

Mesh Dependency

The theoretical volume of the tube can be calculated as;

$$V = \frac{\pi D^2}{4} L$$

where L denotes the length of the interested region. For flame region, $L_{flame} = 2a_f = 0.05m$. Total length of tube is $L = 1m$. Radius is $D = 0.047m$

Element size(m)	Flame Region Volume(m3)	Error(%)	Total Volume(m3)	Error(%)	Simulation Time(s)
Theoretical	8.67E-05	0	0.0017349	0	-
1.00E-02	6.63E-05	23.611	0.0016901	2.585	15.87
5.00E-03	7.51E-05	13.431	0.0017253	0.556	776.21
2.50E-03	8.10303E-05	6.590	0.0017324	0.147	-