

Molecular Furnace

The Molecular Furnace is a system designed to process a bulk of materials such as ores and salvage and convert them into raw materials for manufacture. The furnace system varies from design to design, but has several universal properties. These devices are occasionally referred to a “wave-lathes” because of the slightly wavy pattern that often arises on the surface of raw materials they produce. Variants are manufactured by [Solan Starworks](#), [Ahmida Civiltech](#) and even [Altjira Biomedical](#) and are distributed in the civilian sector as essential industrial devices.

Even before they had achieved faster than light travel, the [Iromakuanhe](#) had a solid grasp of conventional materials science that allowed them to construct megastructures such as the orbital elevators of [Maekardan](#) and [Hlarai](#), and establish massive arcologies on the icy world of [Mazerin](#). Such ventures took more resources than had ever been used by the Iroma before, with the mass to build entire cities barely filling the central shaft of an elevator and hungry arcologies that required to strip mining of entire landmasses into wasteland. In order to solve the materials crisis, it was necessary to figure out ways to quick and cheaply process inner system asteroids and uninhabited planetoids, in order to prevent widespread ecological devastation on their precious homeworlds.

The furnaces were refinements and extrapolations of existing mining technology, using hot fusion torches to render mined minerals down past their constituent molecules and all the way to their basic atoms, which could then be assembled into different compounds and allotrope using crude 'resonance field technology', a precursor to the more complex [Veyrinite](#) drives and weapons of the current era. Using metamaterials (and eventually, Veyrinite), furnace processors are able to oscillate and force high-energy state reactions such as the alloying of metals to occur at relatively 'cool' temperatures, and subsequently shape the resulting mass into an easily processable material. In effect, once broken down into basic allotropic compounds by the fusion torches, the materials can easily be shaped into different prefabricated components with little heat by manipulating them into forming artificial covalent bonds and aggregating into desired shapes.

Depending on the environmental and internal conditions of the Furnace, the functionality of the system might be limited or changed, due to limited gravity control technology in the Iromakuanhe sphere. For example, the high-density allotrope [ADNR](#) is best produced under high-gravity conditions with its most advanced form, Hypercarbon¹⁾, only produce-able in the inner gravity well of a large gas giant or a stellar body. Zero gravity conditions are ideal for producing precisely structured metamaterials, as atoms can be manipulated more easily and do not filter and separate because of gravitational influences.

General Information

Name: Molecular Furnace Type: Advanced Smelter Government: [Government of the Astral Commonwealth](#) Designer: [Ahmida Civiltech](#) Manufacturer: Various

Price

Standard Module, Small: 20 000 KD Standard Module, Medium: 80 000 KD Standard Module, Large: 500,000 KD

Solan Starworks Module, Small: 30,000 KD Solan Starworks Module, Medium: 120,000 KD Solan Starworks Module, Large: 750,000

Ahmida Civiltech Module, Small: 25,000 KD Ahmida Civiltech Module, Medium: 100,000 KD Ahmida Civiltech Module, Large: 625,000 KD

Altjira Biomedical Module, Small: 40,000 KD Altjira Biomedical Module, Medium: 160,000 KD Altjira Biomedical Module, Large: 1,000,000 KD

Statistics

Molecular Furnace Processing Speeds				
Size	Ore to Material	Ore to Goods	Material to Goods	Special Feature
Standard Module Type				N/A
Small	4 Tonnes/Hour	3 Tonnes/Hour	6 Tonnes/Hour	N/A
Medium	12 Tonnes/Hour	9 Tonnes/Hour	18 Tonnes/Hour	N/A
Large	32 Tonnes/Hour	24 Tonnes/Hour	48 Tonnes/Hour	N/A
Solan Starworks Module Type				Veyrinite/Biomass
Small	3 Tonnes/Hour	2 Tonnes/Hour	4.5 Tonnes/Hour	1 Tonnes/Hour
Medium	9 Tonnes/Hour	6 Tonnes/Hour	13.5 Tonnes/Hour	3 Tonnes/Hour
Large	24 Tonnes/Hour	16 Tonnes/Hour	36 Tonnes/Hour	8 Tonnes/Hour
Ahmida Civiltech Module Type				Metamaterials/Heavy Allotropes
Small	9 Tonnes/Hour	8 Tonnes/Hour	13.5 Tonnes/Hour	3 Tonnes/Hour
Medium	27 Tonnes/Hour	24 Tonnes/Hour	40.5 Tonnes/Hour	9 Tonnes/Hour
Large	72 Tonnes/Hour	64 Tonnes/Hour	108 Tonnes/Hour	24 Tonnes/Hour
Altjira Biomedical Module Type				Biomass
Small	4 Tonnes/Hour	3 Tonnes/Hour	6 Tonnes/Hour	2 Tonnes/Hour
Medium	12 Tonnes/Hour	9 Tonnes/Hour	18 Tonnes/Hour	6 Tonnes/Hour
Large	32 Tonnes/Hour	24 Tonnes/Hour	48 Tonnes/Hour	16 Tonnes/Hour

Size

Small

Small molecular furnaces are units commonly found in private workshops or the utility areas of small starships for maintenance and recycling purposes. Each Small-scale unit is roughly the size of kitchen appliance such as a washing machine and are light enough to be carried around without heavy moving equipment. They are relatively safe units with no real environmental impact, and can be safely operated in a flammable environment or a homestead without any health concerns. For this reason, they are the most common and popular scale of molecular furnace and have few restrictions on their ownership or use.

Medium

Medium molecular furnaces are the fare of medium and heavy industry, large pieces roughly twice the size of the small molecular furnace, equipped with more robust processing equipment that makes better use of the technologies used. These units are often deployed on specialized mining drones, allowing them to smelt materials on-site and deposit the refined product on the controlling ship. Although still relatively safe, the fusion devices inside of a medium furnace are large enough to be set off and cause severe damage to the surrounding environment. Overloaded, they can burn through reinforced floors and ignite flammables.

Large

Large furnaces are systems designed to process bulk materials in great quantities, and are scaled accordingly. Each unit is approximately six times the size of a small furnace and capable of filling most of a small room. Many factories dedicate entire areas to massive arrays of furnaces, which operate in union to churn out massive numbers of prefabricated components and feed them onto factory production lines. This is the largest size of molecular furnace purchasable by organizations without express license from the government, and the largest that can legally be used in an atmosphere. Large units exist, but are only used in industrial space stations and orbital industries.

Variant

Standard

The Standard commercially available molecular furnace is an industrial piece that combines the elements of a smelter, forge and machining seamlessly into a single system, essentially acting as an all-in-one fabrication system that produces basic prefabricated mechanical, electronic and structural components. Most startup corporations and 3rd party distributors manufacture this basic variant of the molecular furnace which can be acquired cheaply and utilize registered and open source manufacturing codecs.

Hot fusion torches can render down metals within a matter of minutes, and can reduce their energy output to process or create ceramics and plastics. It lacks the ability to create complex smart materials or produce sophisticated circuitry, although the latter is possible by assembling individual components produced through a standard module.

Solan Starworks

Solan's variant of the molecular furnace is the most conventionally advanced, and is de-rigueur among Veyrinite prospectors and high-tech industries. It uses far more precise and powerful distortion fields, but uses smaller fusion torches to prevent damage to the processing equipment. It is the only unit capable of processing Veyrinite and is capable of manufacturing advanced smart materials and circuitry as easily as it can generate prefab structural and mechanical pieces, at some cost to production speed. It is also

capable of producing organic molecules and compounds like the Altjiran variant, although it does so at half the rate.

Solan's version is generally only capable of using Solanii manufacturing codecs, although certain open source options are vaguely possible with a bit of clever programming. For this reason, the Solan Starworks version of the molecular furnace is only used by select groups with a need to have permanent access to replacement components for a MASC Drive or other common Solanii technologies.

Ahmida Civiltech

The Ahmida Civiltech molecular furnace is robust, efficient and simple to operate. It is exclusively capable of refining and processing ore into mechanical and structural components such as armor plates, replacement bulkheads and engine components, and lacks any of the sophistication of the standard or other corporate variants. It is equipped with much more hotter burning fusion torches and a more powerful distortion system that allows it to process nearly twice the ore tonnage of the standard variant furnace, which has made the Ahmidan product very popular with ore prospector and mining conglomerates.

The Ahmida Civiltech furnace is in fact not capable of producing most of the goods Ahmida Civiltech is recognized for producing, and uses its specialized units exclusively to mass produce large components for the assembly lines. It is possible to configure one to craft pieces made entirely out of metals, metamaterials or ceramics such as blades or other simple shapes, but more complex pieces are beyond the purview of the variant.

Altjira Biomedical

Altjira Biomedical's molecular furnace is a somewhat anomalous variant that is unable to process bulk goods or materials, and is exclusively used for creating organic compounds. It lacks the trademark fusion torches of the system and uses distortive compression to break down captured ore, water and gasses and form basic compounds such as carbohydrates, amino acids and organic metallic compounds essential for the growth of many lifeforms.

It does so rather quickly, processing several tonnes of harvested mined frozen or liquid water, reclaimed ore or landfill and various gasses and converting them into a raw proteinous slurry which can put to use for biotech industries. Given more time, it can also create more complex protein structures, synthesize ingredients for pharmaceuticals and dietary supplements or even make various toxins. It is unable to directly 'create life' but can assemble the basic building blocks to sustain the exowombs and culturing facilities used to do so.

1)

Which is most famous as the primary component for the outer armor of the [Erla Vandr 2](#).

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