Formulas for EVE Industry

Made by Qoi - Version 2.1 - 2014-11-05

1 Manufacturing

Items can be manufactured from a BPO (Blueprint Original) or BPC (Blueprint Copy), in the later case the number of runs will be deduced from the BPC. The maximum number of runs is such that it is one higher than the number of runs that would fit into 30 days, as such it depends on the same modifiers as $productionTime$ below.

Required Materials for Production Job

$$required = \max(runs, \text{ceil}(\text{round}(runs * baseQuantity * materialModifier, 2))$$

$materialModifier$ is a product of the ME modifier (1.0 to 0.90 or 0% to 10% reduction), the facility modifier (1.05 for Rapid Assembly Arrays, 1.0 for NPC Station, 0.98 for most POS arrays etc), and potentially two team modifiers. Two team members can affect the same job, one with a broad specialisation (modifier down to 0.975 or 2.5% reduction) and one with narrow specialisation (modifier down to 0.95 or 5% reduction). All four modifiers are multiplied together.

Production Time

$$productionTime = baseProductionTime * timeModifier * skillModifier * runs$$

$$skillModifier = \prod_{k=1}^{d} [1 - 0.01 * Level(k)]$$

Where d is the number of science skills listed in Table 2 that are required for manufacturing this particular item, k is indexing those skills and Level(k) is the currently trained level of that skill. This currently mostly applies to Tech II manufacturing.

$timeModifier$ is a product of the TE modifier (1.0 to 0.80 or 0% to 20% reduction), the facility modifier (1.0 for NPC Station, 0.75 for many POS assembly arrays etc), and potentially two team modifiers. Again, two team members can affect the same job, with one having up to 5% reduction (modifier 0.95) and the other having up to 10% reduction (modifier 0.90). Also the skills Industry (4% per level, down to modifier 0.80) and Advanced Industry (3% per level, down to modifier 0.85) affect it. Furthermore the BX-801 (1% reduction, modifier 0.99), BX-802 (2% reduction, modifier 0.98) or BX-804 (4% reduction, modifier 0.96) implants can have an effect, only one implant can be active at the same time. All seven modifiers are multiplied together.

Job Installation Fee

$$jobFee = baseJobCost * systemCostIndex * runs$$

The $baseJobCost$ and $systemCostIndex$ can be acquired via CREST and are explained in a later section.

2 ME & TE Research

Blueprints can have 11 different ME and TE levels. ME ranges from 0 to 10 in steps of 1, TE from 0 to 20 in steps of 2. In the following we assume that TE 20 is level 10, TE 18 level 9 etc. This research can only be done on BPOs (Blueprint Originals).

Research Time from level 0 to level n

$$researchTime_n = baseResearchTime * timeModifier * levelModifier_n/105$$

The $timeModifier$ is calculated the same as for Manufacturing, with the following changes: The implants are XX-701 (1% reduction, 0.99 modifier), XX-703 (3% reduction, 0.97 modifier) or XX-705 (5% reduction, 0.95 modifier), where XX has to be replaced with RR for TE research and MY for ME research. Instead of the Industry skill the Research (TE research) and Metallurgy (ME research) skills apply, with a 5% per level reduction and a modifier down to 0.75 at level V. The advanced industry skill, the facility modifier and the team boni apply exactly as before.

Research Costs from level 0 to level n

$$jobFee = baseJobCost * systemCostIndex * 0.02 * levelModifier_n/105$$

The $levelModifier$s are 0, 105, 250, 595, 1414, 3360, 8000, 19000, 45255, 107700, 256000 respectively for level 0 to 10.

3 Copying

Copying creates a BPC (Blueprint Copy) from a BPO (Blueprint Original). The copy only has a limited number of runs remaining and the same ME/TE levels as the original.

Copying Time

$$copyTime = baseCopyTime * runs * runsPerCopy * timeModifier$$

The $timeModifier$ is calculated exactly like in the ME & TE Research section, replace the XX in the Implant names with SC and the Research/Metallurgy skill with the Science skill.

Copying Fees

$$jobFee = baseJobCost * systemCostIndex * 0.02 * runs * runsPerCopy$$

4 Invention (PHOEBE)

Tech II Invention subtracts runs from a T1 BPC and potentially produces one BPC for each run for the T2 version with ME -2%, TE -4% and a number of runs remaining that is type specific. For ships, rigs and Perpetual Motion Unit II there is one run remaining, Rapid Heavy Missile Launcher II has 20, all other blueprints have 10.

Tech III Invention consumes an ancient relic and potentially produces a T3 BPC with 3, 10 or 20 runs remaining for wrecked, malfunctioning or intact ancient relics respectively.

Invention requires data cores as input and optionally allows decryptors to be used. If decryptors are used, they can also change the ME/TE values as well as the number of runs remaining on the T2 BPC. The ME/TE of the input blueprint have no effect on invention.

Chance of Success

$$inventionChance = baseChance * SkillModifier * DecryptorModifier$$
$$SkillModifier = 1 + EncryptionLevel/40 + (Datacore1Level + Datacore2Level)/30$$

The *baseChance* is listed in Table 1.

Invention Time

$$inventionTime = baseInventionTime * facilityModifier * (1 - 0.03 * AdvancedIndustryLevel)$$

Invention Fees

$$jobFee = baseJobCost * systemCostIndex * 0.02 * runs$$

The *baseJobCost* is that of the output blueprint.

5 Job Installation Costs

For the Job Installation Costs the adjusted prices, the system cost indices and the team cost modifiers are required. These can be imported with a JSON parser from

- http://public-crest.eveonline.com/market/prices/
- http://public-crest.eveonline.com/industry/systems/
- http://public-crest.eveonline.com/industry/teams/

respectively.

There are several options available to get this data other than building a CREST importer yourself, some of them are:

- http://eve-prosper.blogspot.co.uk/2014/07/building-better-spreadsheets-crius.html For Google Spreadsheets
- https://www.fuzzwork.co.uk/2014/07/26/excel-and-crest/ For Excel
- http://api.eve-industry.org A XML API made by yours truly, similar in usage to the eve-central API.

The *baseJobCost* for a blueprint is calculated using the materials required for manufacturing.

$$baseJobCost = \underbrace{\sum (baseQuantity * adjustedPrice)}_{\text{All manufacturing materials}}$$

Generally the baseJobCost is then multiplied with the activity specific System Cost Index and an activity specific multiplier to get the $jobFee$. See the individual activities for details.

Total Job Installation Costs

$$\begin{aligned} teamCost &= jobFee * teamCostRate/100 \\ facilityTax &= (jobFee + teamCost) * taxRate/100 \\ totalInstallationCost &= jobFee + teamCost + facilityTax \end{aligned}$$

The *taxRate* is 10 for NPC Stations and can be set for each facility individually for corporation owned facilities.

6 Reprocessing

Reprocessing Rate for Ore & Ice (including Compressed)

$$rate = facilityModifier * (1 + 0.03 * ReprocessingLevel) * (1 + 0.02 * ReprocessingEfficiencyLevel) * (1 + 0.02 * OreSpecificSkillLevel) * implantModifier * (1 - StationTax)$$

The $facilityModifier$ is 0.5 for most NPC stations, 0.52 for Reprocessing Arrays anchorable in highsec, 0.54 for Reprocessing Arrays anchorable in lowsec/nullsec and 0.50 to 0.60 in nullsec Outposts. The $implantModifier$ is 1.01, 1.02 and 1.04 for RX-801, RX-802 and RX-804 respectively.

Reprocessing Rate for everything else (including unrefined Alchemy products)

$$rate = facilityModifier * (1 + 0.02 * ScrapMetalProcessingLevel) * (1 - StationTax)$$

The $facilityModifier$ is 0.5 for most NPC stations as well as for all nullsec outposts. There are no anchorable arrays for this activity.

The reprocessing output is obtained by multiplying the reprocessing rate with the base material amounts and then rounding down (POS) or rounding to next integer (Station).

NPC Station Tax for Reprocessing

$$StationTax = 5.0\% - (0.75\% * YourCorporationStanding)$$

You need $5\%/0.75\% = 6.67$ Standing to pay no Station Tax.

A Appendix

Table 1: Invention Base Chance

Chance of Success	Blueprints
18%	Freighter
22%	Battleship, Wrecked Ancient Relict
26%	Cruiser, Battlecruiser, Mining Barge, Industrial
30%	Frigate, Destroyer, Malfunctioning Ancient Relict
34%	Modules, Rigs, Ammunition, Intact Ancient Relict
100%	Perpetual Motion Unit I

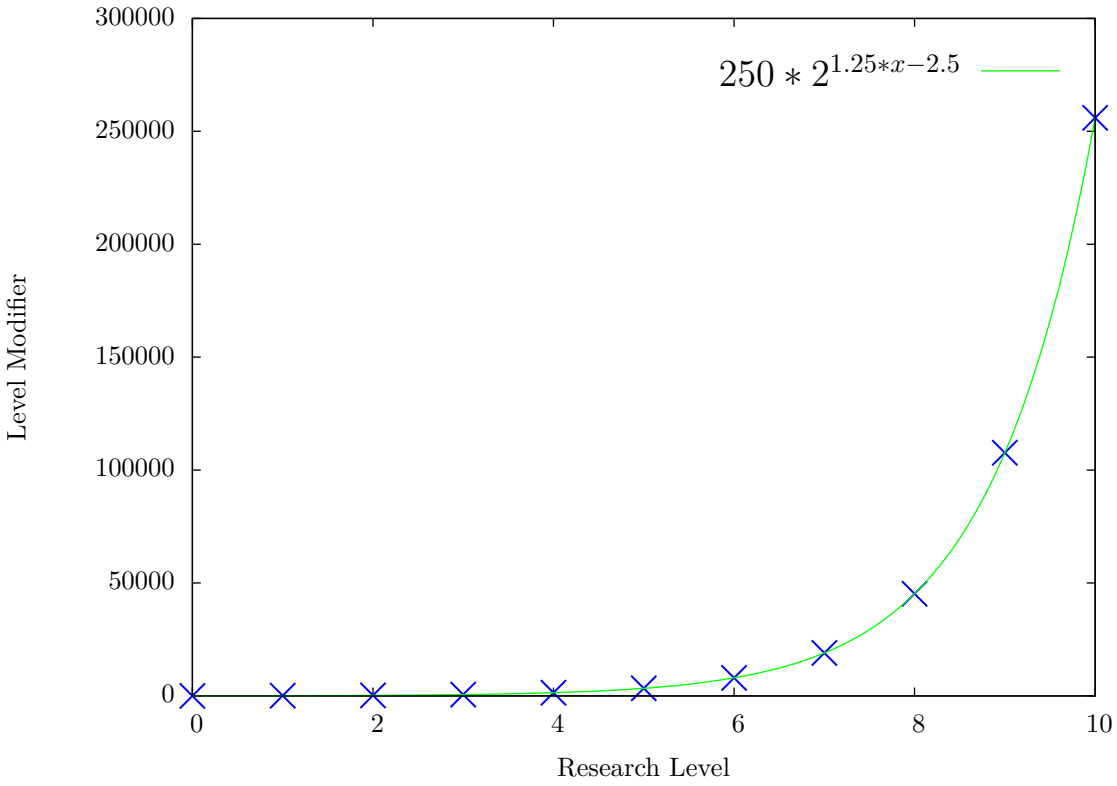

Figure 1: Level Modifiers for ME/TE Research

Table 2: Science skills with 1% reduction in manufacturing time per level

Skill
Advanced Small Ship Construction
Advanced Medium Ship Construction
Advanced Large Ship Construction
Avanced Industrial Ship Construction
Amarr Starship Engineering
Caldari Starship Engineering
Gallente Starship Engineering
Minmatar Starship Engineering
Electromagnetic Physics
Electronic Engineering
Graviton Physics
High Energy Physics
Hydromagnetic Physics
Laser Physics
Mechanical Engineering
Molecular Engineering
Nuclear Physics
Plasma Physics
Quantum Physics
Rocket Science

Table 3: Invention Outcomes (Proposed in DevBlog - NOT IMPLEMENTED IN PHOEBE)

Name	**Output**	
Success	exceptional	Yields a ME 2 and TE 3 bonus to the outcome.
	great	Yields a ME 1 and TE 2 bonus to the outcome.
	good	Yields a TE 1 bonus to the outcome.
	standard	Basic unmodified outcome.
Failure	standard	50% of datacores returned
	poor	25% of datacores returned
	terrible	10% of datacores returned
	critical	No datacore returned

Table 4: Team Specializations

Category	Broad Specialization	Narrow Specialization
Structure	Deployables	Mobile Disruption
		Mobile Structures
	Sovereignty	I-Hubs
		SBUs
		TCUs
	Starbase	Starbase Defense
		Starbase Processing
		Starbase Storage
		Starbase Weapons
		Starbase Production
		Starbase Core
	Containers	
Component	Capital Construction	
	Construction Components	
	Data Interfaces	
	Hybrid	
	Outpost Components	
	Subsystem	Propulsion Systems
		Electronics Systems
		Offensive Systems
		Defensive Systems
		Engineering Systems
	Tools	
Consumable	Ammo	Projectile Ammo
		Bombs
		Hybrid Ammo
		Crystals
		Interdiction Probe
		Missiles & Rockets
	Capacitor Boosters	
	Fuel Blocks	
	Nanite Repair Paste	
	Neural Boosters	

Category	Broad Specialization	Narrow Specialization
Ship	Capital class	Supercarrier
		Freighters
		Dreadnought
		Carrier
		Capital Industrial Ship
		Titan
	Large class	Battleship
		Industrial Command Ship
		Black Ops
		Marauder
	Medium class	Mining Barges
		Heavy Assault Cruisers
		Strategic Cruiser
		Logistics
		Recon Ships
		Heavy Interdiction Cruisers
		Cruiser
		Battlecruisers
		Command Ship
		Industrial Ships
	Small class	Covert Ops
		Electronic Attack Ship
		Interceptor
		Interdictor
		Assault Frigate
		Frigate
		Shuttle
		Destroyer
Mobile	Disruption Drones	Stasis Webifying Drone
		Cap Drain Drone
		EW Drone
	Fighters	Fighter Bomber
		Fighter Drone
	Utility Drones	Mining Drone
		Salvage Drone
		Logistic Drone
	Scanner Probe	
	Survey Probe	
	Warfare Drone	Combat Drone

Category	Broad Specialization	Narrow Specialization
Equipment	Armor	Armor Active Modules
		Armor Passive Expanders
		Armor Passive Resistance
	Damage	Damage Amplifiers
		Missile Launchers
		Smart Bomb
		Energy Weapon
		Hybrid Weapon
		Projectile Weapon
	Drone Modules	Drone Effectiveness Modules
		Drone Operation Modules
	Electronic Warfare	Energy Drain Modules
		Warp Scrambling Modules
		ECM & ECCM
		Tracking Disruptor
	Engineering	Capacitor Passive
		Capacitor Active
		Capital Modules
		Hull Modules
		Damage Control
		Fitting Modules
	Implants	
	Navigation	Propulsion Modules
		Jump Modules
		Cloaking Device
		Stasis Web
		Stabilizer Modules
	Rigs	
	Scanners & Harvesting	Harvesting Modules
		Scanning Modules
		Surveying Modules
	Scripts	
	Sensors & Targeting	Fleet Coordinator
		Remote Modules
		Tractor Beam
		Targeting Modules
		Tracking Modules
	Shields	Shield Passive Recharge
		Shield Active Modules
		Shield Passive Extenders
		Shield Passive Resistance