**Table I-3 Importance Factor, I (Wind Loads)**

| Category | Nonhurricane-Prone Regions and Hurricane-Prone Regions with $V = 85–100$ mph and Alaska | Hurricane-Prone Regions with $V > 100$ mph |
|---|---|---|
| I | 0.87 | 0.77 |
| II | 1.00 | 1.00 |
| III | 1.15 | 1.15 |
| IV | 1.15 | 1.15 |

GENERAL NOTE: The building and structure classification categories are listed in Table I-2.

**Table I-4 Velocity Pressure Exposure Coefficients, $K_z$**

| Height Above Ground Level, $z$, ft (m) [Note (1)] | A | B | C | D |
|---|---|---|---|---|
| 0–15 (0–4.6) | 0.32 | 0.57 | 0.85 | 1.03 |
| 20 (6.1) | 0.36 | 0.62 | 0.90 | 1.08 |
| 25 (7.6) | 0.39 | 0.66 | 0.94 | 1.12 |
| 30 (9.1) | 0.42 | 0.70 | 0.98 | 1.16 |
| 40 (12.2) | 0.47 | 0.76 | 1.04 | 1.22 |
| 50 (15.2) | 0.52 | 0.81 | 1.09 | 1.27 |
| 60 (18.0) | 0.55 | 0.85 | 1.13 | 1.31 |
| 70 (21.3) | 0.59 | 0.89 | 1.17 | 1.34 |
| 80 (24.4) | 0.62 | 0.93 | 1.21 | 1.38 |
| 90 (27.4) | 0.65 | 0.96 | 1.24 | 1.40 |
| 100 (30.5) | 0.68 | 0.99 | 1.26 | 1.43 |
| 120 (36.6) | 0.73 | 1.04 | 1.31 | 1.48 |
| 140 (42.7) | 0.78 | 1.09 | 1.36 | 1.52 |
| 160 (48.8) | 0.82 | 1.13 | 1.39 | 1.55 |
| 180 (54.9) | 0.86 | 1.17 | 1.43 | 1.58 |
| 200 (61.0) | 0.90 | 1.20 | 1.46 | 1.61 |
| 250 (76.2) | 0.98 | 1.28 | 1.53 | 1.68 |
| 300 (91.4) | 1.05 | 1.35 | 1.59 | 1.73 |
| 350 (106.7) | 1.12 | 1.41 | 1.64 | 1.78 |
| 400 (121.9) | 1.18 | 1.47 | 1.69 | 1.82 |
| 450 (137.2) | 1.24 | 1.52 | 1.73 | 1.86 |
| 500 (152.4) | 1.29 | 1.56 | 1.77 | 1.89 |

GENERAL NOTE: Exposure categories are defined in para. 4.3.3.4.

NOTE:

(1) Linear interpolation for intermediate values of height $Z$ is acceptable.

## Table I-5 Force Coefficients, $C_f$

| Cross Section | Type of Surface | h/D | | |
|---|---|---|---|---|
| | | 1 | 7 | 25 |
| Square (wind normal to face) | All | 1.3 | 1.4 | 2.0 |
| Square (wind along diagonal) | All | 1.0 | 1.1 | 1.5 |
| Hexagonal or octagonal | All | 1.0 | 1.2 | 1.4 |
| Round ($D\sqrt{q_z} > 2.5$) ($D\sqrt{q_z} > 5.3$, $D$ in m, $q_z$ in N/m$^2$) | Moderately smooth | 0.5 | 0.6 | 0.7 |
| | Rough ($D'/D = 0.02$) | 0.7 | 0.8 | 0.9 |
| | Very rough ($D'/D = 0.08$) | 0.8 | 1.0 | 1.2 |
| Round ($D\sqrt{q_z} \le 2.5$) ($D\sqrt{q_z} \le 5.3$, $D$ in m, $q_z$ in N/m$^2$) | All | 0.7 | 0.8 | 1.2 |

GENERAL NOTES:

(a) The design wind force shall be calculated based on the area of the structure projected on a plane normal to the wind direction. The force shall be assumed to act parallel to the wind direction.

(b) Linear interpolation is permitted for $h/D$ values other than shown.

(c) Nomenclature:

$D$ = diameter of circular cross section and least horizontal dimension of square, hexagonal, or octagonal cross sections at elevation under consideration, in ft (m)

$D'$ = depth of protruding elements such as ribs, corrugated jackets, or other surface irregularities that affect the roughness of the stack, in ft (m)

$h$ = height of structure, in ft (m)

$q_z$ = velocity pressure evaluated at height $z$ above ground, in psf (N/m$^2$)

# NONMANDATORY APPENDIX A
# MECHANICAL DESIGN

See Figs. A-1 through A-13 and Table A-1.

**Fig. A-1 Friction Factor, *f*, as Related to Reynolds Number and Stack Diameter**

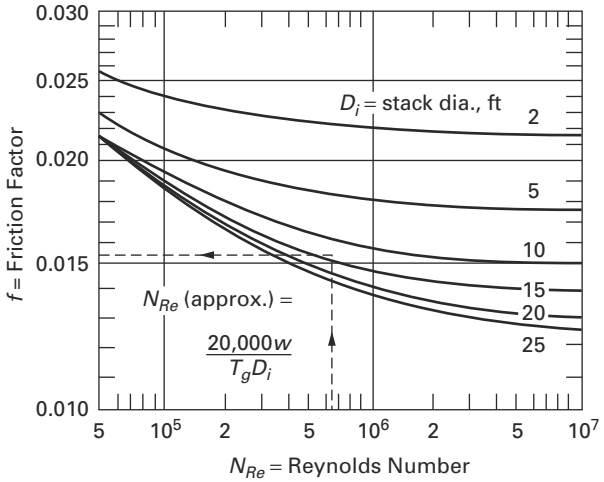


**Fig. A-2 External Heat Transfer Coefficient for Forced and Natural Convection**

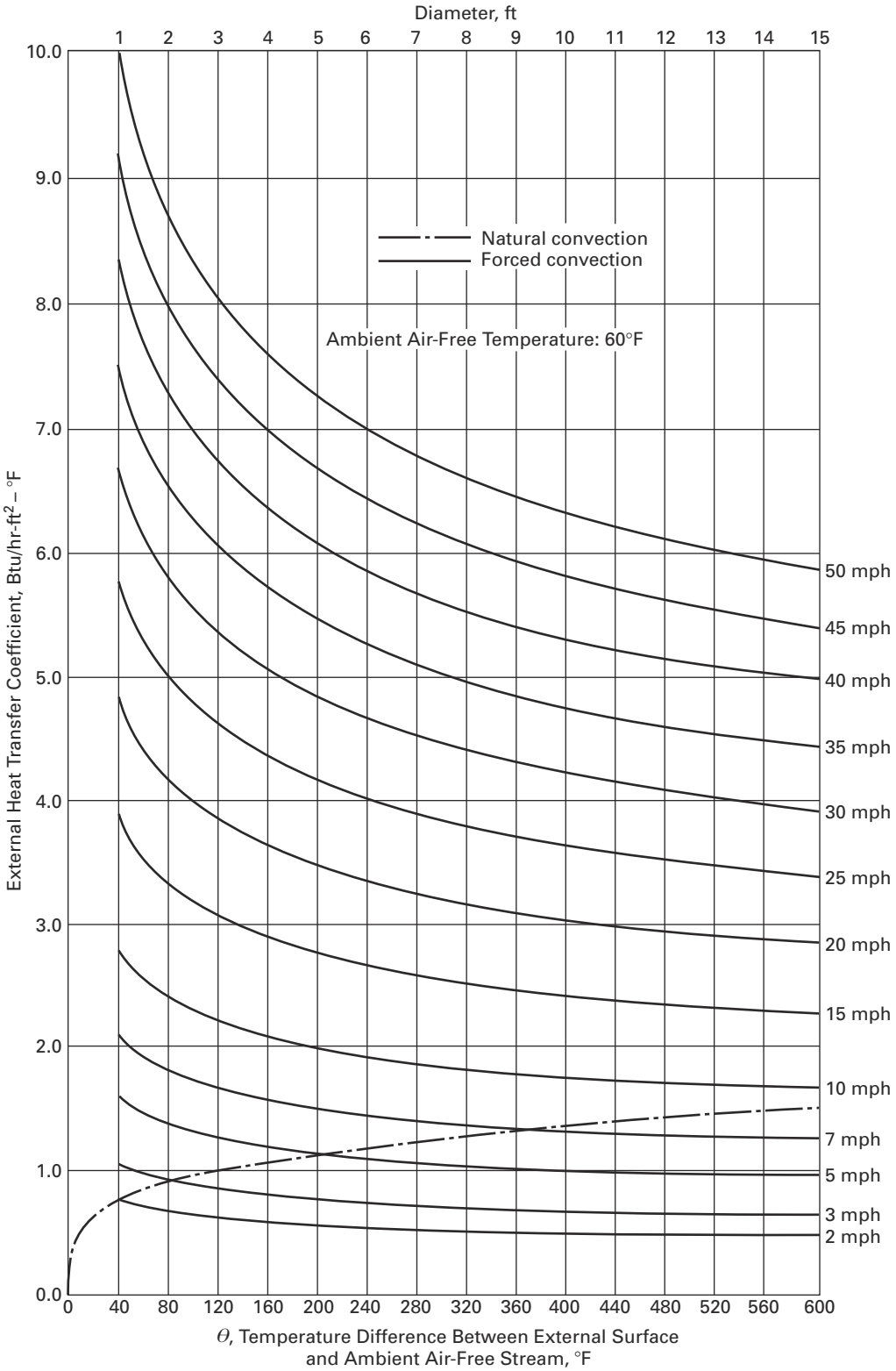
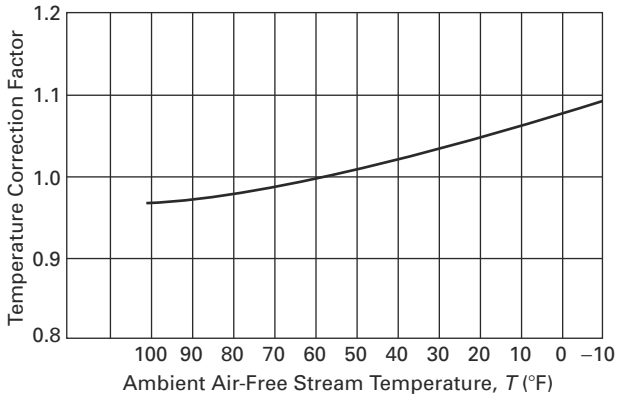


**Fig. A-3 Effect of a Change in the Ambient Air-Free Stream Temperature on the External Heat Transfer Coefficient for Forced Convection**




GENERAL NOTE:

$h_T = (h_{60°F})$ (Temperature Correction Factor)$_T$, where

$h_T$ = the external heat transfer coefficient for forced convection when the ambient air-free stream temperature is $T$ (°F)

$h_{60°F}$ = the external heat transfer coefficient for forced convection for a $T$ (°F) of 60°F (see Fig. A-2)

**Fig. A-4 Heat Transfer Coefficient for the Air Gap Between Two Walls of a Double-Walled Metal Chimney**
**(Mean Temperature 200°F Through 400°F)**

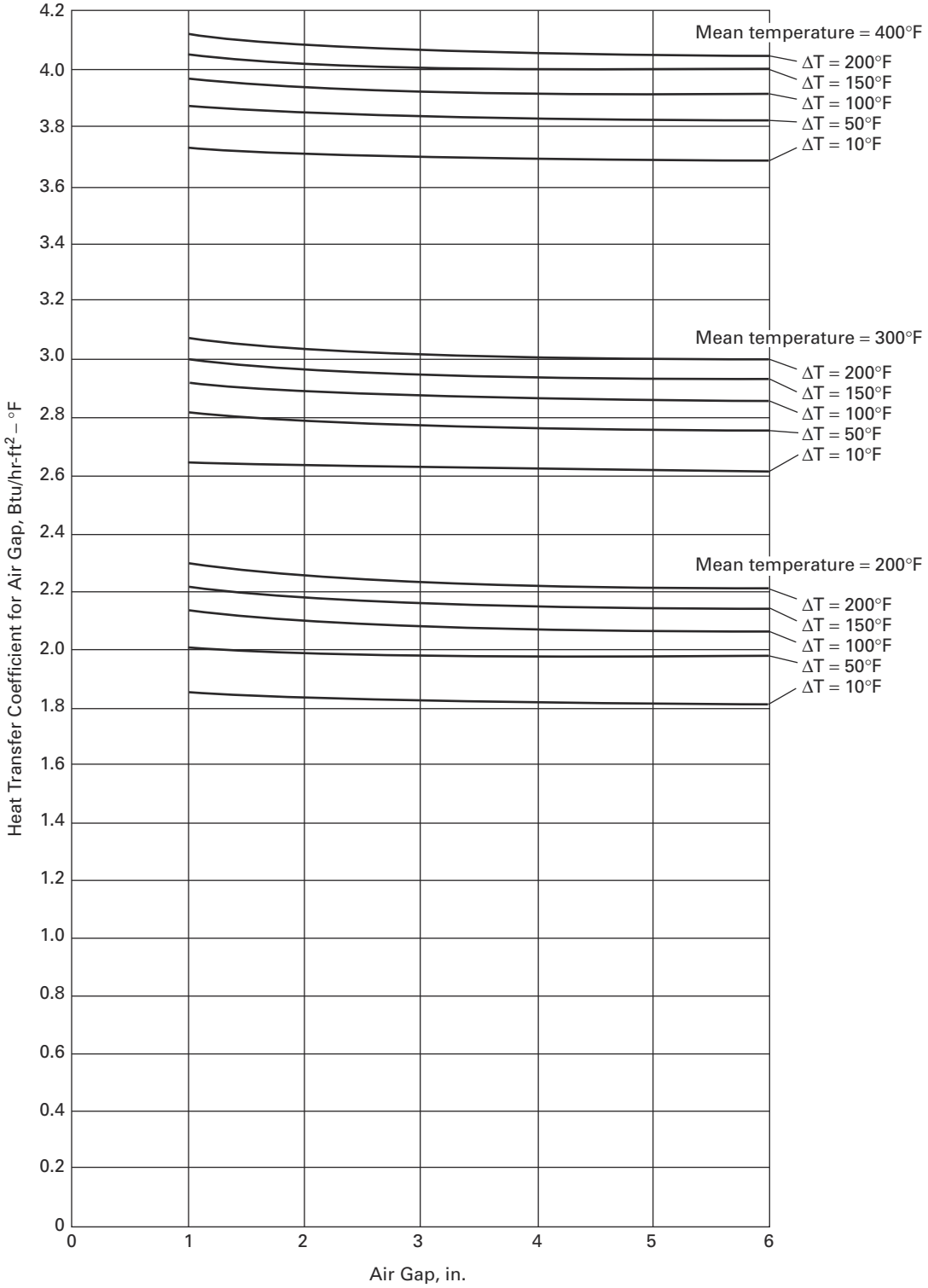


**Fig. A-5 Heat Transfer Coefficient for the Air Gap Between Two Walls of a Double-Walled Metal Chimney**
(Mean Temperature 500°F and 600°F)

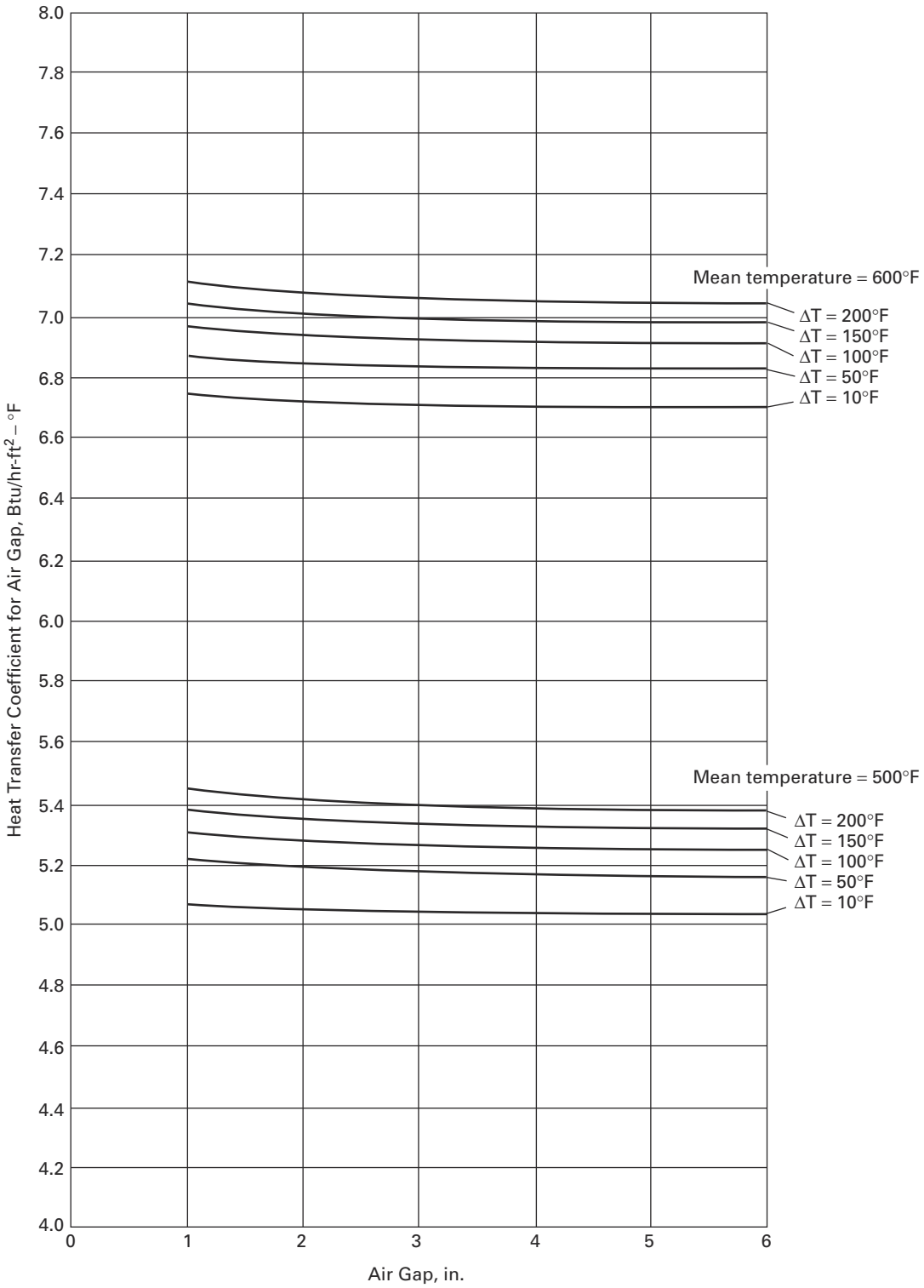


**Fig. A-6 Internal Heat Transfer Coefficient (Btu/hr-ft$^2$ °F) vs. Velocity (ft/sec) Film Temperature: 200°F**

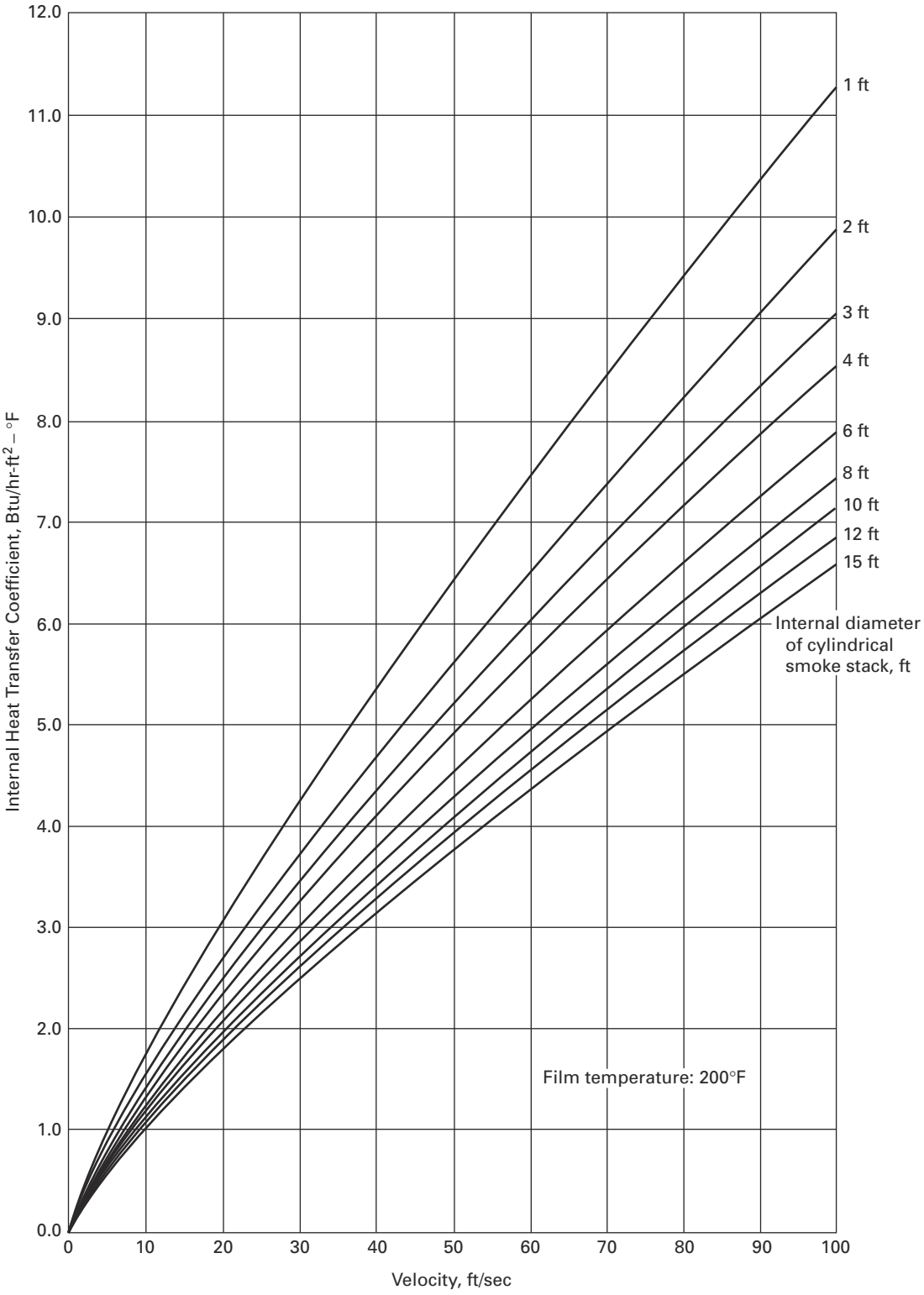


**Fig. A-7 Internal Heat Transfer Coefficient (Btu/hr-ft$^2$ °F) vs. Velocity (ft/sec) Film Temperature: 300°F**

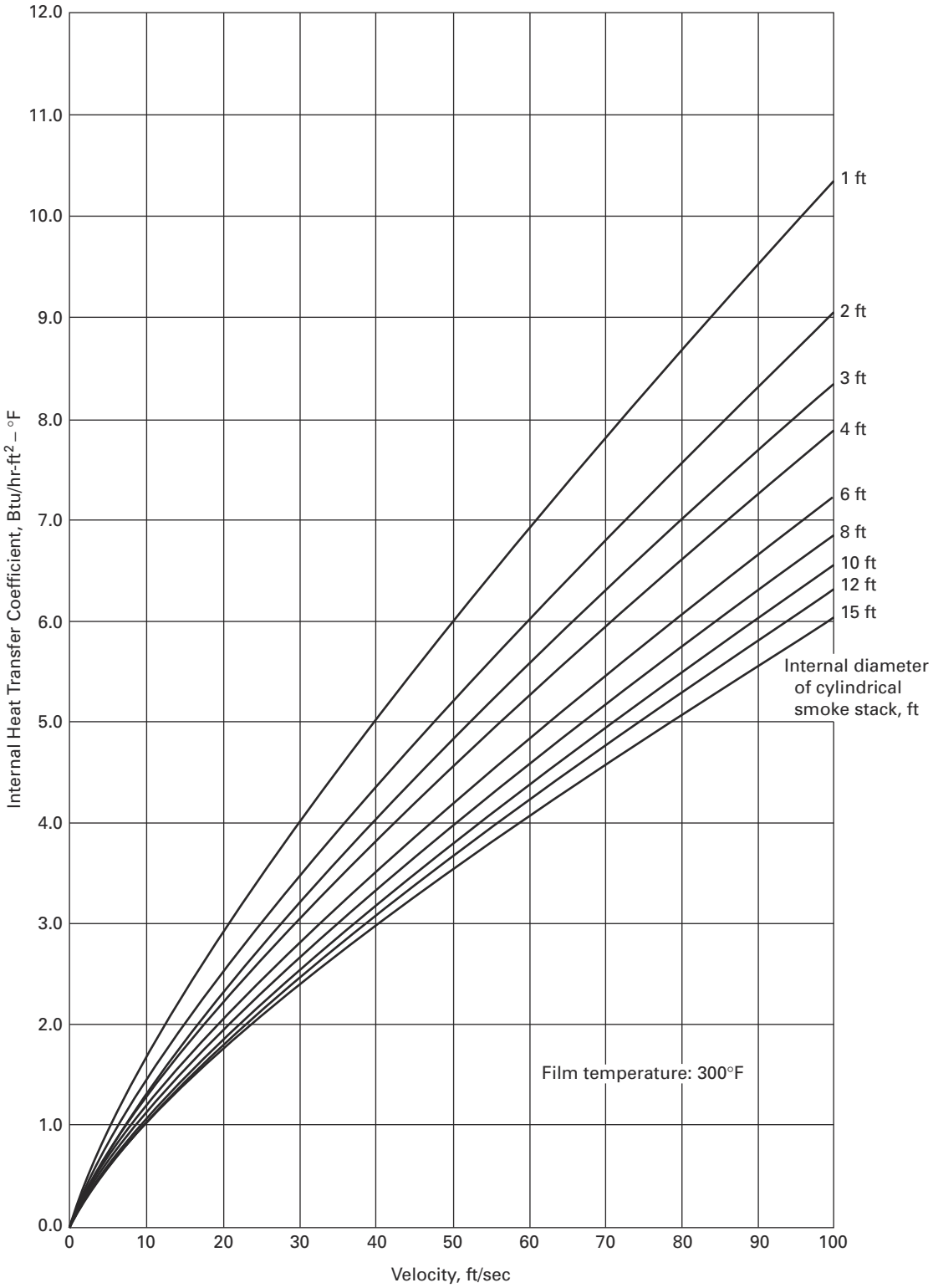


**Fig. A-8 Internal Heat Transfer Coefficient (Btu/hr-ft$^2$ °F) vs. Velocity (ft/sec) Film Temperature: 500°F**

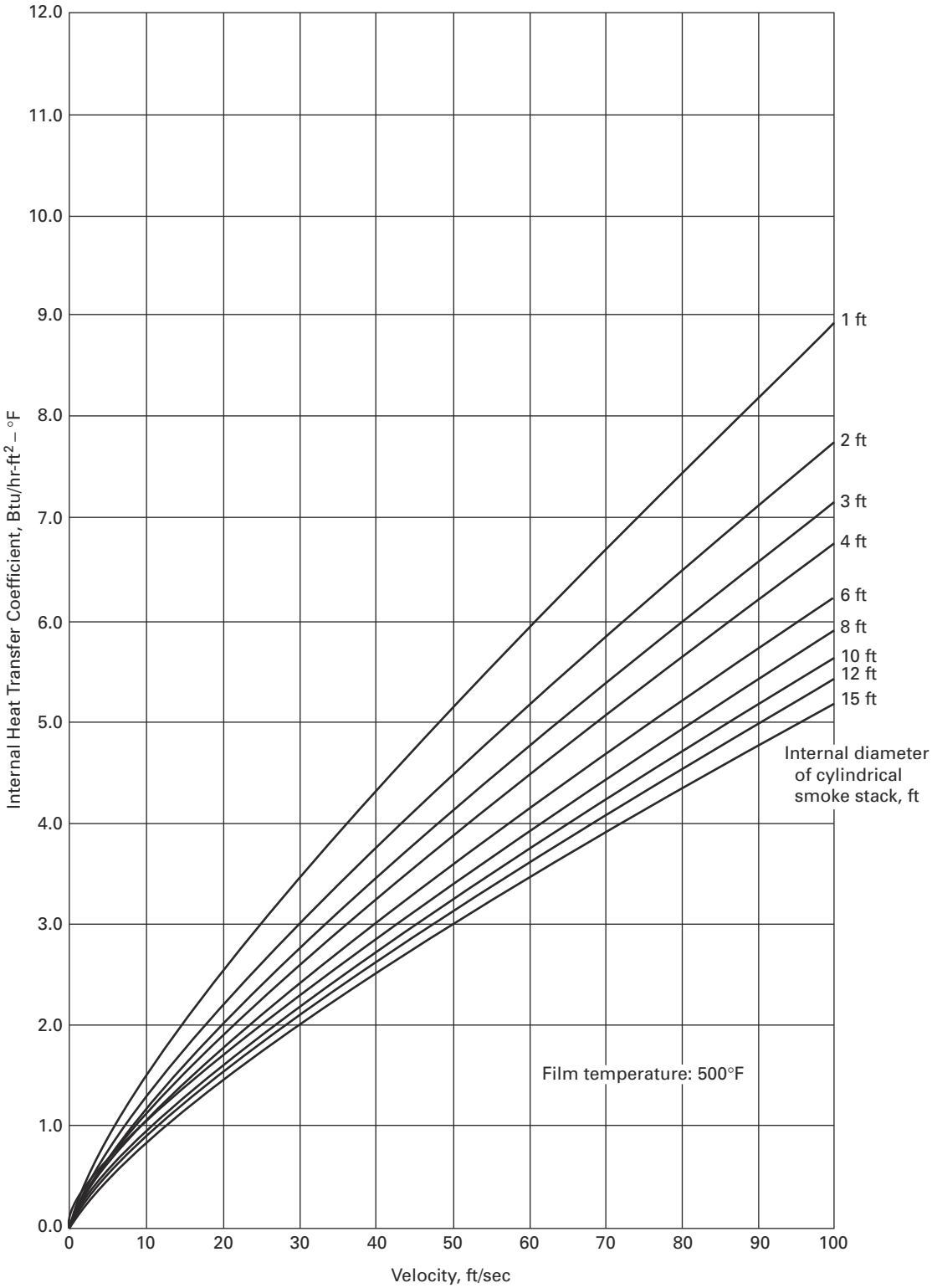


**Fig. A-9 Internal Heat Transfer Coefficient (Btu/hr-ft$^2$ °F) vs. Velocity (ft/sec) Film Temperature: 1,000°F**