



ATR NEXSHARE Fact Sheet

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Changing the World's Energy Future

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Advanced Test Reactor (ATR)



GENERAL INFORMATION

Acronym:	ATR
Facility name:	Advanced Test Reactor
Organization:	Department of Energy
Country:	United States of America
Operational since:	1967
Reactor family:	
<input checked="" type="checkbox"/> Water Cooled	<input type="checkbox"/> High Temperature Gas Cooled
<input type="checkbox"/> Molten Salt	<input type="checkbox"/> Liquid Metal Cooled Fast Spectrum
Other:	
Website/Contact email:	https://inl.gov/advanced-test-reactor/

TECHNICAL DESCRIPTION

Operating conditions modeled: ☒ Normal operation ☐ Accident conditions
please specify: ATR's unique serpentine core allows the reactor's corner lobes to be operated at different power levels, making it possible to conduct multiple simultaneous experiments under different testing conditions.

Application:

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> Thermalhydraulics—separate effects | <input checked="" type="checkbox"/> Thermalhydraulics—integral effects | <input checked="" type="checkbox"/> Neutronics |
| <input checked="" type="checkbox"/> Fuel | <input checked="" type="checkbox"/> Components/Feature | <input checked="" type="checkbox"/> Materials |
| <input checked="" type="checkbox"/> Containment | <input type="checkbox"/> Severe Accident | <input type="checkbox"/> Hazards (seismic) |

Other:

Phenomena modeled:

ATR can provide large-volume, high-flux thermal neutron irradiation in a prototype environment. The reactor's singular design makes it possible to study the effects of intense neutron and gamma radiation on reactor materials and fuels. Experiments conducted at ATR provide a critical look at reactor components and systems. Testing at ATR supports reactor research around the world to extend the life of current nuclear power plants, develop designs for the reactors of the future, and test new types of stronger nuclear fuels that reduce waste generation and proliferation risks.

Key facility parameters:

- Large test volumes—up to 48 inches long and 55.25 inches in diameter
- Seventy-seven test positions available within the core and reflector assembly
- High neutron flux enables accelerated testing for fuel and materials development
 - Maximum thermal flux in the core: 1.0×10^{15} n/cm²-sec
 - Maximum fast flux in the core: 5.0×10^{14} n/cm²-sec
- Fast and thermal flux ratios ranging from 0.1 to 1.0
- Constant axial power profile
- Power tilt capability for experiments in same operating cycle
- Operating conditions:
 - 360 psia with unique ability to provide independent pressure control for loops

Last update:

- 125–160°F
- 250 MW thermal max power level

Records of experiments:

ATR has a long history of testing fuels and materials.

Planned experiments:

Please refer to [Advanced Test Reactor - Idaho National Laboratory \(inl.gov\)](#) or [OSTI.gov](#) for the latest published ATR Integrated Strategic Operating Plan (ISOP).

QUALITY ASSURANCE, INTELLECTUAL PROPERTY AND DATA SHARING

QA standards followed by the Facility: NQA-1

QA certifications received by an independent organization(s): None

Confidentiality and Intellectual Property (IP):

Experimenters can interact with ATR personnel under nondisclosure agreements and IP can be protected under Department of Energy's (DOE's) Cooperative Research and Development Agreement rules.

Potential for data sharing:

Information that can legally be published can be shared with interested parties. Many of ATR's DOE-funded experiments have been or will be published openly.

DETAILED DESCRIPTION

A detailed description of ATR and its support facilities can be found at the link below:

[ATR User Guide \(Program Document\) | OSTI.GOV](#)