



Flame Speeds of Methane-Air,
Propane-Air, and Ethylene-Air
Mixtures at Low Initial
Temperatures

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By Gordon L. Dugger

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 30 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. Flame speeds were determined for methane-air, propane-air, and ethylene-air mixtures at -73 C and for methane-air mixtures at -132 C. The data extend the curves of maximum flame speed against initial mixture temperature previously established for the range from room temperature to 344 C. Empirical equations for maximum flame speed u (cm sec) as a function of initial mixture temperature T (sub 0) were determined to be as follows: for methane, for T (sub 0) from 141 to 615 K, $u \approx 0.000160 T$ (sub 0)^{exp 2.11}; for propane, for T (sub 0) from 200 to 616 K, $u \approx 0.000342 T$ (sub 0)^{exp 2.00}; for ethylene, for T (sub 0) from 200 to 617 K, $u \approx 0.00259 T$ (sub 0)^{exp 1.74}. Relative flame speeds at low initial temperatures were predicted within approximately 20 percent by either the thermal theory as presented by Semenov or by the diffusion theory of Tanford and Pease. The same order was found previously for high initial temperatures. The low-temperature data were also found to extend the linear correlations between maximum flame speed and calculated equilibrium active-radical...



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