

Simple Mechanism Fission Reactor + Industrial Turbine

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The designs in this tutorial are taken straight from the Wiki as a "minimally viable stable" Reactor+Turbine setup. You can, of course, make something bigger than this but the core mechanics will be the same. Scroll to the bottom of the album if you're interested in a sample Fissile Fuel generation setup.

SgjmITA.png

Start with the Fission Reactor. The smallest Fission Reactor you can make is 3x4x3. Start with a 3x3 base layer of Fission Reactor Casing.

3Jbgwpt.png

On the next layer, continue building up the outer walls with Fission Reactor Casing. Optionally, use Reactor Glass on these walls for decoration. Note: The outside edges of your Fission Reactor can **only** be Casings. The edges cannot be glass.

In the center, place a Fission Fuel Assembly in the middle.

avPlcTw.png

On the next layer, continue building up the outer wall.

In the center, place a Control Rod Assembly in the middle.

rROYtwm.png

On the final layer, place Fission Reactor Casings on the outer edges. The center block can either be a Casing or Glass - it doesn't matter.

That's it, for now. The Fission Reactor multiblock should form. You will see redstone particles if the multiblock formed correctly. Right clicking anywhere on the multiblock will open the GUI.

We will return to this to place our ports for getting resources in and out of the reactor.

dJ2SvuW.png

For the Industrial Turbine, we will build a small one that can match the output of our small Fission Reactor.

Start with a 5x5 base of Turbine Casings.

o7f5SZZ.png

Begin building up the outer wall. The edges must be Turbine Casings, but the faces may be Casings or Structural Glass.

In the center, place a Turbine Rotor. Right click the Turbine Rotor twice while holding Turbine Blades to place two blades on this section of Turbine Rotor.

bQe3M9F.png

Continue building up the outer wall and the Turbine Rotor and Blades. This step is exactly the same as the previous step.

DE9i67M.png

Continue building up the outer wall and the Turbine Rotor and Blades. This step is exactly the same as the previous step, again, again, and again. This is the final height of your Turbine Rotor. You should have a 5-block tall Turbine Rotor with 10 Turbine Blades on it in total.

30s7p3K.png

Place a Rotational Complex on top of the Rotor.

PWGABXW.png

Continue building up the exterior wall. Place a ring of Pressure Dispersers around the Rotation Complex. This layer must always be filled completely with Pressure Dispersers surrounding the Rotation Complex, no matter how big your Turbine is.

FP6mfBt.png

Place Electromagnetic Coils on the next layer up. They must touch the Rotational Complex and each Coil must touch one another. You can place more than 3, but this Reactor + Turbine design can only make use of 3 so there's no point in adding more.

iuqx5q6.png

At this level, the faces of your exterior wall can (and should) be Turbine Vents. Continue building up the exterior wall.

JlZ0wBG.png

Surround the Electromagnetic Coils with Saturating Condensers. These blocks are responsible for turning Steam back into Water.

In this configuration, you will need 6. Continue building up the exterior wall, remembering to place Turbine Vents on the faces.

WteJGWC.png

On the final layer, place Turbine Casings on the edge and Vents on the inside face. And you're done, for now.

The multiblock should form. Right clicking anywhere on the multiblock will open the GUI.

otDHRRN.png

We will now revisit both structures to determine where to put our input and output ports.

For the Fission Reactor, use Fission Reactor Ports. For the Industrial Turbine, use Turbine Valves. In addition, any Turbine Vent can be used to output waste water from the Turbine.

I've chosen to put two Fission Reactor Ports facing the Industrial Turbine. The top Port on the Reactor is configured to be an input port, where I input water into the Reactor. The bottom Port is configured to output heated coolant.

I placed one Turbine Valve directly adjacent to the heated coolant output of the Reactor. This Valve will accept the heated coolant into the Turbine. I'm using an arbitrary Vent at the top of the Turbine to output water back into the Fission Reactor after it's been used up.

I've connected the Turbine Vent to the top Fission Reactor Port (input) with an Ultimate Mechanical Pipe, and the Turbine Valve to the lower Fission Reactor Port (output) with an Ultimate Pressurized Tube. The Mechanical Pipe is set to extract from the Turbine Vent, and the Pressurized Tube is set to extract from the Fission Reactor Port.

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On the other side, I've chosen to place my other two Fission Reactor Ports. The top is configured for input, where I will input Fissile Fuel. The bottom is configured to output waste, where the spent Fissile Fuel will be ejected as Nuclear Waste.

2maDPrH.png

On the other side of the Turbine, I've chosen to place my second Turbine Valve. I will use this one to extract power from the Turbine. Here I've chosen to export power into an Energy Cube.

vZKlg2S.png

It's a little hard to see, but I placed a Fluid Tank of water on the Mechanical Pipe to "prime" the system with water. Once you've filled up your Fission Reactor with water, this can be removed as the system will be a "closed loop" where all the water gets converted to steam in the Reactor and then the steam gets converted back to water in the Turbine.

All that's left to do is hook up your input of Fissile Fuel to the input port (top) and some way of managing your Nuclear Waste (bottom). Here I am importing from a Chemical Tank full of Fissile Fuel that I've "created" elsewhere and exporting to a Nuclear Waste Barrel.

Once this is done, right click on the Fission Reactor and click "Activate".

7bSFqjO.png

If all is well, water will begin to be turned into steam and extracted to the Turbine, where it will then be converted into water + power. The water will be piped back into the Reactor to be reheated. At the default "Burn Rate" setting of 0.1 mB/t on the Reactor, this design should have a Heating Rate that fluctuates between 1998-1999 mB/t. Looking at the Turbine, the flow rate should also be fluctuating between these two values. If this is true, then your system is properly configured and can be left to run indefinitely****

***As long as.... (see below)

4Ecot27.png

NOTE: If the Industrial Turbine fills up with energy, it will stop processing steam, which will cause the Fission Reactor to build up pressure until it explodes. Make sure that you are either venting your excess steam, or voiding your excess power in some way if you don't want a big explosion and lots of radiation.

Bonus: Fissile Fuel Generation. It can definitely be made more compact but the setup has been intentionally split up for clarity.

The purple boxes are Creative Crates from Create. This simulate your raw resource input that will be coming from elsewhere.

- The crate in the blue side has Uranium Ingots.
- The crate at the top of the orange side has Sulfur.
- The crate at the bottom of the orange side has Fluorite.

The process is split into three parts:

1. Uranium Oxide generation
2. 2. Hydrofluoric Acid generation
3. 3. Fissile Fuel Generation

You combine the outputs of the blue side and the orange side to make Uranium Hexafluoride, then spin that really fast in the Isotopic Centrifuge to make Fissile Fuel.

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