

## CFD SIMULATION OF CRYO-MQL SPRAY AND THE EFFECT OF DROPLET SIZE

UMAYAR AHMED<sup>1</sup> & NING HE<sup>2</sup>

*College of Mechanical and Electrical Engineering Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China*

### ABSTRACT

A mixture of carbon dioxide (CO<sub>2</sub>) and minimum quantity lubrication (MQL) is being used as the coolant in this article. Then using computational fluid dynamics (CFD) a mist form was made and using the discrete phase modeling (DPM) atomization simulation was performed in a turbulent environment. Using variables like mass flow rate and pressure, we were able to calculate the jet velocity and droplet size. This study investigates the impact of spray parameters on droplet size and velocity, discovering that a medium-sized droplet, which is significantly effective in lubricating the working zone when the pressure is higher.

**Keywords:** CFD, DPM, Cryo-MQL, Droplet Size, Spray