

**Table 1-5**  
**Recommended surface roughness values for various**  
**pipng materials**

Pipe Material	Surface Roughness, m	Surface Roughness, ft
Copper, drawn, tubing	0.000002	0.0000067
Glass, drawn tubing	0.000002	0.0000067
Plastic, drawn tubing	0.000002	0.0000067
Brass, drawn	0.000002	0.0000067
Iron, cast — new	0.0003	0.0021
Iron, wrought — new	0.000045	0.00017
Iron, galvanized	0.00015	0.0005
Iron, asphalt coated	0.00015	0.0005
Steel, new	0.000045	0.00015
Steel, lightly corroded	0.0003	0.00125
Steel, heavily corroded	0.002	0.0067
Steel, galvanized	0.00015	0.0005
Steel, polished (hygienic)	0.000002	0.0000067
Steel, stainless, drawn tubing	0.000002	0.0000067
Sheet metal ductwork, smooth joints	0.00003	0.0001
Concrete, very smooth	0.00004	0.00013
Concrete, wood floated, brushed	0.0003	0.001
Concrete, rough, visible form marks	0.002	0.0067
Rubber, smooth tubing	0.00001	0.000033
Rubber, wire reinforced	0.001	0.0033

*Never use a value less than 0.0000015 m or 0.000005 ft, which are the limiting values that define "smooth" pipe [11].*