating Time.

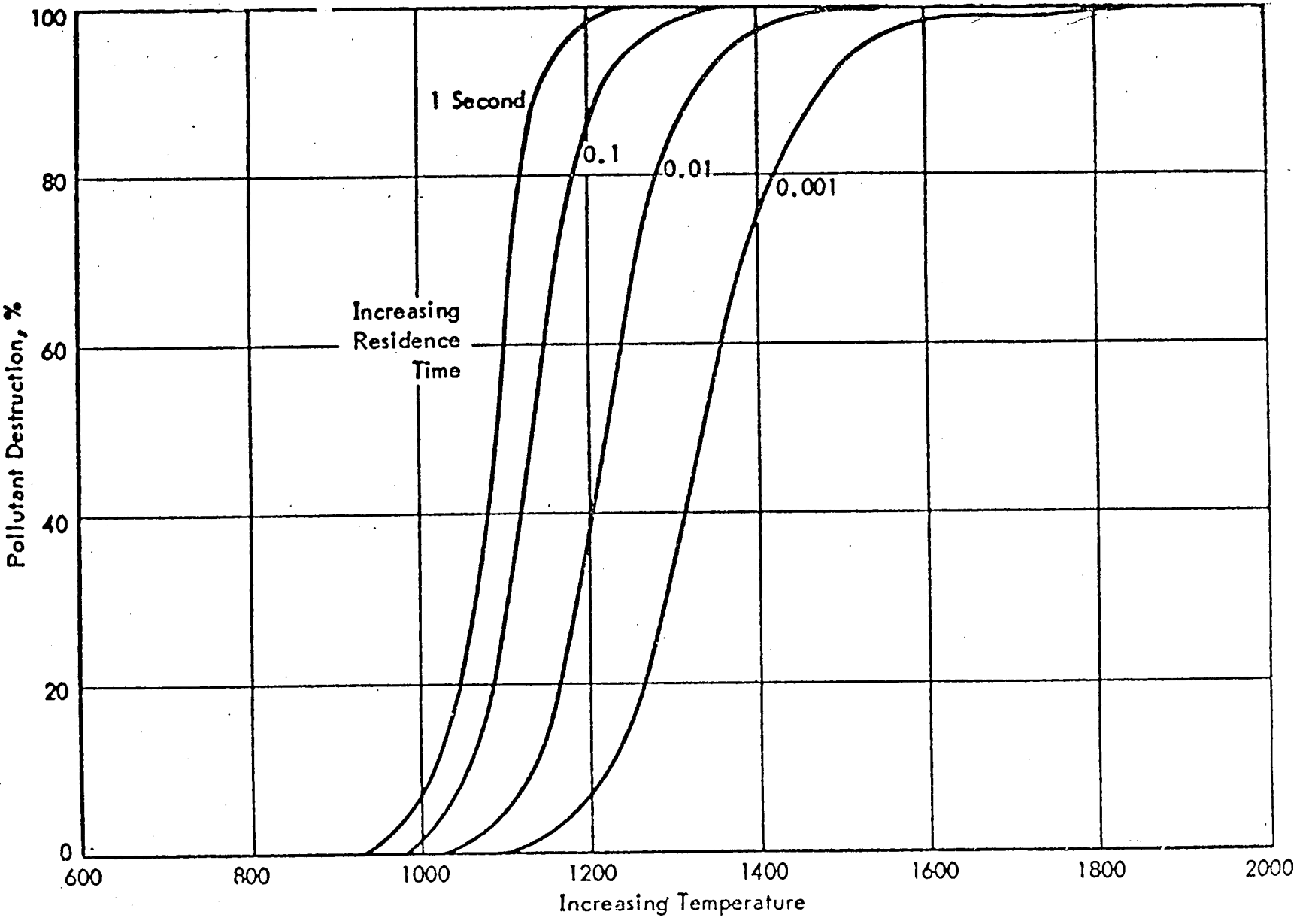


Figure 4 COUPLED EFFECTS OF TEMPERATURE AND TIME ON RATE OF POLLUTANT OXIDATION

Table 2 THERMAL-AFTERBURNERS

Conditions Required for Satisfactory Performance in Various Abatement Applications

Abatement Category	Afterburner Residence Time (Sec)	Temperature (°F)
Hydrocarbon Emissions (90% + Destruction of HC)	0.3-0.5	1100-1250[a]
Hydrocarbons + CO (90% + Destruction of HC + CO, as in LAAPCD Rule 66)	0.3-0.5	1250-1500
Odor		
(50-90% Destruction)	0.3-0.5	1000-1200
(90-99% Destruction)	0.3-0.5	1100-1300
(99% + Destruction)	0.3-0.5	1200-1500
Smokes and Plumes		
White Smoke (Liquid Mist)		
(Plume Abatement)	0.3-0.5	800-1000[b]
(90% + Destruction of HC + CO)	0.3-0.5	1250-1500
Black Smoke (Soot and Combustible Particulates)	0.7-1.0	1400-2000

a) Temperatures of 1400-1500°F may be required if the hydrocarbon has a significant content of any of the following: methane, cellosolve, substituted aromatics (e.g. toluene, xylenes).

b) Operation for plume abatement only is not recommended, since this merely converts a visible hydrocarbon emission to an invisible one, and frequently creates a new odor problem due to partial oxidation in the afterburner.

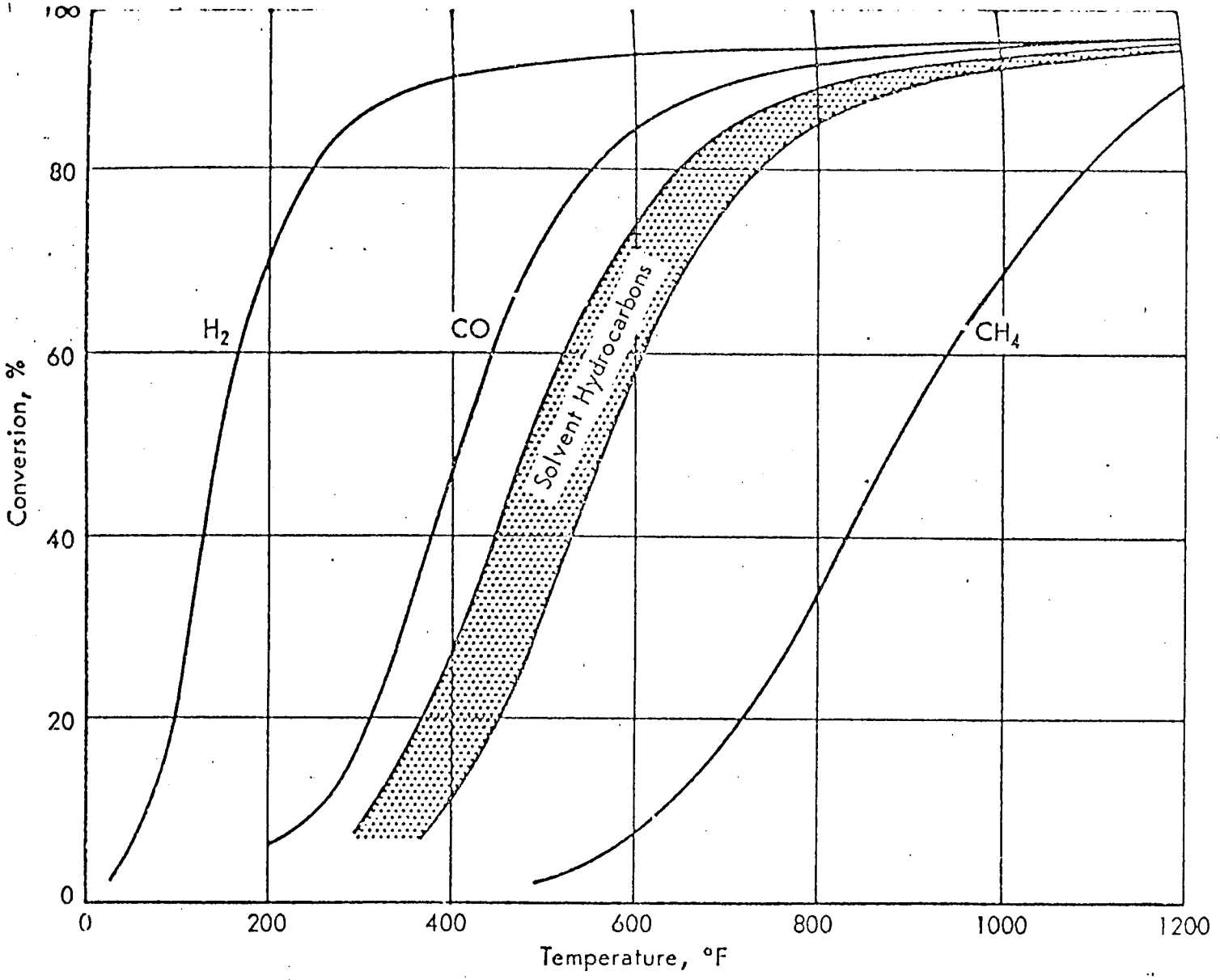
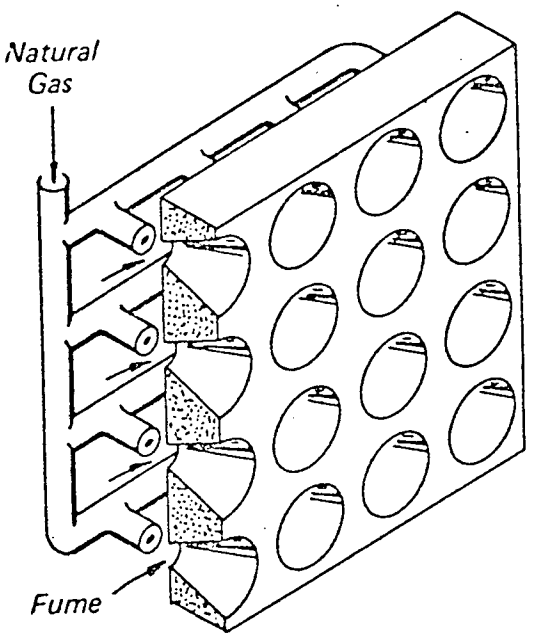
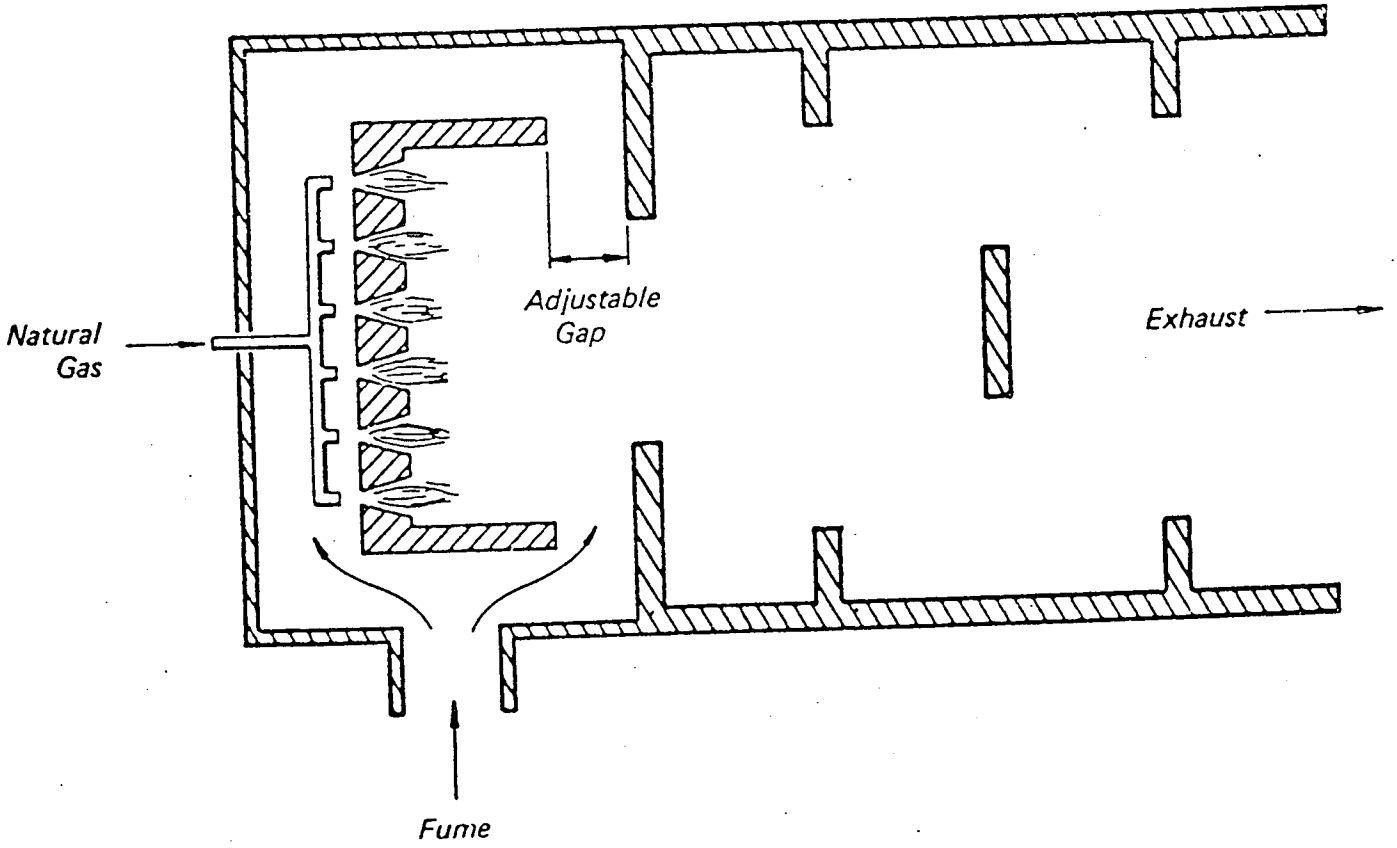


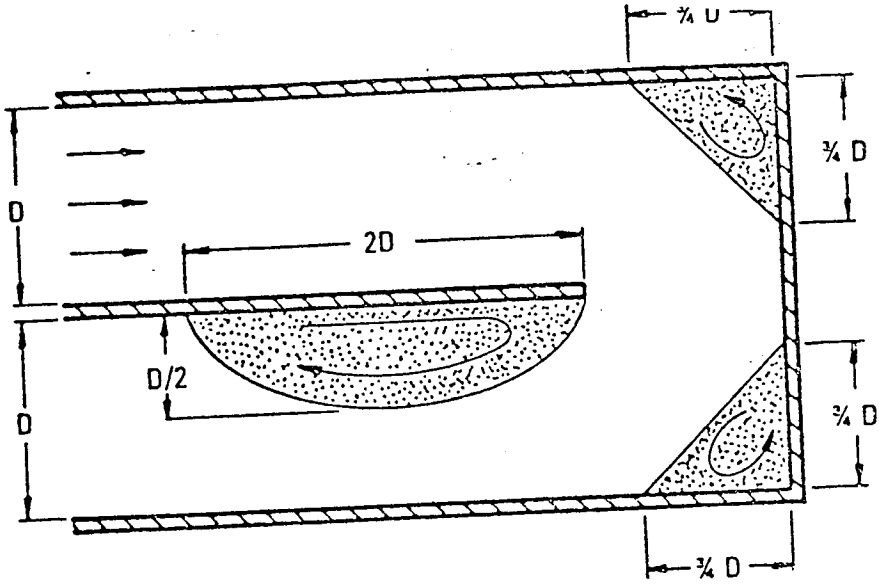
Figure 11. TYPICAL TEMPERATURE-PERFORMANCE CURVES FOR VARIOUS MOLECULAR SPECIES BEING OXIDIZED OVER Pt/Al_2O_3 CATALYSTS



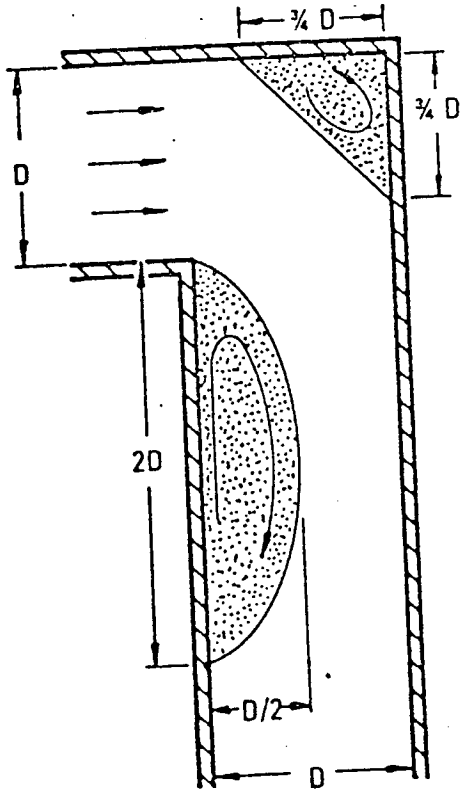
A. Hirt Multijet Gas Burner



B. Afterburner System Employing Multijet Burner

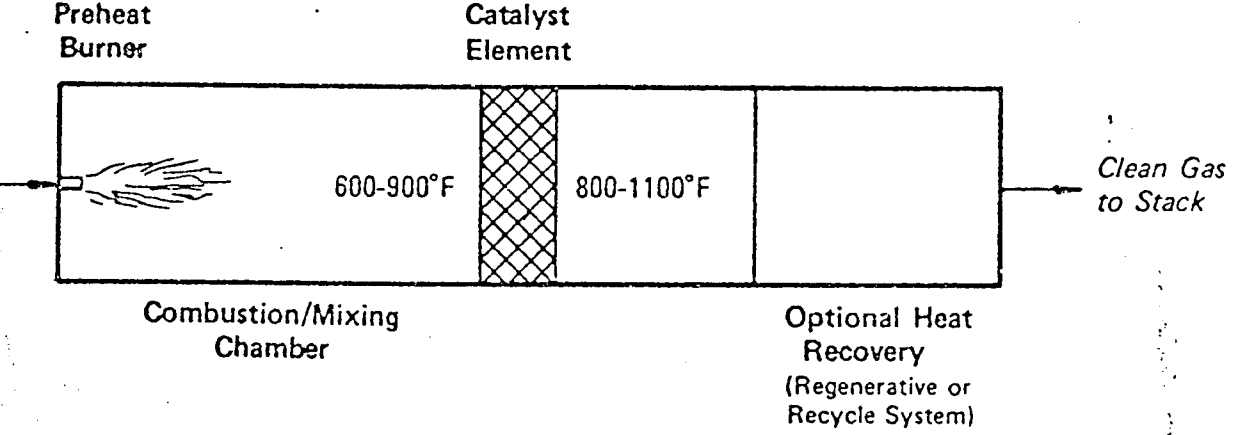


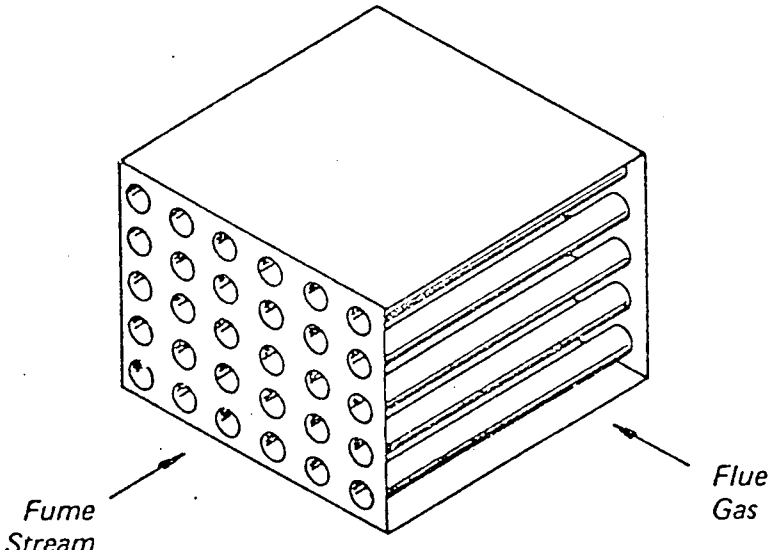
A. U Bend



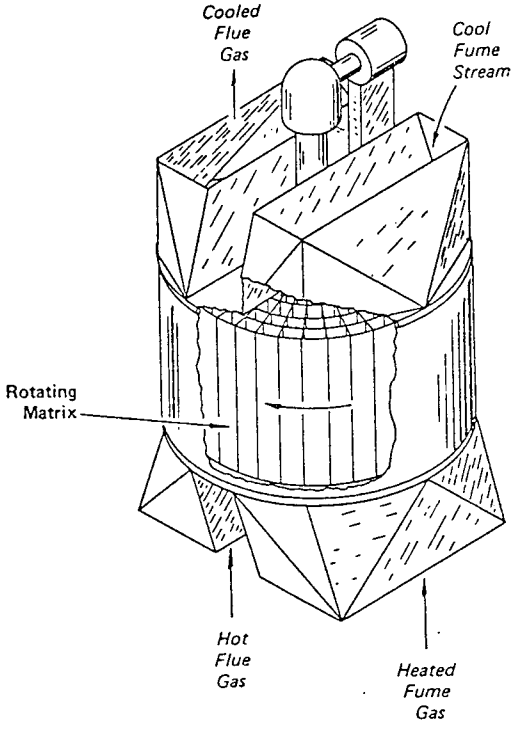
Shaded Areas Represent Recirculating Flows – Dead Zones

B. L Bend

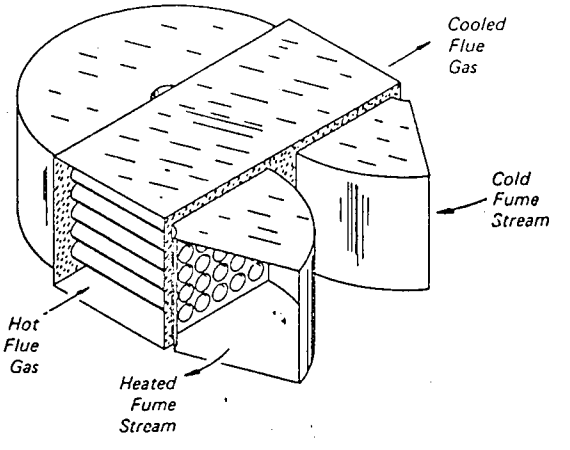

Preheat Burner
Catalyst Element
600-900°F
800-1100°F
Clean Gas to Stack
Combustion/Mixing Chamber
Optional Heat Recovery
(Regenerative or Recycle System)



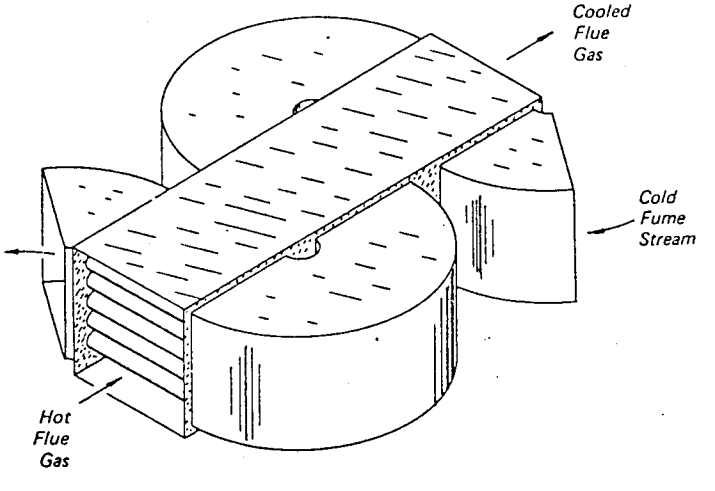
Shell and Tube Type Exchanger
Cross-Flow Type



ROTARY REGENERATIVE HEAT EXCHANGER



A. 2-Pass, Crossflow Exchangers (Arranged to Place Units Counter-Flow)



B. 3-Pass, Crossflow Exchangers (Arranged to Place Units Counter-Flow)

MULTI-PASS COUNTER FLOW ARRANGEMENTS