

## 7. In-service Inspection Apparatus and Irradiation Equipment

### 7.1 In-service Inspection Apparatus for Graphite Components

A visual inspection of the core support graphite components using a TV camera is planned to monitor the structural integrity. At the visual inspection, the TV camera will be inserted by the in-service inspection apparatus into the HTTR core after one column of removable graphite components has been removed. Figure .7.1 shows the in-service inspection apparatus for core support graphite components. The TV camera is held within the supporting unit, which is hung by doubled wire

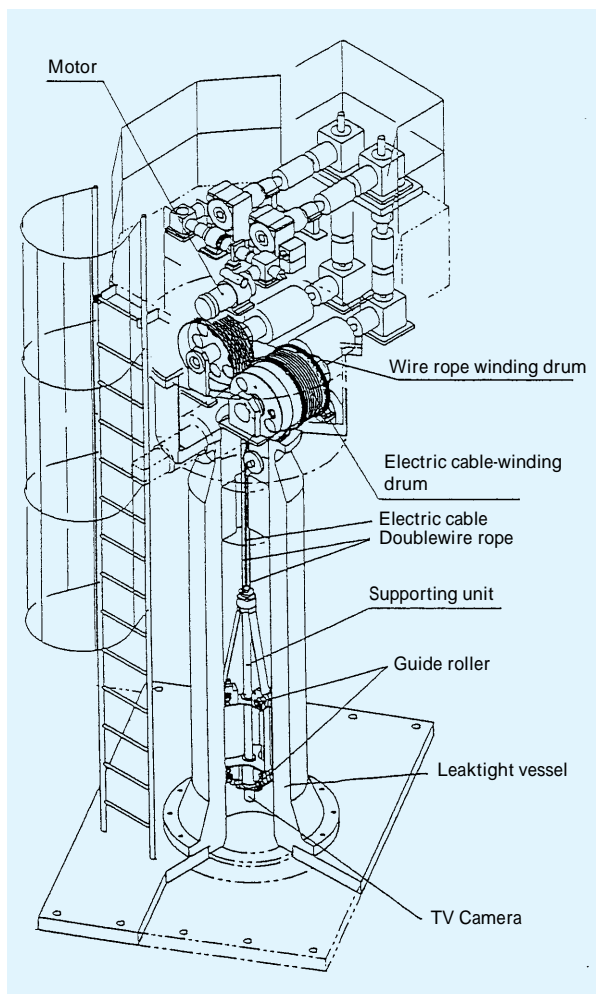


Fig. .7.1 In-service inspection apparatus for core support graphite components.

ropes. A rotation-type prism mirror is attached at the top of the camera head so that the surrounding area of the TV camera can be seen.

The supporting unit is inserted into a specified column by gravity, and the inner surfaces of core-side permanent reflector blocks, top surfaces of the seal blocks, outer surfaces of support posts etc. are visually inspected by the TV camera. A demonstration test with this apparatus was performed in August 1998 on the HTTR, and a fairly clear picture was obtained in this test.

### 7.2 Irradiation equipment

The HTTR has a unique and superior capability to irradiate large-sized specimens at high temperatures with a uniform neutron flux in irradiation tests. The - type irradiation equipment, shown in Fig. .7.2, is the first irradiation rig in the HTTR and is served for an in-pile creep test for a metallic material. This equipment can give great load on large-sized specimens of about 6 mm in diameter, used for a usual non-irradiation creep test. The specimens, made of 316 FR stainless steel (FBR grade type 316) developed for a structural material of the fast reactor, are installed in the irradiation units as shown in Fig. .7.2. A weight loading system located outside the reactor gives a stable and precise tensile load on the specimen in the units. The maximum load of this system is about 1000 kg for a tensile test. The irradiation temperature is controlled by an electric heater surrounding the specimens in addition to the heat of the reactor. The temperatures of 550 and 600 were selected for the in-pile creep test. Creep behavior of the specimen is detected by a differential transformer. The in-pile creep test for the large-sized specimens can be realized by making the most of the capability of the HTTR as an irradiation field.

Two sets of the irradiation rigs had been fabricated through functional tests. One is for

the in-pile creep test, the other is for measurement of the irradiation condition in the HTTR. The irradiation condition can be

measured directly by the rig for the first time. The first measurement will be carried out prior to the in-pile creep test.

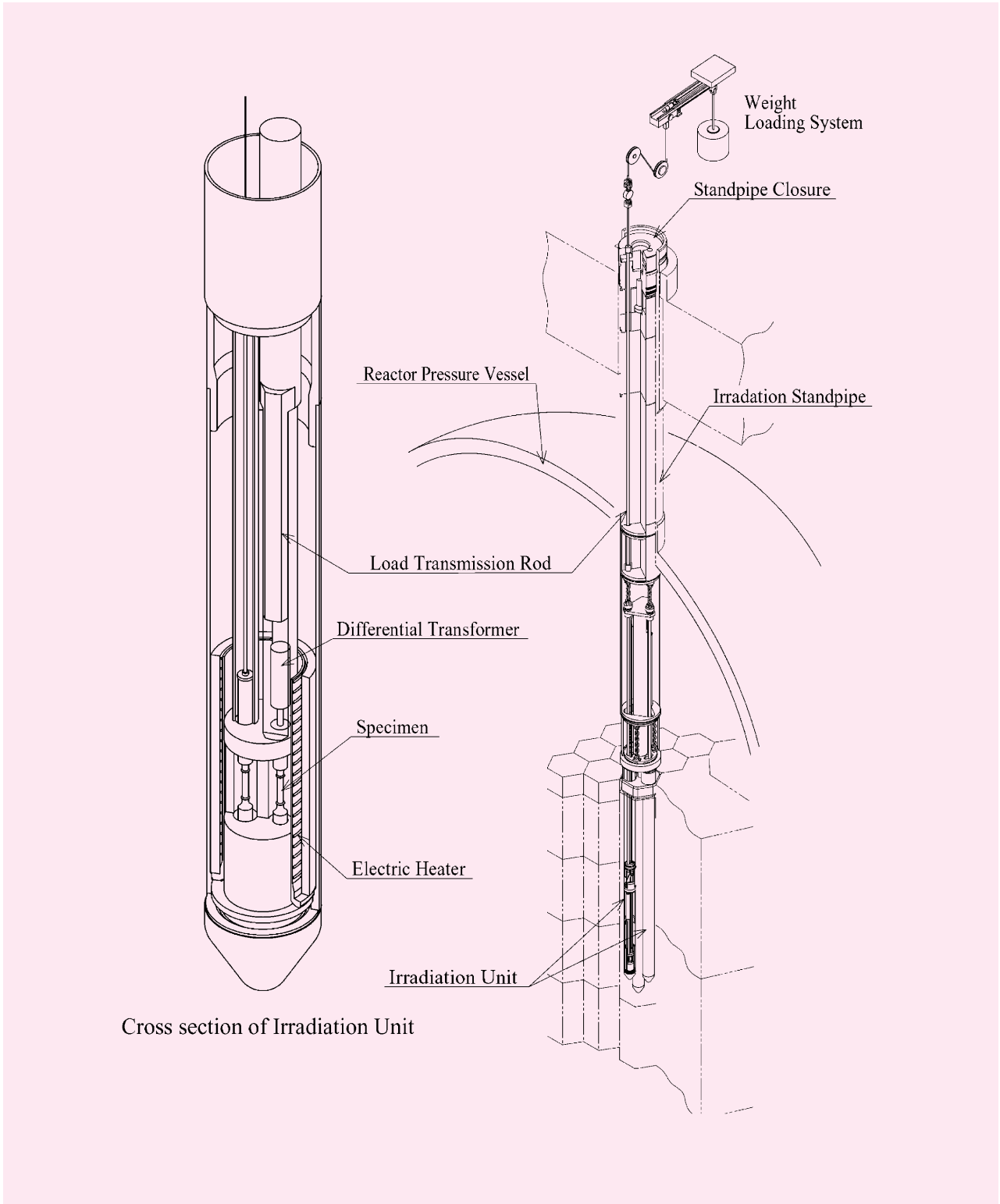


Fig. .7.2 I-I type irradiation equipment.