

Type	Application and Conditions	U W/(m ² K) ¹⁾	U Btu/(ft ² °F h) ¹⁾
Tubular, heating or cooling	Gases at atmospheric pressure inside and outside tubes	5 - 35	1 - 6
	Gases at high pressure inside and outside tubes	150 - 500	25 - 90
	Liquid outside (inside) and gas at atmospheric pressure inside (outside) tubes	15 - 70	3 - 15
	Gas at high pressure inside and liquid outside tubes	200 - 400	35 - 70
	Liquids inside and outside tubes	150 - 1200	25 - 200
	Steam outside and liquid inside tubes	300 - 1200	50 - 200
Tubular, condensation	Steam outside and cooling water inside tubes	1500 - 4000	250 - 700
	Organic vapors or ammonia outside and cooling water inside tubes	300 - 1200	50 - 200
Tubular, evaporation	steam outside and high-viscous liquid inside tubes, natural circulation	300 - 900	50 - 150
	steam outside and low-viscous liquid inside tubes, natural circulation	600 - 1700	100 - 300
	steam outside and liquid inside tubes, forced circulation	900 - 3000	150 - 500
Air-cooled heat exchangers²⁾	Cooling of water	600 - 750	100 - 130
	Cooling of liquid light hydrocarbons	400 - 550	70 - 95
	Cooling of tar	30 - 60	5 - 10
	Cooling of air or flue gas	60 - 180	10 - 30
	Cooling of hydrocarbon gas	200 - 450	35 - 80
	Condensation of low pressure steam	700 - 850	125 - 150
	Condensation of organic vapors	350 - 500	65 - 90
Plate heat exchanger	liquid to liquid	1000 - 4000	150 - 700
Spiral heat exchanger	liquid to liquid	700 - 2500	125 - 500
	condensing vapor to liquid	900 - 3500	150 - 700

Notes:

1) 1 Btu/(ft² °F h) = 5.6785 W/(m² K)

2) Coefficients are based on outside bare tube surface

Sources

- Schlünder, E. U. (Ed.): VDI Heat Atlas, Woodhead Publishing, Limited, 1993, Chapter Cc.
- Perry, R. H., Green, D. W. (Eds.): Perry's Chemical Engineers' Handbook, 7th edition, McGraw-Hill, 1997, Section 11.
- Kern, D. Q.: Process Heat Transfer, McGraw-Hill, 1950.
- Ludwig, E. E.: Applied Process Design for Chemical and Petrochemical Plants, Vol. 3, 3rd edition, Gulf Publishing Company, 1998.
- Branan, C. R.: Process Engineer's Pocket Handbook, Vol. 1, Gulf Publishing Company, 1976.