

SCIENCE AND INDUSTRY GUIDE FOR EVE ONLINE

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I. Introduction

1. To get things started...

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If you have any questions or corrections, then e-mail GC13 (again, make sure to include "Science and Industry Guide" in the subject).

This guide is available as a .txt and .html at <http://evefiles.mysterious-mysteries.com>, and other guides are available there as well.

2. Version history

01-10-2007: Some Invention information clarified, re-inserted the language warning that the interface can only see previously used blueprints, removed reference to BPCs with unlimited runs.

10-15-2006: Added preliminary Invention section, made various editations, and reflected changes made in recent patches.

07-07-2006: Made final corrections and modifications and added formula for mineral cost in manufacturing. Final planned editation until the Kali expansion.

04-23-2006: Added note about blueprints with different Base Time Wastage Factors. Reflected fact that it is now possible to cancel jobs. Covered roles needed to perform research/manufacturing jobs for your corporation.

02-23-2006: Added the first data about Tech 2 research and production. Various clarifications.

02-03-2006: Added information on obtaining blueprints, and a general section on using them. Added Deliver to the list of terminology.

01-25-2006: Guide is put up, basically complete but lacking information about Tech2 production.

3. Terminology

First off, some simple terminology that will be used throughout the guide:

BPO: Blueprint original. Can be improved with research, and never runs out of licensed production runs.

BPC: Blueprint copy. Cannot be improved with research, and has a limited number of production runs.

Licensed production runs: How many more times a blueprint can be used to produce an item.

Lab slot: Any assembly line used for Material Research, Time Efficiency Research, or Copying.

Factory slot: An assembly line used for Manufacturing.

ML: Material Level. Increased by performing Material Research.

PL: Productivity Level. Increased by performing Time Efficiency Research.

Run: A single usage of a blueprint, be it increasing the ML or PL by 1, copying it once, or manufacturing one run's worth of items (this is shown under the blueprint's Attributes tab by the name of "Produces:") with it.

Job: What gets submitted to the assembly lines. Consists of a certain number of runs, ranging from one and going to as many runs as you can complete in thirty days (the time limit for a job). A job can be canceled once you accept the quote the installation gives you. However, this results in you losing everything except for the blueprint (no partial progress is given to research or construction, and minerals spent on construction are lost), so be very careful.

Deliver: Finishing a job. When a job is finished, the blueprint and finished goods are still nowhere to be found until you go to the Jobs tab of the Science and Industry interface, find the "Ready" job, and deliver it. This will place the blueprint and the goods in your hangar at the station you installed the job at (or, in the case of a job using your corporation's blueprint, will put the blueprint back where it started and will place the goods where you told it to put them).

4. The anatomy of a blueprint

Attributes:

Manufacturing Time: The amount of time it would take somebody with level 0 in the Industry skill to build one run with this blueprint.

Manufacturing Time (You): How long it would take you, with your current Industry skill level, to build one run with this blueprint.

Material Level: How many levels of Material Research that have been done on this blueprint.

Wastage Factor: The extra minerals it takes to make items with this blueprint, expressed as a proportion of what a perfect build would require.

Research Material Time: How long it would take someone with level 0 in the Metallurgy skill to perform one level of Material Research on this blueprint.

Research Material Time (You): How long it would take you, with your current Metallurgy skill level, to perform one level of Material Research on this blueprint.

Research Copy Time: How long it would take someone with level 0 in the Science skill to make a blueprint copy from this blueprint with the maximum number of allowed licensed production runs.

Research Copy Time (You Per Single Copy): How long it would take you, with your current Science skill, to make a blueprint copy, per production run in the job you have installed.

Produces: What you get when you perform a single run of this item in Manufacturing. Expressed as “Item name [number of items]”. Most items only give one item per run, but most ammunition gives one hundred.

Copy: Whether or not this item is a blueprint copy. Blueprint copies cannot be used in lab slots.

Research Productivity Time: How long it would take someone with level 0 in the Research skill to perform one level of Time Efficiency Research on this blueprint.

Research Productivity Time (You): How long it would take you, with your current Research skill level, to perform one level of Time Efficiency Research on this blueprint.

Productivity Level: How many levels of Time Efficiency Research that have been done on this blueprint.

Licensed Production Runs Remaining: How many more runs of Manufacturing this blueprint can be used for. Says “Infinite” for BPOs.

Bill of Materials:

Skills: Lists any skills you need to perform either manufacturing or research (specific to the tab) on this blueprint. Tech 1 stuff does not have any skill requirements, while Tech 2 requires level 5 in the job-specific skill (Metallurgy for Material Research, Research for Time Efficiency Research, Science for Copying, and Industry for Manufacturing) as well as certain skill levels in R&D skills applicable to that blueprint.

Materials: Lists what it takes to perform one run of manufacturing or research (again, specific to the tab) on this blueprint (note that only tech level 2 blueprints need any materials to be researched). Unless you have Production Efficiency 5, it will display two values: “You” and “Perfect” here. The “You” value shows what it would take you to make a single run with the blueprint, while the “Perfect” value shows what somebody with Production Efficiency 5 needs. Note that this value’s name refers to your skills, and not the Material Level of the blueprint.

Tech 2 production will require R.Dbs for research and copying, R.A.M.s for manufacturing, and various consumer goods for both. Various components are used in constructing T2 ships, and Morphite and various reactions (produced at starbases with moon materials) can also be used to manufacture any T2 stuff.

5. Obtaining a blueprint

The easiest and most common way to get a blueprint is to buy the un-researched BPO off of the market. You can easily get any tech level 1 blueprint this way, and there is an unlimited stock of them. Certain blueprints are not sold by NPCs in certain regions, so the blueprint may be marked up by a player reseller depending on where you are. A good way to be safe is to buy the blueprints for ships in a region belonging to that ship’s race (buy Caldari blueprints in Lonetrek or The Forge, for example).

If there are no NPC blueprint sellers in your region and you want to find out for certain where you can buy a given blueprint, go to the [Item Database](#) at and find the blueprint you want (either by navigating to it starting with the Manufacture and Research category, or going to the item you want to build then clicking on the link to the blueprint). Once at the blueprint’s entry, click on the NPC Market tab to be shown what NPC corporations are buying and selling the blueprint. Once you know who is selling it, you can search for the corporation in-game using the Corporation search feature available on the People and Places button. Check the corporation’s Settled Systems tab to find the station nearest you, then fly there to claim your blueprint.

You can get BPCs for special ships (such as the Worm or the Caldari Navy Raven to name two) from agent offers (for the faction navy ships), or from doing certain complexes or killing special random NPC pirate spawns (for the pirate faction ships like the Worm).

There is also the possibility of buying off of escrow. Usually you’ll just find short-run BPCs for ships (and sometimes ammo), but it’s worth a shot if you want to make yourself or a friend a ship, but don’t want to buy the BPO for it. To tell if a blueprint on escrow is a copy or an original, first right-click the entry and Inspect Merchandise. Don’t bother using Show Info on the blueprint, as it won’t give you information about that specific blueprint. Instead, look at the values in the columns on the table that popped up. A copy will have “No” in the “Original” column and a numerical value in the “BPRuns” column. Likewise, an original will say “Yes” in the “Original” column and have “Unlimited” written in the “BPRuns” column. Also make sure you check the Material Level and Productivity Level columns to see if the seller is telling the truth about the research he’s done. Be very wary of scams; people will often try to pass copies as originals, or tech 1 blueprints as tech 2 blueprints that have been “accidentally” priced cheaper than they normally go for. If you don’t take the time to check the information, you may fall for an easily-avoidable scam.

Finally, there is a trading channel for blueprints.

In order to obtain a tech level 2 BPO, you need to participate in the BPO lottery. I won’t go into any sort of detail here, as there is an excellent guide to this (and the R&D agents which facilitate it) on the Eve forums at <http://myeve.eve-online.com/ingameboard.asp?a=topic&threadID=86084> . Still, let it suffice to say that a very limited quantity of tech level 2 BPOs are distributed via this lottery, meaning they are very expensive to purchase (the only way to get them is in the lottery, or to buy them from people who won the lottery).

6. Using your blueprints

As with most things in Eve, right-clicking on your blueprints opens many doors. Right-clicking on any blueprint gives you the option to initiate any job with the blueprint. Once you choose the kind of job you want to start, it will then ask you to choose which assembly line you want to use. If the installation you want to use is at a station, you need to choose an installation at the same station the blueprint is in. If the installation is at a starbase, you can choose any starbase in the same solar system as the blueprint, so long as you are allowed to use that starbase and your blueprint is located in your corporation's hangar at a station.

It doesn't matter if you are using the blueprint while it's in your Items window at a space station, in your Assets window, or in the Science and Industry window: you need to right-click the blueprint to do anything with it.

It is also worth noting that after you submit a job, the server has marked down when the job will finish, and improving your skills (such as Industry for a manufacturing job) will not affect the time to finish that job.

II. Navigating the Interface

The Science and Industry window has a lot of people confused, but at its heart it is very simple and intuitive. This interface is used to review what research and manufacturing jobs you have done, are currently doing, or are finished and waiting to be delivered.

TAB 1: Jobs

Here you have a few filtering options. The default should be on the "show less options" choice, which allows you to sort by the kind of Activity the job is, the State the job is in, and the Owner of the job. Selecting "show more options" opens up the ability to sort by the Creator, the Range, and the From/To dates (From Date and To Date do not seem to work at the moment).

These options give you great power in sifting through your past and current projects.

Activity allows you to choose whether you want to search for projects in Manufacturing, Material Research, Time Efficiency Research, Copying, or All activities.

State allows you to choose between Pending, In Progress, Ready, Delivered, or Any Active state. Pending projects are still in the queue, and work has not started on them yet. Projects that are In Progress are just what they say they are. Projects that are Ready are finished, and waiting for you to Deliver the blueprint and/or product. The Delivered option will show all projects that you have completed, and serves as a useful history tool.

Owner allows you to sort between jobs that are being done by you for you ("Me"), and by you for your corporation ("My Corporation"). Any job you start using a blueprint you use that is being stored at one of your corporation's hangars (but NOT your own hangar at a station where your corporation has an office) will show as being owned by "My Corporation".

Range allows you to choose whether you want to see jobs from the current station, solar system, constellation, or region.

From Date and To Date are useful for checking old jobs starting at the from date and ending at the to date (make sure you set State to Delivered though).

Once you find a job, clicking on it will display at the bottom of the screen the Activity, State, Time Till Completion (to the second), Output Location (where you installed the job), and Output Type (what you get when it is done, such as “1 unit of Rifter”). For research jobs, it will show at the right the starting and ending ML (listed as ME) or PL, or how many copies with how many runs you are making.

TAB 2: Blueprints

For those with the Scientific Networking and Supply Chain Management skills, this is where the investment in those skills pays off. When you first open up the Blueprints tab, you are greeted with a list of the stations in the region that you have blueprints at. The bar for each station shows the station’s name along with how many blueprints you have there and how many jumps away it is.

Expand a station to be greeted by a full list of all of your blueprints there. It shows their picture, gives the item name, tells what group (Frigate Blueprint, Missile Blueprint, etc...) the blueprint is in, whether or not the blueprint is a copy, its Material Level and Productivity Level (ML and PL), and (if the blueprint is a copy) how many runs are remaining on the copy.

The bottom of the screen tells you how many manufacturing and research jobs you can have active at any given time, as well as the range on your remote manufacturing and researching (“limited to stations” or “limited to 5 jumps” for instance).

You can start any job on any blueprint here by right-clicking on it just as you would at a station and choosing the kind of job you want to start. From there, it will prompt you to pick an installation (more information on that at the Installations tab), how many runs you want the job to go for, and allow you to change the input and output hangars.

Note that any blueprint that has not been used (copying, research, or manufacturing) cannot be “seen” by this tab, so they cannot be used remotely until you have been at the same station as the blueprint, right-clicked on it and chosen an activity to use it for, and gotten the game to try to send you to the quote screen. Note that this means it works just fine even if you choose an installation in a different system (which will make the blueprint viewable by this tab, but cannot start a job); all that matters is that it try to generate a quote.

Also note that (so long as you have Scientific Networking for research jobs, or Supply Chain Management for manufacturing jobs) you can do the same thing by locating your blueprint via the assets window, and right-clicking on it from there. You still need to be in the same region as the blueprint to start a job, however.

TAB 3: Corp Blueprints

This tab functions exactly like tab 2, except it shows blueprints in hangars rented by your corporation. Any jobs you start up from this tab (or, to be more precise, any jobs started up when the blueprint is in a corporate hangar) will show up under “My Corporation” for the “Owner” sorting option.

In order to start jobs for your corporation, you need the “Rent Factory Slot” role for Manufacturing jobs, or the “Rent Research Slot” role for any of the research jobs. The “Factory Manager” role is also necessary. The minerals the manufacturer wishes to use must also be in a corporate hangar that the manufacturer has full access to (both query and take).

TAB 4: Installations

When you want to use a blueprint, you will inevitably be sent here to select the assembly line you want to use for the job you have chosen to perform.

Here you will find two of the same options that you also found on Tab 1, and some new ones. The Activity and Range options are the same as they were before. You can use the Location option to indicate whether you only want assembly lines located in stations, in assembly arrays, or either. You can select whether you want the assembly line to be Public, Personal, or belonging to your corporation. Finally, you can choose what Production Category and Production Group you want to be able to build. A Production Category is something broad, like Ships, while a Production Group is more specific, like Cruisers. All stations can Manufacture almost everything you could want, so simply selecting “All” will suffice for now (they can’t produce everything, however; you need special facilities to manufacture things such as Titans, for instance).

After you have queried the database for a list of installations meeting your specification, you can select a station with the assembly lines on them in the top table, and a list of the assembly lines at that installation will appear in the table in the lower portion of the window. You can sort the assembly lines by time until the slot’s queue is empty (basically, this is how long it would take a job installed in that slot to even get started), install cost (the base fee you pay regardless of how long you are using the slot for), hourly rate, time multiplier, and material multiplier. At any given installation, the fees and multipliers should all be the same. Also, all stations should have a 1.0 time and material multiplier. Starbase structures have bonuses here, and will show up as a number below 1.0. A 0.9 time multiplier, for instance, means it only takes 90% as long to do the same job.

The three research options only require that the slot be able to make Blueprints, so you can filter out all the Manufacturing lines but show all three kinds of Research assembly lines by choosing “All activities” along with the “Manufacture and Research” Production category and the “Blueprints” production group.

You can only use a blueprint in an installation on the same space station the blueprint is located at (or, in the case of a starbase installation, at a starbase in the same system that the blueprint is located in your corporate hangars at a space station or when the blueprint is at the starbase itself).

Very often people experience a problem on the Installations tab where after choosing an installation, they do not see a list of assembly lines. This is usually because the portion of the window devoted to installations is stretched to take up almost the entire window, and the assembly lines section (which should normally be below the installations list) doesn’t have any room to be displayed. To fix this, simply go down to the point on the window where it stops listing installations, left-click (before you click, your cursor should be changed to two arrows, one pointing up and the other pointing down) and hold, then drag the segment’s border upwards. A list of assembly lines should become visible.

III. Research

1. Introduction to research

What is research, exactly? It does not really produce anything itself, yet is very valuable for those who do the production. Research is the fine, fine art of making it quicker, cheaper, and easier to manufacture the goods that the manufacturers (of which you may be one) build. Every blueprint benefits from being researched, and important blueprints can be heavily researched, then copied and distributed to corporation members and allies. All you need for this is one skill (Science), and an assembly line of the appropriate type. Are you interested? Then read on.

There are four ways you can use a lab slot on a blueprint: Material Research, Time Efficiency Research, Copying, and Invention. The first two improve a blueprint original, the third duplicates it, while the fourth can actually turn a tech one blueprint copy into a tech two blueprint copy.

Material Research

Improves the Material Level of a blueprint, making it cost fewer minerals to build with.

Time Efficiency Research

Improves the Productivity Level of a blueprint, decreasing the amount of time it takes to make an item.

Copying

Duplicates a blueprint, leaving you with the original you copied, and a copy with a limited number of runs, and a Material Level and a Productivity Level equal to those of the original.

Invention

Required datacores and a data interface, and has a chance to turn a tech one BPC into a tech two BPC.

2. Vital skills

While you only need a single skill at level one (the generic “Science” skill) to operate a lab slot, there is a variety of skills that makes your research faster and easier, or lets you use more lab slots simultaneously.

Science (Rank 1)

5% reduction in time it takes to copy a blueprint per level.

No prerequisites.

You need Science at level 1 to use any lab slots at all, though it does not give any bonus to maximum research jobs after that. Any dedicated researcher will want to raise it to level 4, as that is a prerequisite for Metallurgy.

Metallurgy (Rank 3)

5% reduction in time it takes to conduct Material Research per level.

Requires Science to be at level 4.

A very important skill considering the importance of Material Research. It is highly recommended to take this skill to level 4 or 5.

Research (Rank 1)

5% reduction in time it takes to conduct Time Efficiency Research per level.

Requires Science to be at level 3.

Not as important as Metallurgy, given the lower level of importance placed on Time Efficiency Research. Still, if a researcher plans on performing Time Efficiency Research, then taking Research to at least level 3 is recommended.

Laboratory Operation (Rank 1) and Advanced Laboratory Operation (Rank 8)

Both allow the operation of one extra lab slot per level.

Laboratory Operation requires Science to be at level 3.

Advanced Laboratory Operation requires Science to be at level 3 and Laboratory Operation to be at level 5.

Very important for a researcher. Laboratory Operation at level 4 should be enough for the needs of most researchers, but busy ones always have the option to advance it to level 5 and take a few levels of Advanced Laboratory Operation.

Scientific Networking (Rank 3)

Allows the operation of lab slots from ranges greater than just the station you are currently in. At level 1, the range is any lab in the same solar system as you. At level 2, the range changes to any lab within five jumps of your present location. After that, the range continues to double until at level 5 you can operate any lab in the region.

Science needs to be at level 3 and Laboratory Operation needs to be at level 4.

This is a skill with a non-essential function, and a hefty 6.75 million ISK price tag. Still, it can be very convenient, as it allows you to locate all of your blueprints at a station in low-security space (with lower lab fees and shorter queues), where you can research them remotely and then make copies to take from the station if you need to manufacture with the blueprint.

3. Material Research

Most of the research performed on blueprints is Material Research (which is why almost all Material Research assembly lines, even those in the depths of low-security space, have a queue at all times). Quite simply, Material Research makes a blueprint cheaper to build with. Every blueprint has a “wastage factor” which increases the mineral cost to manufacture items with it beyond the mineral cost listed on the eve-online.com item database (which lists the perfect mineral requirements). For almost all blueprints, the base wastage factor is equal to 0.1, meaning that it takes 10% extra minerals to manufacture the item (note that some blueprints have a base wastage factor of 0.05).

So if material research is so great, how are you supposed to get any important research done with these long queues? Well, unfortunately the only option you have at this time is to select the slots with the shortest queues and let your job wait its turn in line. If you don't want to do the research yourself, there's also the option of buying researched BPOs or BPCs from other players, but this means you'll pay a premium for the research. Still, it can be worth it if you want a blueprint in action immediately. Other options are hiring somebody with a laboratory array at a starbase to do it, or later launching your own starbase (this would cost hundreds of millions of ISK though, so is not for new players).

Material Research decreases the wastage factor. The formula for the reduction means that your returns decline quickly. First, the formula for determining the blueprint's wastage factor:

$$\text{Wastage factor} = \text{Base Wastage Factor} / (1 + \text{ML})$$

This means at a Material Level of one, you've already cut the wastage factor in half. By the time you are up to 4 ML, your wastage factor is only 0.02. Once you get up to 9, it's only 0.01. Note that in order to halve the wastage factor again, you need to double the current ML and add one.

For instance at a ML of 9, you are only wasting 1% of the perfect mineral requirements. To only be wasting 0.5% of the perfect mineral requirements, you need to add another 9+1 to the ML, for a final ML of 19. The math here holds true, since $10\% / (19+1) = 0.5\%$.

Note that those first nine levels of Material Research saved you an average of $9\% / 9 \text{ levels} = 1\%$ per level. Those next ten levels (on their own) only saved you another 0.5%, divided by ten, for a total of 0.05% per level (or: 1% of what your first level of Material Research saved). These declining returns mean that after researching the first few levels on a blueprint and drastically lowering your mineral costs, you are left researching several levels (very easily twenty or more) to make one run of the blueprint cost one less unit of tritanium to build. Just be aware of this when deciding how long to research your blueprints.

In addition to the rapidly declining gains, there is a very finite amount of good that any amount of research you can do. Why research the ML to 100 when the blueprint is perfect (no more minerals can be saved) at a ML of 21?

To find the ML of a blueprint past which there is no gain to be had from doing Material Research, go to the Item Database on the official web site and look at the mineral requirements. These are the amount of minerals it takes to make an item with Production Efficiency 5, and a blueprint with a perfect ML. Take that number, divide by 5, and round down. That is the highest level that Material Research can have any effect on the blueprint's waste material usage. You can use this same principle to find the ML at which any mineral has zero waste.

Desired ML = (Amount of specific mineral at perfect build) / 5 (round down)

For instance, to make one run of Small Lead Charge S takes 106 tritanium, 1 mexallon, and 2 isogen. $106 / 5 = 21.2$. Rounded down, that equals 21: that blueprint's perfect level of material efficiency.

(Note that the actual formula requires you to multiply by the base wastage factor and then multiply by two. For most items this means you divide by five, but those items with a BWF of 0.05 require you to divide by ten.)

4. Time Efficiency Research

Time Efficiency Research is often neglected. For instance, many of the blueprint copies you find on escrow have a ML above 20, yet their PL is still zero. It is also very easy to find an open assembly line for Time Efficiency Research (though in high-security space it will still be expensive, since the costs for all lab slots at the same station are the same) at any time and any place you choose. This is a bonus you should take advantage of: Time Efficiency Research works exactly like Material Research, except it reduces the time to manufacture (though its level for "perfection" would be different). Also, the "base time wastage factor" for most blueprints is 0.25, meaning each blueprint takes 125% as long to manufacture with as it theoretically should.

Time Wastage Factor = Base Time Wastage Factor / (1 + PL)

Since the Productivity Level formula is the same as the Material Level formula (except with a different Base Wastage Factor), the declining returns are exactly the same: in order to halve the time wastage factor again, you need to double the current PL and add one.

For tech 2 missiles, the base time wastage factor is equal to $1/249$, meaning there is almost nothing to be gained by performing Time Efficiency Research on them. Components required for tech 2 production use $1/14$, and there are a few other blueprints that use different numbers. Still, most blueprints use $1/4$ (or 0.25).

For the curious, it may be interesting to know that while time waste can be expressed in the same terms as material waste, it is actually stored by the game as the proportion of the base time (in this base, “base time” actually means time to build at a PL of zero) that is a result of waste. For most items this is 0.2.

5. Copying

When you copy a blueprint, you choose how many copies you want to make, and how many licensed runs you want to make. The end result when you deliver the job will of course be equal to the number you put into the “copies” box, and each of them will show as having a number of “licensed production runs remaining” equal to the number you put in the “licensed runs” box.

Unlike a blueprint original, which can be used any amount of times (they always show “Infinite” for “licensed production runs remaining”), a blueprint copy will disappear when it has no production runs left (though this was not always the case; BPCs with zero runs remaining still exist). Also, a blueprint copy cannot be put into a lab slot, so you can neither improve its ML and PL, nor can you copy it.

While this limits BPCs, it also makes them very valuable. You can copy blueprints and give the BPCs to lower-level members of your corporation so that they can build with them, and you do not need to worry about them running off with a valuable BPO. Also, copying and selling ship blueprints on escrow is very popular (as escrow is flooded with these at any given time).

6. Invention

Invention is the process through which a scientist can take a BPC for a tech 1 item (125mm railgun i, for instance), use some new items called “datacores” (more on them in the next paragraph), and turn it into a BPC for the corresponding tech 2 item (in our example it would become a BPC for a 125mm railgun ii). If there are multiple tech 2 versions of an item (ships being the guilty party here), the version that is given with a successful usage of Invention would be determined randomly.

So what are these Datacores? They are just a new way of spending those research points you have accumulated with your R&D agents. It is a tradeoff; you can still hold onto hope that you will win a tech 2 BPO, or you can reduce your chance at winning and get a sure thing in the form of Datacores which are needed for Invention. Every item being Invented needs two kinds of Datacores, one for each of the skills needed to build the tech 2 item. In the case of our 125mm railgun, we would need Datacores from an Electromagnetic Physics agent and from a Mechanical Engineering agent.

BPOs do not become involved in Invention at all. You cannot use a tech 1 BPO (except to make BPCs with), and you cannot get a tech 2 BPO through this procedure (the tech 2 lottery remains the only way of doing that).

Unlike all of the other science and industry options, Invention involves chance. That is to say, you are not guaranteed a tech 2 BPC automatically when you start an Invention job. Improving your skills and adding actual examples of the tech 1 item to be used up by your Invention job (adding a better tech 1 item gives a better improvement, for instance a 125mm prototype i gauss gun will give you better odds at succeeding than adding a 125mm ‘scout’ i accelerator cannon) can make success more likely, but cannot give you a 100% chance.

You also have the option of using another new item: a Decryptor. Decryptors are also consumed at the end of a job, but modify the job somehow, with bonuses and penalties to the job.

The final new item being used for Invention is the Data Interface. There are twelve different Data Interfaces, and they mix a race (Amarr, Caldari, Gallente, Minmatar) with an item-type (“regular” for Inventing modules, “ship” for Inventing ships, and “tuner” for Inventing rigs). To use these, you will need the correct racial encryption skill (“*Race* Encryption Methods”).

When the job is done, everything except your Data Interface is used up and if you’re lucky you have a brand new tech 2 BPC to build with or sell. The ML, PL, and number of runs on your tech 2 BPC will be based on the numbers on your tech 1 BPC, but will be much worse.

And so, the things affecting the odds of a successful Invention are these:

- Your skill level in the R&D skills that you needed the Datacores for.

- Your Racial encryption skill level.

- The tech one item you use in the job.

- The decryptor used in the job.

IV. Manufacturing

1. Introduction to manufacturing

Manufacturing itself is rather straight-forward. You acquire a blueprint, whether it be a copy or an original, get the minerals needed to make the items you want to build, and then get a manufacturing assembly line to make the stuff with.

The formula for mineral cost is as follows:

$$\text{Mineral cost} = \text{Base cost} + (\text{Base cost} * (0.25 - (0.05 * \text{Production Efficiency}))) + (\text{Base cost} * \text{Mineral wasteage factor})$$

(Note that “base cost” refers to the pre-waste cost listed in the Item Database at <http://www.eve-online.com/itemdatabase> .)

The factories round down any decimal value in “Mineral Cost” that is less than 0.5 to zero. This is done for each run individually, so ten runs with a Zydrine waste of 0.1 per run will waste zero Zydrine, not one unit. Likewise, any decimal value 0.5 and above is rounded up to one. This means 6.5 wasted units of Mexallon become 7, and 9.374 wasted units of Isogen are turned into just 9.

2. Vital Skills

Like Research, only a single skill is needed to use a factory slot (the Industry skill). Still, there are other skills that make an manufacturer's life easier, most important among them being Production Efficiency.

Production Efficiency (Rank 3)

4% reduction per level for material costs for manufacturing.

Requires Industry to be at level 3.

No matter how hard you look, you cannot find a more important skill for manufacturing to get to level 5 than Production Efficiency. Taking this from level 0 to level 5 means you can make 125% the product with the same amount of materials as you made before, and makes manufacturing much more profitable. Try to have this at level 4 at the very least before you do any major manufacturing.

Industry (Rank 1)

4% reduction in manufacturing time per level.

No skill requirements

You need Industry at level one to be able to use a factory slot, though advancing it beyond one does not give any further bonus to the amount of factory slots you can operate at once. Aside from using it as a prerequisite for more important skills, there are no pressing reasons to raise Industry. Still, the time saved by increasing Industry can be helpful, and it's only a rank 1 skill.

Mass Production (Rank 2) and Advanced Mass Production (Rank 8)

Both allow the operation of one extra factory slot per level.

Mass Production requires Industry to be at level 3.

Advanced Mass Production requires Industry to be at level 3 and Mass Production to be at level 5.

Like Laboratory Operation is for a researcher, Mass Production is important for the manufacturer. It is up to the individual manufacturer to decide how many factory slots they need to be able to use at once.

Supply Chain Management (Rank 3)

Allows the operation of factory slots from ranges greater than just the station you are currently in. At level 1, the range is any factory in the same solar system as you. At level 2, the range changes to any factory within five jumps of your present location. After that, the range continues to double until at level 5 you can operate any factory in the region.

Industry needs to be at level 3 and Mass Production needs to be at level 4.

Just like Scientific Networking, this skill is an expensive convenience. While it is not a requirement, it can save a manufacturer from having to do a lot of flying if their main manufacturing area is not close to their main area of operations.

3. Getting started in manufacturing

Though the rest of this guide covers the information about the actual workings of Science and Industry in Eve, many budding industrialists are still at a loss for how they should actually step into the wide world of manufacturing. This question is usually asking “what should I start by building?”

The first thing to cross most people’s minds when wondering what to build is most likely going to be ships. Any of the main combat frigates are certainly popular ships, and can sell well if put up for sale in a well-populated area. Still, ships tend to have lower margins of profit than many modules have (with Production Efficiency at 5, and with a well-researched BPO with a ML of 20 you can expect a 20% margin of profit on a frigate, while many modules can pull in a 100% margin).

A good idea is to search the market, making extensive use of the “Market History” tab for a given item, and finding items with a good volume number (which tells you how much they are traded) and with prices you can effectively compete with. It can be a lot easier to view the Market History as a table, but the default is as a graph (there is a button in the window to change it).

During your searching, you will likely find that many items are being frequently sold at a value near or even below the value of the minerals that make up the item. This is because people receive these items as loot from killing NPCs, and you will not make a profit from manufacturing them. Other items, however, will have a high volume and will have very good prices. These are the items you want to build.

Also, a problem that a lot of people new to manufacturing seem to have is a very bad one for their finances: they are under the illusion that any minerals they mine themselves rather than buy off of the market are free. This is not the case, however; those minerals “cost” you what you could have sold them on the market for. Whether you’re making the items for your own use, for a friend or a corporation member, or to sell, this doesn’t change at all. When manufacturing, always check the prices in the region to see if it is cheaper for you to buy from someone else (and if they are close enough to you to be convenient, given the price gap).

Finally, remember that you don’t need to service a main hub (Jita, Rens, or Oursulaert). People are willing to pay a premium in order to have their stuff (especially ammunition) sold to them where they will use it rather than five jumps away. Find a system with a lot of good agents and try selling there. Don’t forget the Market History though.