

Ship Size Armour Modifiers

On GURPS Space 2nd Edition page 78 it states "Larger ships have proportionately less surface area for their volume." The percentages listed in the book work fine unless you want to build very large ships. These size ships are rare but they could happen. For this reason I sat down one day and figured out the equation used to generate the percentages.

The table below gives the multiplier for each ship size range in four forms. The first is the percentage, the second is the rounded off decimal, the third is the actual decimal, and the last is the calculation. You can use any of the forms, they are all similar, the last two are the most accurate though.

Ship Size (cy)	Percentage	Decimal (rounded)	Decimal	Equation
Less than 100	100%	1	1	0.7^0
100+	70%	0.7	0.7	0.7^1
1,000+	50%	0.5	0.49	0.7^2
10,000+	34%	0.34	0.343	0.7^3
100,000+	24%	0.24	0.2401	0.7^4
1,000,000+	17%	0.17	0.16807	0.7^5
10,000,000+	12%	0.12	0.117649	0.7^6
100,000,000+	8%	0.08	0.0823543	0.7^7
1,000,000,000+	6%	0.06	0.05764801	0.7^8
10,000,000,000+	4%	0.04	0.040353607	0.7^9

Quantum Crystallite Armour

At higher TL's denser armour is available that weighs a fraction of regular armour. The trade off is that it is a lot more expensive. The structure of the crystalline armour allows it to be applied in layers that increase the protection exponentially while keeping the weight to a minimum. The same rules for normal armour apply to quantum armour except that instead of doubling the mass to gain a higher DF the DF is multiplied by the mass. For example, a DF of 2 would weigh twice as much as a DF of 1, and a DF of 3 would weigh three times as much, and so on.

	\$/Cubic Yard				
TL	\$5,000	\$3,750	\$2,500	\$1,000	\$500
10	0.04	—	—	—	—
11	0.02	0.04	—	—	—
12	0.01	0.02	0.04	—	—
13	0.005	0.01	0.02	0.04	0.08
14+	0.0025	0.005	0.01	0.02	0.04

Phase Shields

At TL12 and above, a heavier version of the force field is available. The size and mass of the generators required to produce these heavier fields makes them more practical for capital ships rather than smaller vessels. They are also more expensive than normal force fields.

A Phase Shield generator takes a base \$100,000, 60 tons and 100 cy, plus \$500, .001 tons, .0001 cy and .02 MW per cy of the ship. Larger ships have proportionately less surface area for their volume, thus they require less energy to project the field. For ships of 1,000+ cy, total power is only 70% of normal. For ships of 10,000+ cy, 50%. For ships over 100,000 cy, 35%. For ships of 1,000,000+ cy, 25%.

The above figures are for a DF of 1. For an increased DF increase the cost, mass, volume, and power requirements by the number of DF. Phase shields protect against radiation in the same way as regular force fields.

The above prices are for TL12. At TL13, halve the cost, mass, and volume. At TL14, divide the cost, mass, and volume by 5. At TL15, divide them by 10. At TL16, divide by 20.

Extra Performance from Force Fields

On a successful *Engineering (Force Field)-2* skill roll (+1 bonus for ablative fields) extra performance can be gained from any type of force field. DF is increased by a percentage equal to 5 times the amount by which the roll was made, energy requirements are increased by a similar amount.

Ship Size Armour Modifiers—General Formula

$$SA_{mod} = 0.7^{(\log X - 1)}$$

Where X is the volume of the ships hull in cy.

I had several people submit formulas, I finally chose this one because it produced a number almost exactly to what the book lists. Special thanks go to Antti Heikkila, who first submitted this particular formula to me.

Normal Force Fields

The regular force fields found in the GURPS Space book remain mostly the same, except that the mass is reduced by half.

Ablative Force Fields

Similar to normal force fields, and available at the same tech level, ablative force fields have one important difference, their DF decreases the more damage they take. For every two medium or one heavy damage hit reduce the effective DF of the field by one. A successful damage control roll will restore one DF, only one damage control roll may be made per round of combat. Ablative force fields cost half as much as normal force fields and take one eighth the mass and one quarter volume. Energy requirements remain the same. Improvements for tech levels are the same as normal force fields. Ablative Phase Shields are not available.