

## Expression of Interest

CSIR-CEERI invites expression of interest from public and private companies for the transfer of technology of 35kV/3kA Thyatron Plasma Switch developed by CSIR-CEERI, Pilani.

### AVAILABLE TECHNOLOGY

#### High Power 35kV/3kA Thyatron Plasma Switch

A high power 35kV/3kA Thyatron Plasma Switch has been developed at CSIR-CEERI under the BRNS sponsored project. The developed Thyatron Plasma Switch was primarily for its use in line type pulse modulator in Linear Accelerator. The fabrication, processing, development, conditioning and testing up to 35kV/3kA @50 Hz has been carried out at CSIR-CEERI, Pilani while higher PRR testing (~215Hz) has been carried out at BARC, Mumbai.

#### Design of the 35kV/3kA Thyatron Plasma Switch

The 35kV/3kA Thyatron Plasma Switch is in tetrode arrangement, having anode, cathode, pre-ionizing grid (Grid1/G1) and control grid (Grid2/G2). The Thyatron uses the cylindrical oxide coated cathode with heat shields mounted together with the pre-ionizing grid assembly, a special kind of control grid assembly and anode assembly. The cooling is provided by either forced-air directed mainly on to the base or immersion in the liquid (oil or coolant). Figure 1 shows the image of the 35kV/3kA Thyatron Plasma Switch developed by CSIR-CEERI.

#### Fabrication, Processing, Conditioning and Testing of 35kV/3kA Thyatron Plasma Switch

All the parts of the Thyatron Plasma Switch except control grid have been made in the workshop at CSIR-CEERI, Pilani, while the control grid has been made through outsourcing from Pilani. The complete Thyatron Plasma Switch has been assembled, processed and developed using the facilities available at CSIR-CEERI. The major technical specifications are given in Table-1.

**Table-1: Major Specifications**

Gas	Deuterium
Peak forward anode voltage	35 kV
Peak forward anode current	3 kA
Rate of rise of anode current	5 kA/ $\mu$ s
Pulse repetition rate	250 Hz
Pulse width	5 $\mu$ s
Average current	3 A
Heater current (typical)	19 A
Reservoir current	6 A



**Figure 1: CSIR-CEERI developed 35kV/3kA Thyatron Plasma Switch**

**Applications:** Medical and Industrial Linear Accelerators, Synchrotron Radiation Source, Radar Modulators, Cargo Scanning Systems, Crowbar Protection Circuits, etc.

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