EVE ONLINE

Guide to T2 Component Production

PART 1 – INTRODUCTION

I've been learning a lot about T2 industry, and I wanted to capture what I've learned so that other people don't have to go through the same long, painful process of figuring all this out. I've broken this guide into 4 parts:

1. Introduction and Overview
2. Moon mining
3. Reactions
4. T2 Construction Components

OVERVIEW

Producing T2 items is different than T1 production in three ways:

1. T2 "final product" BPOs are very difficult to get. They can be earned from R&D agents, purchased on the Blueprints channel. BPCs can sometimes be purchased from escrow, and in a future patch will be given out as agent rewards.

2. Manufacturing T2 items requires additional skills than those needed to manufacture T1 items. Additional skills are also necessary for T2 BPO research.

3. T2 items require "T2 construction components" in addition to minerals and other mundane materials. These T2 construction components come from player manufactured items created from "moon minerals, and from NPCs.

Obtaining a T2 BPO is expensive and a little difficult. Obtaining exactly the one you want will be very tough since they are rare. It appears that T2 BPOs are tightly monitored by CCP, and the number of each in existence is exactly controlled. Only when CCP decides to release more of a specific BPO, or when one is somehow destroyed, are more T2 BPOs "released" via R&D Agents. Often these show up for sale in the blueprints channel where they sell for hundreds of millions to billions of ISK.

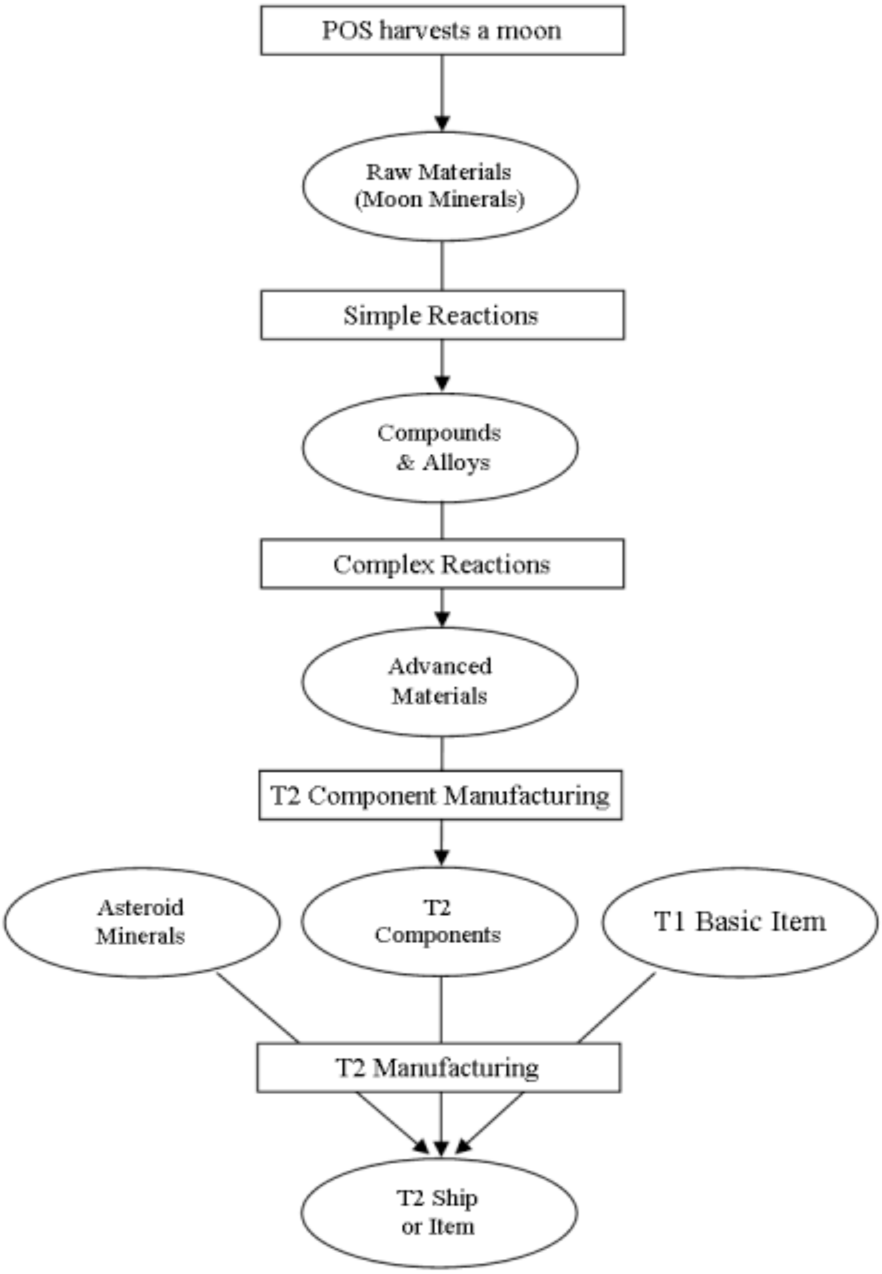
In most cases, manufacturing a T2 item starts with producing a T1 version of the object. If you are making a ship, you must first build the T1 "base" hull. If you are making ship equipment, you often must start with the T1 "base" equipment equivalent. This T1 "basic" object is then augmented with the addition of T2 construction components (and often a few more minerals) in a second manufacturing process to produce the final T2 product.

Manufacturing all T2 items, including the components, requires training in skills not needed for T1 manufacturing. These skills have a prerequisite of Science 5 and either mechanic 5, electronics 5, or engineering 5. These skills are also a requirement for ME and PE research on T2 BPOs. Most of these skills are found under the "science" group of your skills list. The specific skills needed are described on the BP.

Once you have the skills and a BP, the only challenging barrier left is the T2 construction components. Some of these components are made by NPCs for purchase, such as construction blocks. But many of the components are made by players. The process of creating T2 components is the focus of this guide.

To create T2 components, raw materials are harvester (mined) from a moon using a POS (Player Owned Structure/Station) with a harvesting array. These raw materials are used in a "simple reaction" (at a POS using a medium or "large" reactor) to create alloys/compounds. These alloys/compounds are then used as inputs for "complex reactions" (also at a POS using a "large" reactor)) which create advanced materials. The advance materials are then used in a manufacturing process to create construction components, which are used in creating finished T2 items.

Here is an illustration of this process:



PART 2 - MOON MINING

Moon "mining" is the harvesting of raw materials using a POS fitted with one or more harvesting arrays. But the first step is finding a moon with desirable materials.

SURVEYING

To find what raw materials are on the moon before setting up a POS and harvesting array, you need a ship equipped with a probe launcher. Fly straight toward the moon in question and launch only 1 survey probe. The survey probe description may say you need three probes, but at the time of this writing only one is actually required. Depending on the probe used, in 10-40 minutes the "moons" tab in your scanner window will start showing results, or a message will appearing saying the moon has no materials to exploit.

Be careful to avoid moons that already have POS. Existing POS are often set to fire on sight, and accidentally warping to a moon with a POS will get your ship toasted quick. The easiest way to find moons with a POS is fly to a planet, then scan to the distance of the first moon plus about 50,000km (to account for orbit distance). The moons are numbered so that the one closest the the planet is numbered "moon 1". Then next furthest out is "moon 2", etc. By gradually increasing your scan range to include the next moon out plus about 50,000km, you will be able to tell which moons have POS as new control towers become visible in your scan results. Make sure your overview settings are such that they show control towers.

POS BASICS

A POS is constructed at a moon by first deploying a control tower at the moon, anchoring it in space at that moon, and then "onlining" it. An online control tower "burns" fuels and components. If it runs out of fuel or components, it goes offline and offlines all it's fittings. While it is online it projects a force field bubble 30-50km in diameter around it. POS fittings can be anchored in space, and then onlined inside the force field bubble. Like ship fittings, POS fittings use some of the tower's power and CPU when online. The number of fittings and their quality depends on the tower's available CPU and power grid.

There are 3 sizes for control towers: small, medium, and "normal" (aka large). Small towers use the least fuel and components, but have the least power grid and CPU. Likewise, "large" POS use the most fuel and components, but have the most CPU and power grid. The burning of fuel and materials occurs in "cycles". Each cycle is 1 hour long.

Each of the 4 races has their own control towers. Like ships, there are racial differences between the tower's abilities. Amarr towers, for example, have lots of power grid but very little CPU. POS weaponry tends to use power grid and not CPU. Caldari towers have more CPU and less power grid. Fittings like moon harvesters, silos, reactors, labs, and factories require a great deal of CPU.

A small POS can run 1 harvesting array and 1 silo. A medium POS can run 2 harvesting arrays and silos with some CPU left over, or a harvester with a silo and a medium (simple) reactor. A large POS is the only structure that can run a (complex) reactor array.

To harvest minerals the POS needs to have a Moon Harvesting Array online. This array gathers raw materials from the moon and places them into either a Silo or a coupling array. A coupling array is a "mini" silo that does not hold very much material. Harvesting arrays gather 100 units of the material every hour.

Configuring harvesters, reactors, silos, and coupling arrays occurs through the production tab in the POS management window (access by right clicking the control tower).

Launching, configuring, and running a POS is a very complicated subject and not the focus of this guide.

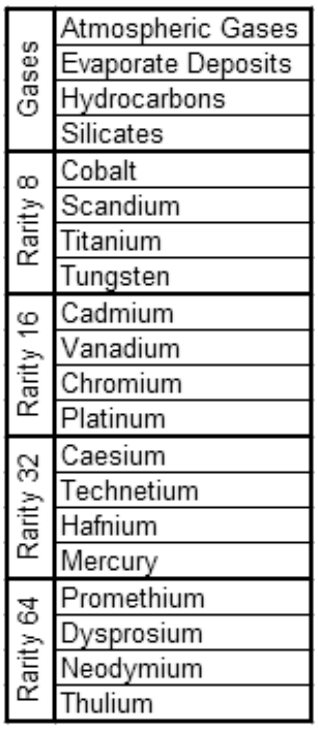
RAW MATERIALS

Now you know how to find materials on a moon, and how to set up a POS to mine that moon. But which materials are "good"? There are 5 classes of raw materials a moon might have.

1. Gasses: Atmospheric Gases, Evaporate Deposits, Hydrocarbons, Silicates
2. Rarity 8 metals: Cobalt, Scandium, Titanium, Tungsten
3. Rarity 16 metals: Cadmium, Vanadium, Chromium, Platinum
4. Rarity 32 metals: Ceasium, Technetium, Hafnium, Mercury
5. Rarity 64 metals: Promethium, Dysprosium, Neodymium, Thulium

Gasses are very common. The "rarity 8" metals (r8) are twice as common as the r16 metals. Likewise, there are half as many moons with r64 metals as those with r32 metals.

Below is a table that lists these materials.



Gases	Atmospheric Gases
	Evaporate Deposits
	Hydrocarbons
	Silicates
Rarity 8	Cobalt
	Scandium
	Titanium
	Tungsten
Rarity 16	Cadmium
	Vanadium
	Chromium
	Platinum
Rarity 32	Caesium
	Technetium
	Hafnium
	Mercury
Rarity 64	Promethium
	Dysprosium
	Neodymium
	Thulium

But rarity isn't the only thing that determines value. These materials are useless by themselves and must be reacted with other raw materials to create anything useful. Rarity just gives us an idea about supply, but does not tell us about demand for each raw material. In order to understand the demand we must examine how these raw materials are reacted.

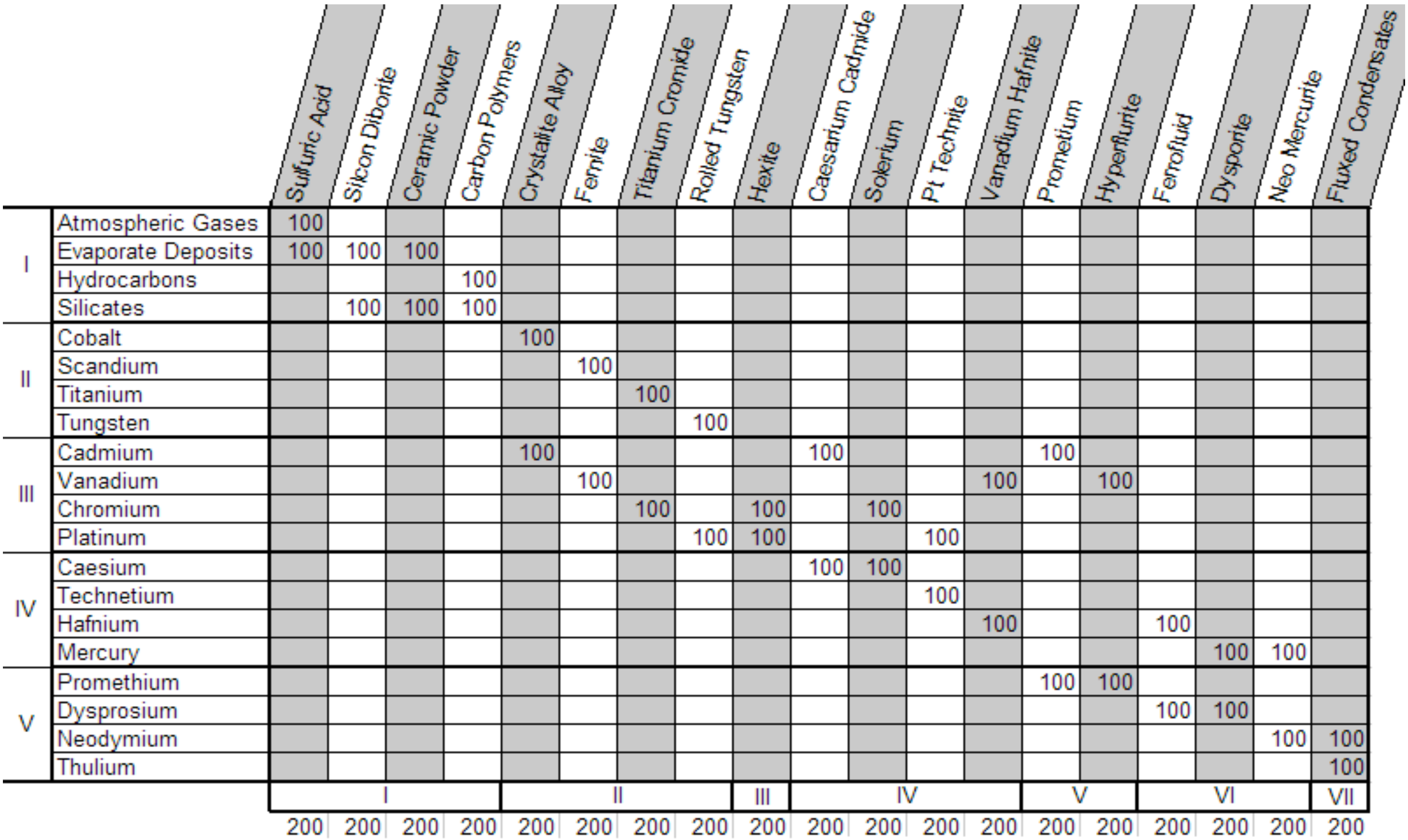
PART 3 – REACTIONS

SIMPLE REACTIONS

Raw materials gathered from a harvesting array are used in simple reactions to make alloys and compounds. These simple reactions always start with 100 units of two different raw materials and produce 200 units of alloy or compound. The reaction occurs once per hour.

Simple reactions can take place in either a medium or "regular" reactor array. The raw materials for the reaction need to come from a silo, coupling array, or directly from a moon harvesting array. The output of the reaction must be directed to a silo or coupling array.

Below is a table showing simple reactions and which raw materials they use.



		Sulfuric Acid	Silcon Diborite	Ceramic Powder	Carbon Polymers	Crystalite Alloy	Fernite	Titanium Cromide	Rolled Tungsten	Hexite	Caesarium Cadmide	Solerium	Pt Technite	Vanadium Hafnite	Prometium	Hyperflurite	Ferrofluid	Dysporite	Neo Mercurite	Fluxed Condensates
I	Atmospheric Gases	100																		
	Evaporate Deposits	100	100	100																
	Hydrocarbons				100															
	Silicates		100	100	100															
II	Cobalt					100														
	Scandium						100													
	Titanium							100												
	Tungsten								100											
III	Cadmium					100					100				100					
	Vanadium						100							100		100				
	Chromium							100		100		100								
	Platinum								100	100			100							
IV	Caesium										100	100								
	Technetium												100							
	Hafnium													100			100			
	Mercury																	100	100	
V	Promethium														100	100				
	Dysprosium																100	100		
	Neodymium																		100	100
	Thulium																			100
		I				II				III	IV				V		VI			VII
		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200

On the bottom of the table each simple reaction is assigned to a group. Each group is given a letter. These groups give an indication of the "rarity" or difficulty in producing each alloy/compound.

For example, Group A reactions all consist of gas-gas starting materials. Since gases are common, it should be easy to get materials for these reactions. Group B reactions consist of an r8 material reacting with an r16 material. Group C is an r16-r16 reaction, while Group D is an r16-r32 reaction. Group E is an r16-r64 reaction. Group F reactions combine r32 and r64 materials. The last group, Group G, is a reaction between two r64 materials.

By examining these groups, you can start to draw some conclusions about the demand for the different materials. Silicates participate in 3 different reactions, while atmospheric gases participates in only one reaction. Since silicates and atmospheric gasses occur in roughly equal frequency, you can surmise that the demand for silicates might be slightly higher.

Another interesting pattern to look at regards the r8 materials. You notice that all the r8 materials are involved in only one reaction, and only with a rarer r16 material. So in order to do anything useful with an r8 material you need it's r16 pair. That means that the demand for the r8 materials will always be low since they are dependant on a rarer r16 counterpart. Further, those r16 counterparts are involved in other reactions of their own as well. We already knew that r16 materials are rarer than r8 materials, but by studying the chart we can also see that they are in higher demand.

But just because something is rare does not mean demand for it is high. Take the r64 material Thulium for example. It only reacts with Neodymium, which is also an r64 material. We will also find out later that the product of the Thulium-Neodymium reaction (Fluxed Condensates) is only used in one complex reaction, and the product of that complex reaction is only used when producing reactor units. In short, the supply of Thulium may be low, but demand for it is also low compared to the other r64 materials.

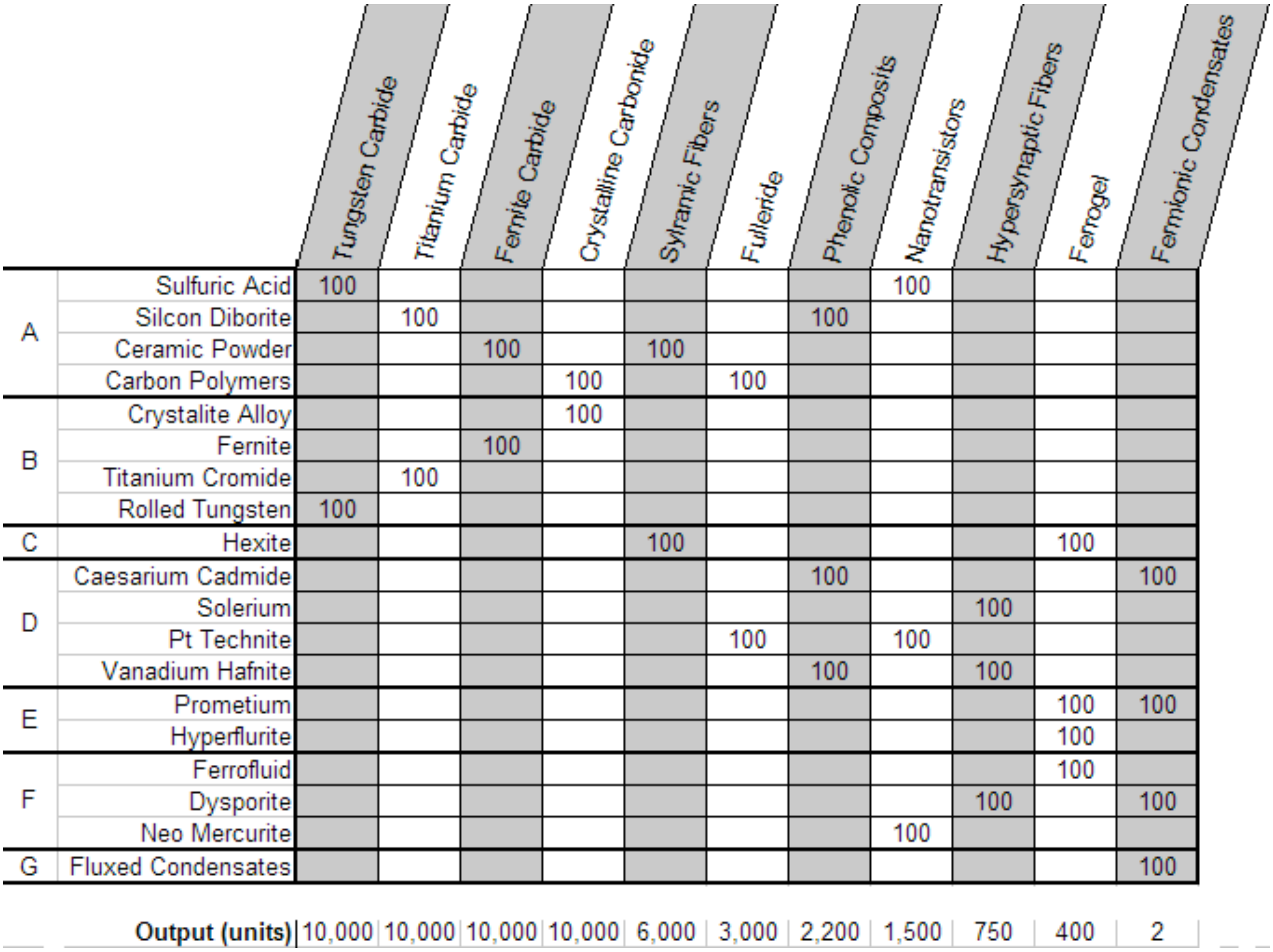
You can study the chart further to draw your own conclusions about demand for the other materials. The groupings, however, make it easier to summarize your conclusions. Since every reaction in the group involves materials of similar rarity, it follows that if the demand for all the materials is similar than their market value should be approximately the same. The groups are arranged in order of increasing rarity of their raw materials.

Like the description for materials, this chart only gives us some information about the ease of supply of alloys and compounds. It does not tell us about the demand. The question of demand requires further understanding of how the products of simple reactions are used.

COMPLEX REACTIONS

The alloys and compounds produced by simple reactions are used as inputs in a complex reaction. Unlike simple reactions which have only 2 inputs, complex reactions sometimes use 2, 3, or even 4 inputs for the reaction. Also, the quantity of the output varies for each complex reaction. Simple reactions always input 100 of each material and output 200 units of product. Complex reactions always use 100 units of each input, but the amount of output varies. Like simple reactions, complex reactions cycle once per hour. Outputs from compound reactions are called "Advanced Materials."

Below is a table describing possible complex reactions.



		Tungsten Carbide	Titanium Carbide	Fernite Carbide	Crystalline Carbonide	Sylramic Fibers	Fulleride	Phenolic Composits	Nanotransistors	Hypersynaptic Fibers	Ferrogel	Fermionic Condensates
A	Sulfuric Acid	100							100			
	Silcon Diborite		100					100				
	Ceramic Powder			100		100						
	Carbon Polymers				100		100					
B	Crystalite Alloy				100							
	Fernite			100								
	Titanium Cromide		100									
	Rolled Tungsten	100										
C	Hexite					100					100	
D	Caesarium Cadmide							100				100
	Solerium									100		
	Pt Technite						100		100			
	Vanadium Hafnite							100		100		
E	Prometium										100	100
	Hyperflurite										100	
F	Ferrofluid										100	
	Dysporite									100		100
	Neo Mercurite								100			
G	Fluxed Condensates											100
	Output (units)	10,000	10,000	10,000	10,000	6,000	3,000	2,200	1,500	750	400	2

You will notice on the far left I show the group for the simple reaction that produces the alloy or compound. As before, I've tried to arrange the inputs and reactions in order of increasing difficulty of material supply according to rarity.

Most of the inputs can be used in more than one reaction. In particular, notice that the Group A products are used very often. 8 of the 11 complex reactions require Group A inputs - and since group A reactions require gases, it indicates that only 3 compound reactions can be run without using some kind of gas as an input.

Also notice that Ferrofluid and Fluxed Condensates both participate in only one reaction, and those reactions require 3 other products. This probably has two consequences: 1) that demand for Ferrofluid and Fluxed Condensates will be lower since they are only used in one reaction, and that 2) the supply of Ferrogel and Fermionic Condensates must be difficult since they require such a great deal of starting material. Fermionic Condesates reaction also has an interesting consideration that the output of the reaction is only 2 units the Fermionic Condensate advanced material. This reaction is further hindered in that it requires fluxed Condensates - a group G compound that is a product of two r64 metals.

Studying this table gives us insights into the ease of supply for complex reactions, and the demand for the previous table of simple reactions. Further, the amount of output for each reaction gives some information about the rarity of the complex outputs, but to know their "value" we need to understand how the advanced materials are used. Advanced materials are used to create T2 construction components. This is covered in the next section.

PART 4 - T2 CONSTRUCTION COMPONENTS

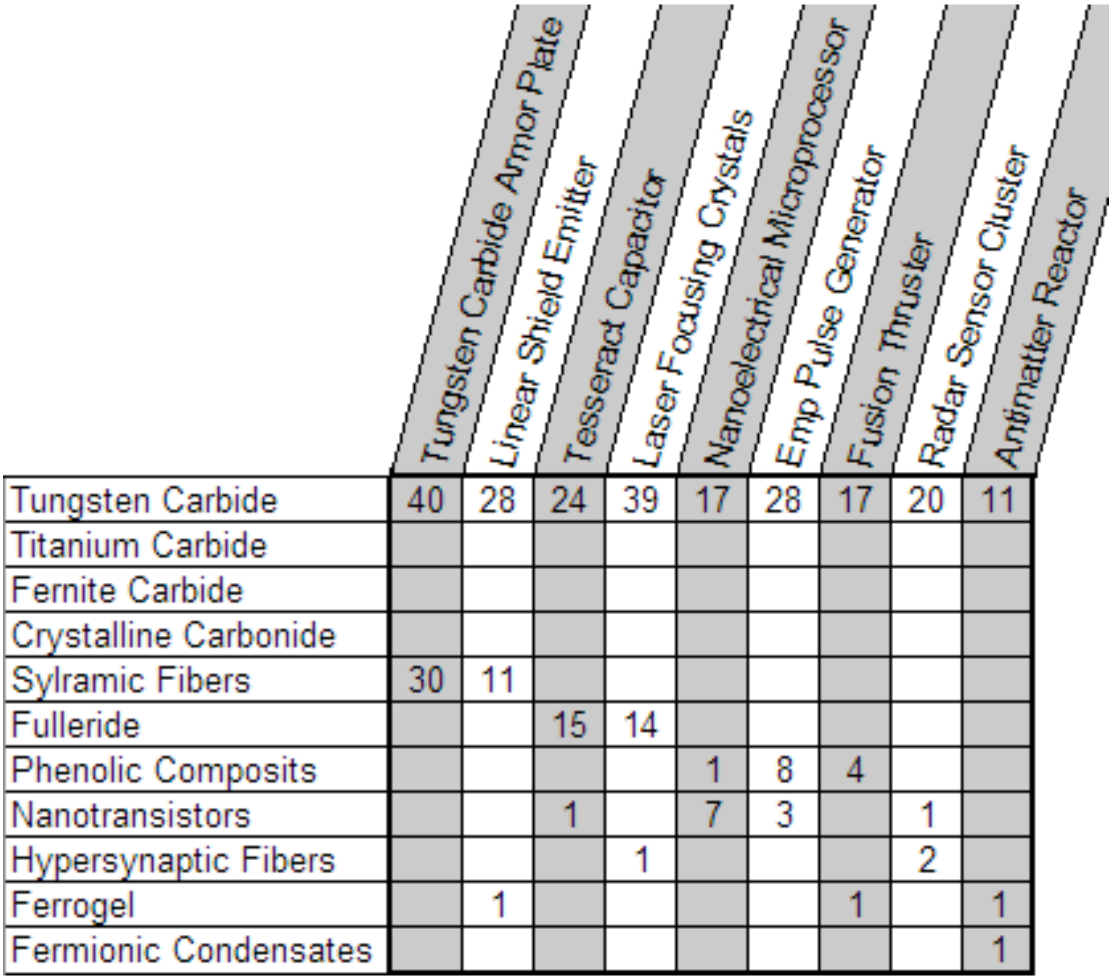
T2 construction components are created as part of a manufacturing process, only instead of using asteroid minerals as inputs, they use advance materials as the inputs. The output is a T2 construction component. This is a manufacturing job, and does require a blueprint for the component to be constructed.

T2 Component BPOs are for sale in the regular market. Researching and Manufacturing these Blueprints requires special skills, as outlined in each BPO. Researching them may also require (often expensive) components - such as research databases.

T2 construction components are broken up along racial lines. I've created tables showing each race, and the "base" amount of material required to produce each - as it was reported to me in game by examining the BPOs. The actual amount of material required can be reduced by researching the BPO Material Efficiency, and by having improved manufacturing skills to reduce waste.

What follows is a list of the different races T2 construction components tables:

Table of Amarr T2 construction components



	Tungsten Carbide Armor Plate	Linear Shield Emitter	Tesseract Capacitor	Laser Focusing Crystals	Nanoelectrical Microprocessor	Emp Pulse Generator	Fusion Thruster	Radar Sensor Cluster	Antimatter Reactor
Tungsten Carbide	40	28	24	39	17	28	17	20	11
Titanium Carbide									
Fernite Carbide									
Crystalline Carbonide									
Sylramic Fibers	30	11							
Fulleride			15	14					
Phenolic Composits					1	8	4		
Nanotransistors			1		7	3		1	
Hypersynaptic Fibers				1				2	
Ferrogel		1					1		1
Fermionic Condensates									1

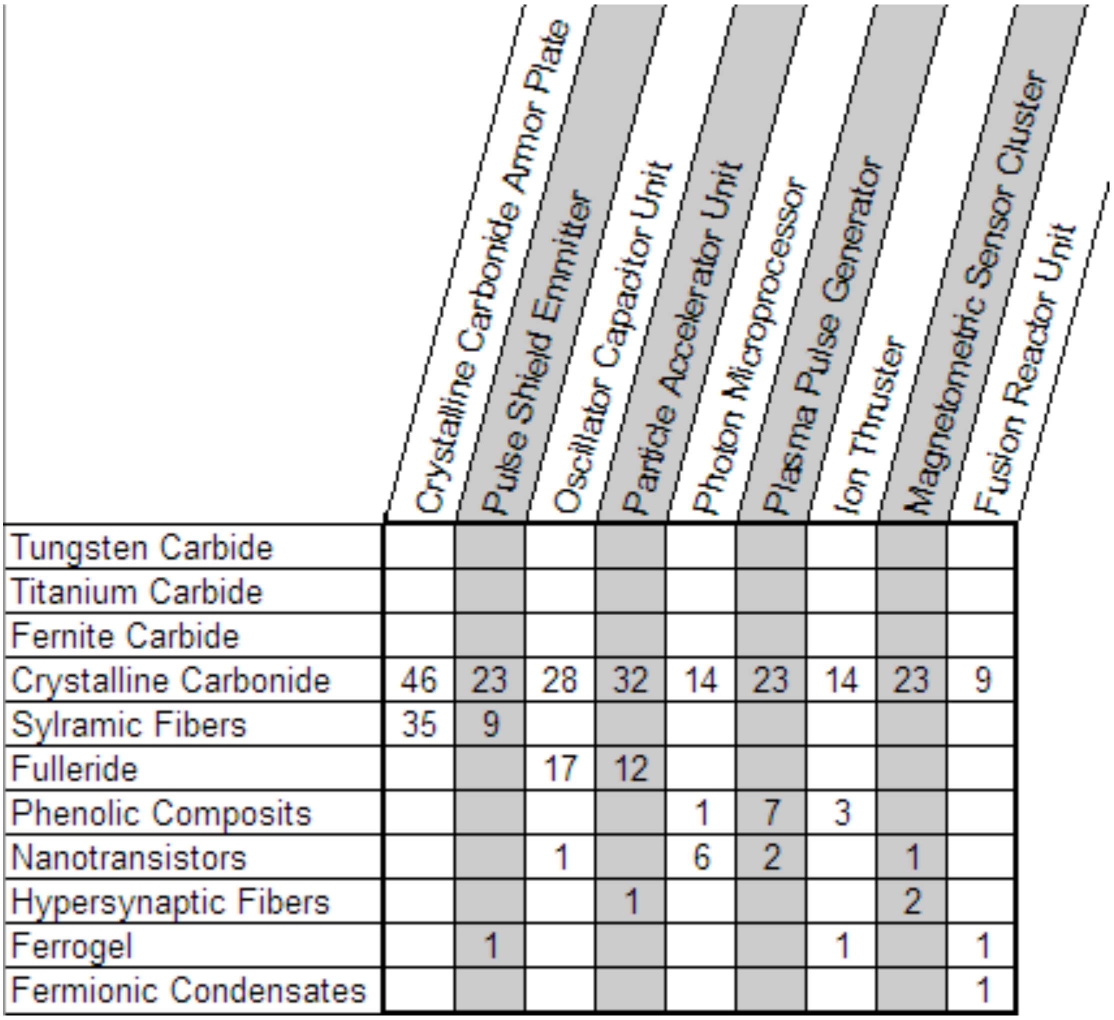
Table of Caldari T2 construction components

	Titanium Diborite Armor Plate	Sustained Shield Emitter	Scalar Capacitor Unit	Superconductor Rails	Quantum Microprocessor	Graviton Pulse Generator	Magpulse Thruster	Gravimetric Sensor Cluster	Graviton Reactor Unit
Tungsten Carbide									
Titanium Carbide	46	23	28	32	14	23	14	23	9
Fernite Carbide									
Crystalline Carbonide									
Sylramic Fibers	35	9							
Fulleride			17	12					
Phenolic Composits					1	7	3		
Nanotransistors			1		6	2		1	
Hypersynaptic Fibers				1				2	
Ferrogel		1					1		1
Fermionic Condensates									1

Table of Minmatar T2 construction components

	Fernite Carbide Composite Armor Plate	Deflection Shield Emitter	Electrolytic Capacitor	Thermonuclear Trigger	Nanomechanical Microprocessor	Nuclear Pulse Generator	Plasma Thruster	Laser Sensor Cluster	Nuclear Reactor
Tungsten Carbide									
Titanium Carbide									
Fernite Carbide	46	23	28	32	14	23	14	23	9
Crystalline Carbonide									
Sylramic Fibers	35	9							
Fulleride			17	12					
Phenolic Composits					1	7	3		
Nanotransistors			1		6	2		1	
Hypersynaptic Fibers				1				2	
Ferrogel		1					1		1
Fermionic Condensates									1

Table of Gallente T2 construction components



	Crystalline Carbonide Armor Plate	Pulse Shield Emmitter	Oscillator Capacitor Unit	Particle Accelerator Unit	Photon Microprocessor	Plasma Pulse Generator	Ion Thruster	Magnetometric Sensor Cluster	Fusion Reactor Unit
Tungsten Carbide									
Titanium Carbide									
Fernite Carbide									
Crystalline Carbonide	46	23	28	32	14	23	14	23	9
Sylramic Fibers	35	9							
Fulleride			17	12					
Phenolic Composits					1	7	3		
Nanotransistors			1		6	2		1	
Hypersynaptic Fibers				1				2	
Ferrogel		1					1		1
Fermionic Condensates									1

Each race has very similar components:

- Armor plates
- Shield emmitter
- Capacitor
- Some kind of weapon unit
- Microprocessor
- Pulse Generator
- Thruster
- Sensor Cluster
- Reactor

These components require similar materials among all the races, and in similar (though not identical) quantities. This implies that manufacturing for a certain race, or manufacturing certain components, gives an opportunity to streamline production by reducing the types of raw materials needed.

Studying these tables points out the fact that each race has an advanced material specific to it. For example, Gallente components all use Crystalline Carbide, but no other race does. Crystalline Carbonide is made from Carbon polymers and Crystalite Alloy. Crystalite Alloy comes from a reaction with Cobalt and Cadmium. Cobalt is an r8 metal and only reacts with Cadmium. So the only technologies that would have any use for Crystaline Carbonide, Crystalite Alloy, or Cobalt are Gallente technologies, but they would certainly have a lot of use for it since all the components require it. The effect of this demand is probably greatest on Cadmium (Cobalt's r16 counterpart in the Crystalite reaction).

If we know that there is a great demand for Caldari T2 technologies, and we see that Caldari components require Titanium Carbide, which ultimately requires Chromium - then we can expect higher demand for Chromium than the other r16 metals.

Studying these tables helps understand demand for certain advanced materials, their inputs, and ultimately raw materials gather from the moons to create them. It also explains why certain races use certain materials - because the moons in and around those empire space contain a greater concentration of those minerals.