

## List of Co-flow flames for the ISF dataset

### 5. S. De Iuliis Burner Data (Non-smoking, co-flowing diffusion ethylene flame)

#### **Burner description (from S. De Iuliis et al. 1998):**

The burner is a co-annular circular burner with a 10 mm inner diameter and 100 mm outer diameter. The annular region contains a honeycomb region to make the air flow as laminar as possible. The flame is shielded with a Plexiglas cylinder which has flat quartz windows. Burner is attached to a motorized table that moves in the XZ directions, which allows measurements to be obtained with a 0.1 mm step size in each direction. There are two mass flow meters which control the flow of air and fuel supply.

#### **Conditions**

Ethylene Sooting Flame- non-smoking

Fuel: Ethylene

Oxidizer: Air

Fuel flow rate: 2.5 cm<sup>3</sup>/s

Fuel velocity: 3.18 cm/s

Oxidizer flow rate: 125 cm<sup>3</sup>/s

Oxidizer velocity: 1.61 cm/s

Reference: S. De Iuliis, M. Barbini, S. Benecchi, F. Cignoli, G. Zizak, *Combustion and Flame*, 115(1998) 253-261.

#### Numerical references:

- Cignoli, F., De Iuliis, S., Manta, V., & Zizak, G. (2001). Two-dimensional two-wavelength emission technique for soot diagnostics. *Applied Optics*, 40(30), 5370-5378.
- De Iuliis, S., Cignoli, F., & Zizak, G. (2005). Two-color laser-induced incandescence (2C-LII) technique for absolute soot volume fraction measurements in flames. *Applied Optics*, 44(34), 7414-7423.
- Huang, Q., Wang, F., Yan, J., & Chi, Y. (2012). Simultaneous estimation of the 3-D soot temperature and volume fraction distributions in asymmetric flames using high-speed stereoscopic images. *Applied Optics*, 51(15), 2968-2978.
- Sergienko, I. A., Florko, A. V., & Shevchuk, V. G. (2000). Specific features of the emission and absorption characteristics of soot particles at combustion temperatures. *Combustion, Explosion and Shock Waves*, 36(2), 187-192.

#### Experimental data available:

- Soot volume fraction of ethylene diffusion flame by absorption measurements