Volutes ineherent to a turbulent process

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A turbulent natural convection mixing process of two fluids of different density inside a cylindrical cavity is studied. The mixing efficiency depends strongly on whether the flow regime is: laminar, transitional or turbulent. Figure 3 shows a variety of capricious shapes that the flow takes during a turbulent process. The dark parts show the shapes that the low-density fluid takes when it goes upwards and the green parts show the shapes that the high-density fluid takes when it goes downwards.

In the lower left part of this two-dimensional view one can see a current of low-density fluid that goes upward and originates twin vortices. In three-dimensions this current probably forms a toroidal structure with a mushroom shape, typical of this regime, originated by the interaction between the two fluids.

Flow visualization technique: Laser sheet and fluorescein.

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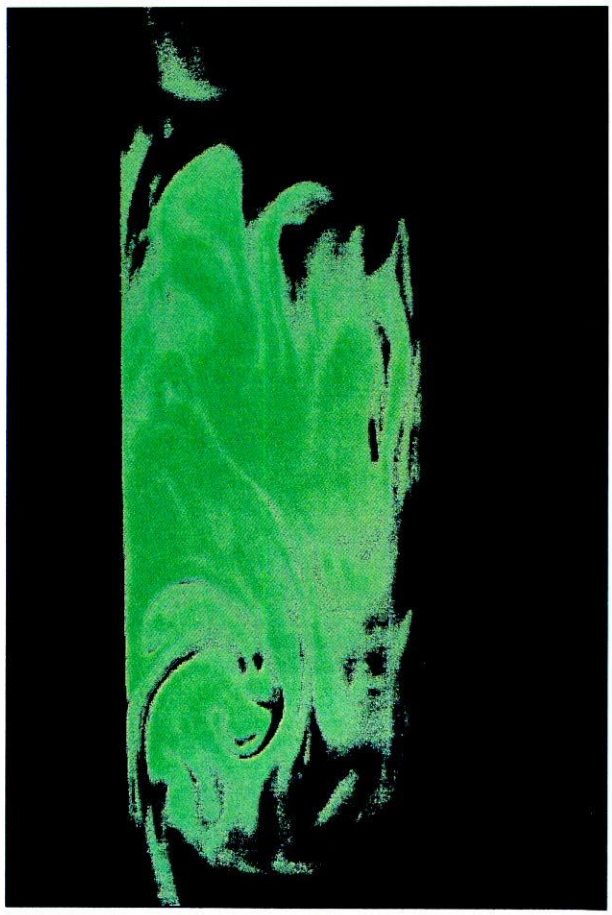

FIGURE 3. Volutes inherent to a turbulent natural convection mixing process of two fluids of different density inside a cylindrical cavity.