

Manning's Coefficient

mountain streams with rocky beds:	0.04–0.05
winding natural streams with weeds:	0.035
natural streams with little vegetation:	0.025
straight, unlined earth canals:	0.020
smoothed concrete:	0.012

Rational Method Coefficient

Description of Area	C
Business	
Downtown	0.70–0.95
Neighborhood	0.50–0.70
Residential	
Single-family	0.30–0.50
Multiunits, detached	0.40–0.60
Multiunits, attached	0.60–0.75
Residential suburban	0.25–0.40
Apartment	0.50–0.70
Industrial	
Light	0.50–0.80
Heavy	0.60–0.90
Parks, cemeteries	0.10–0.25
Playgrounds	0.20–0.35
Railroad yard	0.20–0.35
Unimproved	0.10–0.30
Character of surface	
Pavement	
Asphalt and concrete	0.70–0.95
Brick	0.70–0.85
Roofs	0.75–0.95
Lawns, sandy soil	
Flat, up to 2% grade	0.05–0.10
Average, 2%–7% grade	0.10–0.15
Steep, over 7%	0.15–0.20
Lawns, heavy soil	
Flat, up to 2% grade	0.13–0.17
Average, 2%–7% grade	0.18–0.22
Steep, over 7%	0.25–0.35

SOURCE: American Society of Civil Engineers, Manuals and Reports of Engineering Practice No. 37, 1970.

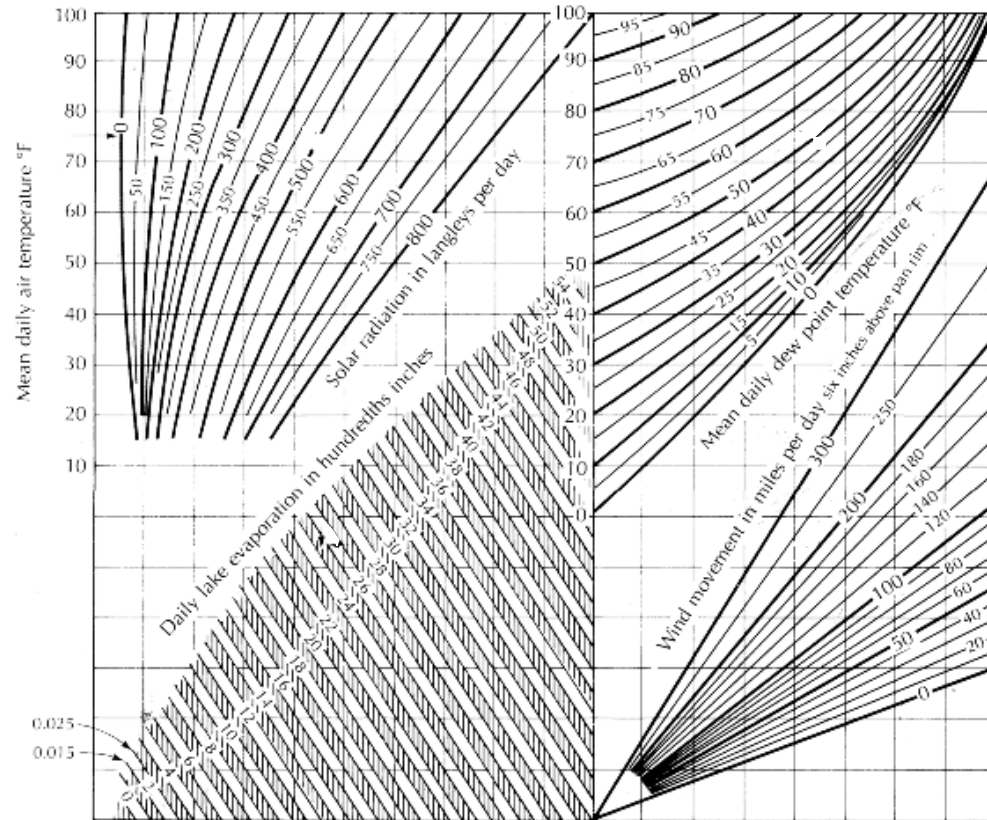


FIGURE 2.1 Nomograph used to determine the value of daily lake evaporation for shallow lakes if solar radiation, mean daily air temperature, mean daily dew point temperature, and wind movement are known. Source: Roberts & Stall 1967.

Some Atomic weights

Element	H	C	N	O	Na	Mg	Al	S	Cl	K	Ca
Atomic weight	1	12	14	16	23	24.3	27	32	35.5	39.1	40.1

$$R \text{ (gas constant)} = 8.314 \text{ J K}^{-1} \text{ mol}^{-1} \text{ or } 1.987 \text{ cal K}^{-1} \text{ mol}^{-1}$$