This is a Rayleigh-Taylor instability problem with thermal conduction. The data files are:
Density
Pressure
Vx
Vy
All these quantities are given as a function of X and Y. The gravity is oriented in the negative-Y direction. X is the horizontal direction, Y is vertical.
In the data files, all the quantities are in SI units (rho in kg/m^3, P in N/m^2, V in m/s).

There are also files with plots of :
Density (in g/cc) profile along Y
Temperature (in KeV) profile along Y
Pressure (in Megabar) profile along Y

There are also contour plots of :
Density (in g/cc) in X-Y
Vorticity (in 1/nanosecond) in XY

The gravitational acceleration is:
g= -1e14 m/s^2 (directed in the negative y-direction)

The thermal diffusion in included through:

$$\rho c_v \left(\frac{\partial T}{\partial t} + v \bullet \nabla T \right) = -p \nabla \bullet v + \nabla \bullet \kappa_0 T^{2.5} \nabla T$$

I use SI units but the temperature is in Joules.
Here $\kappa_0 = 3.734\text{e}+69$**,** $c_v = 7.186e+26$**, the temperature T is in Joules, rho in kg/m^3, P in N/m^2 and V in m/s.**

The adiabatic index is $\gamma = 5/3$ **(I don't think you need that)**

The equation of state is
P=4.7904e+26 ρ T
where the Temperature is in Joules, rho in kg/m^3 and P in N/m^2.

Boundary Conditions:

(a) Reflective BC in X

(b) At the bottom (Y=0), the heat flux is assigned

$q = -\kappa_0 T^{2.5} \nabla T|_{y=0}$ **= 5.876e18 W/m^2**

(c)At the top, the heat flux = 0.

(d)For the other hydro variables the BCs are Outflow at the bottom (Y=0) and inflow at the top. It should not matter much what you use. Below is what I use (it seems to work).

```
!   boundary conditions on the botton boundary
        v(i,0)=       v(i,4)-2*(v(i,3)-v(i,1))
        rho(i,0)=     rho(i,1)*v(i,1)/v(i,0)
        u(i,0)=       u(i,1)
        p(i,0)=       p(i,1)-0.5*(rho(i,0)+rho(i,1))*acceleration*dy &
                   +rho(i,1)*v(i,1)**2-rho(i,0)*v(i,0)**2
```

The first is the continuity of the second derivative
The second is the continuity of the normal mass flow
The third is the continuity of the tangential flow
The fourth is the total pressure equilibrium (here g<0)

$$\frac{d(P+\rho v^2)}{dy} = \rho g$$

```
!   boundary conditions on the top boundary

        u(i,ny+1)=    u(i,ny)
        v(i,ny+1)=    v(i,ny)
        rsh=1.66667
        del_hat=acceleration*rho(i,ny)/p(i,ny)*(rsh-1.)/rsh
        p(i,ny+1)=p(i,ny)*dexp((del_hat*dy-del_hat**2*dy**2*0.5)*rsh/(rsh-1.))
        rho(i,ny+1)=rho(i,ny)*dexp((del_hat*dy-del_hat**2*dy**2*0.5)/(rsh-1.))
```

Here I am using the equilibrium again $\frac{d(P)}{dy} = \rho g$ **without flow and the isentropic condition p = const rho^1.667. The exponentials are used to avoid negative pressures and densities.**