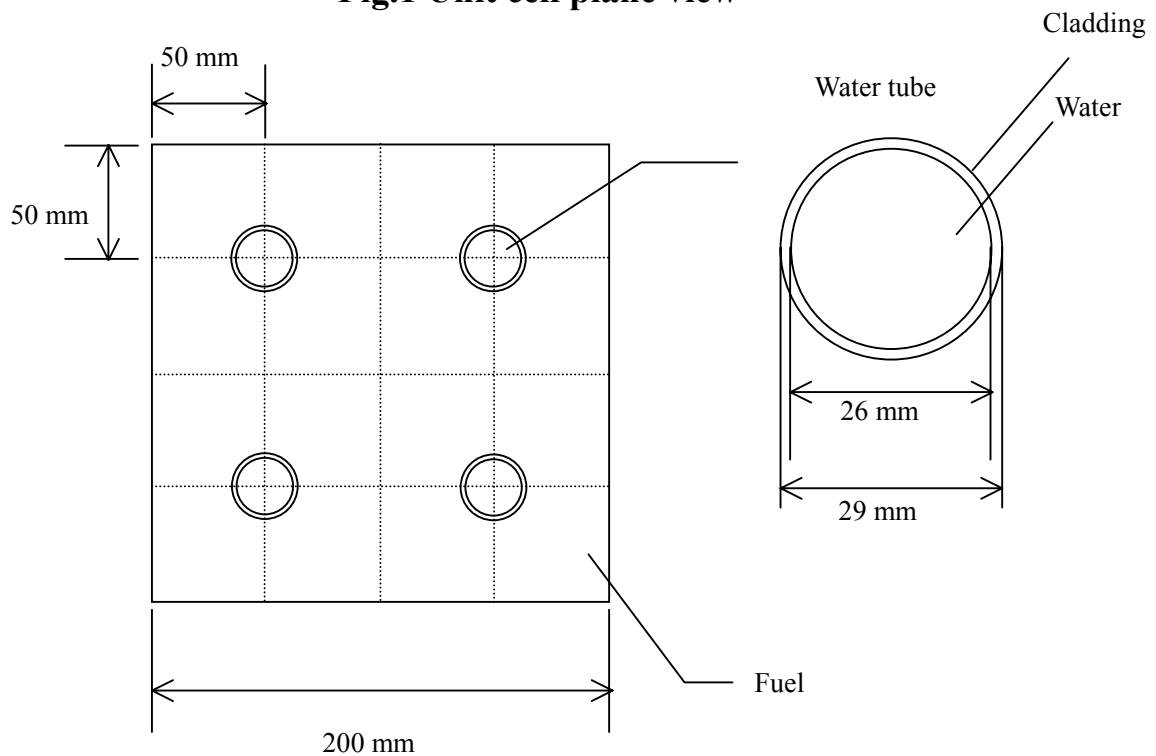


AFPR (USA)

Unit Cell Description

Geometry of a unit cell is a square. A unit cell has four components such as fuel, steam/water mixture, water and cladding. And outer boundary condition is reflective. Power density in the fuel region is 23.43 W/cm^3 .

Fig.1 Unit cell plane view



1. Fuel

Coated particle fuels fill the fuel regions with porosity of 0.35. The parameters of coated fuel pebble is shown in Table 1

Table 2. Micro-Fuel Element parameters

Material	Density,g/cm ³	Diameter, cm	Volume, cm ³	Mass, g
UO ₂ , enrichment U235 10%	10.4	0.15	0.001767	18.4x10 ⁻³
PyC (porous)	1.0	0.17	0.0008052	0.8 x10 ⁻³
PyC (dense)	1.8	0.175	0.0002338	0.44 x10 ⁻³
SiC	3.2	0.195	0.0042	1.1 x10 ⁻³
NbC	8,2	0.20	0.00031	2.54 x10 ⁻³

The average temperature of fuel is 310 C

2. Steam/water mixture

The porous part of the fuel region is filled with steam/water mixture with the following parameters:

Pressure 7.2 MPa

Temperature 288 °C

Average density
of steam/water mixture 87.7 kg/m³

3. Water region. The water inside of moderation tubes is practically in stagnant conditions, the temperature of water is about of feed water temperature ~ 270 °C

Table 3. Water Parameters

Density (g/cm ³)	0.770
Pressure (bar)	75
Temperature (°C)	270

3.Cladding: The material of cladding is zircaloy2. Cladding thickness is 1.5 mm.