

**QSDS Version 3.1 (Alpha)**

Hull Cost per displacement ton – assumes armour value 20.

TL4	Displacement tons x 18,432	AV20	Soft Steel	A
TL5	Displacement tons x 19,600	AV20	Hard Steel	B
TL7	Displacement tons x 34,300	AV20	Composite Laminate	C
TL8	Displacement tons x 26,096	AV20	Lt Wt Composite Laminate	D
TL10	Displacement tons x 22,050	AV20	Crystaliron	E
TL12	Displacement tons x 19,600	AV20	Superdense	F
TL14	Displacement tons x 19,600	AV20	Bonded Superdense	G*
TL16	Displacement tons x 21,538	AV20	Collapsed Crystalline	H

Prices in Cr

Displacement		5	10	50	100	1000
TL4	A	92,160	184,320	921,600	1,843,200	18,432,000
TL5	B	98,000	196,000	980,000	1,960,000	19,600,000
TL7	C	171,500	343,000	1,715,000	3,430,000	34,300,000
TL8	D	130,480	260,960	1,304,800	2,609,600	26,096,000
TL10	E	110,250	220,500	1,202,500	2,205,000	22,050,000
TL12	F	98,000	196,000	980,000	1,960,000	19,600,000
TL14	G	98,000	196,000	980,000	1,960,000	19,600,000

**Armour type G requires 0.014kw/ton of hull enclosed to maintain hull integrity.**

Additional Armour (hull cost/20) x new armour number

E.g. building a 200 ton free trader at TL10 gives us a hull cost of **Mcr4, 410,000** assuming an armour value of 20, should we desire an armour value of 30 we would perform the following calculation.

$$4,410,000/20 \times 30 = 6,615,000$$

Modify the hull cost by configuration and streamlining.

**Modify by Hull Configuration.**

- USL = Unstreamlined
- SS = Semi-Streamlined
- SL = Streamlined
- AF = Airframed

Type	Configuration	Price	USL	SS	SL	AF
00	Open Frame	0.5	1.0	N/A	N/A	N/A
01	Needle/Wedge	1.2	N/A	N/A	1.3	1.5
02	Cone	1.1	0.8	0.9	1.0	2.0
03	Cylinder	1.0	1.0	1.1	1.2	3.0
04	Box/Slab	0.6	1.0	1.2	1.5	N/A
05	Sphere	1.5	N/A	1.0	1.0	2.0
06	Dome/Disk	1.2	N/A	1.0	2.0	3.0
07	Close Structure/Irregular	0.5	N/A	1.0	2.5	3.5

E.g. our 200 ton merchant is a classical wedge/streamlined combination thus cost becomes 6,615,000 x 1.2 = 7,938,000 x 1.3 (for streamlining) = 10,319,400.

**Note Total Hull Displacement Total Hull Cost**

## Hull space lost to streamlining (multipliers)

Unstreamlined	Displacement x 0
Semi-Streamlined	Displacement x 0.02
Streamlined	Displacement x 0.03
Airframed	Displacement x 0.10

e.g. our 200 ton trader is streamlined so 10% of its interior space is lost to the necessary structural fixtures and cowling mounting points that support the exterior streamlining.

Disp 200 x 0.10 = 20 Thus 20 tons are lost to streamlining.

## Internal space lost to drives & power requirements.

<b>Gravitic Locomotion</b>		<b>1G</b>	<b>2G</b>	<b>3G</b>	<b>4G</b>	<b>5G</b>	<b>6G</b>	<b>MW</b>	<b>Cost</b>
TL9	Locomotion – Contragrav	0.04	0.05	0.06	0.07	0.08	0.09	2.5	0.2
TL10	Locomotion – Standard Grav	0.03	0.04	0.05	0.06	0.07	0.08	2.5	0.5
TL11	Locomotion -Thrusters	0.02	0.03	0.04	0.05	0.06	0.07	1.4	0.7

  

<b>TL</b>	<b>Range</b>	<b>J1</b>	<b>J2</b>	<b>J3</b>	<b>J5</b>	<b>J5</b>	<b>J6</b>	<b>MW</b>	<b>Cost</b>
TL9	Jump 1	0.02						1.4	3.0
TL11	Jump 2	0.02	0.03					1.4	3.0
TL12	Jump 3	0.02	0.03	0.04				1.4	3.0
TL13	Jump 4	0.02	0.03	0.04	0.05			1.4	3.0
TL14	Jump 5	0.02	0.03	0.04	0.05	0.06		1.4	3.0
TL15	Jump 6	0.02	0.03	0.04	0.05	0.06	0.07	1.4	3.0
	Jump Fuel	0.10	0.20	0.30	0.40	0.50	0.60	----	3.0

MW – electrical power required per ton of machinery

E.g. our 200 ton trader has jump 1 and m-1G, at tl10 thus internal space lost to drives is as follows

Locomotion – Antigravity	Disp 200 x 0.03	= 6.0 tons
Jump Drive = 1 Parsec	Disp 200 x 0.02	= 4 .0 tons

Power costs Standard grav (MW)            2.5 x 6 = 15.0

Power costs Jump Drive (MW)            1.4 x 4 = 5.6

Cost is in Mcr per displacement ton

Multiply the vessel's displacement by the modifier above to find the amount of space in tons lost to the needed components and tankage.

Internal space lost to command and control is always 2% regardless of craft size for any vessel over 20 tons. Smaller vessels must devote a minimum of 1% to command and control.

### **Command & Control**

Command and control represents bridge/flight deck spaces and workstations and other control panels. Access to engineering and other components is already accounted for in the component sizes of various parts.

<b>TL</b>	<b>Control Type</b>	<b>Cost/MW ton</b>
TL5	Basic Mechanical	0.0005
TL6	Enhanced Mechanical	0.0010
TL7	Electronic	0.0015
TL8	Electronic Linked	0.0020
TL9	Computer Linked	0.0025
TL10	Dynamic Linked	0.0014
TL13	Holographic Linked	0.0007
TL16	Synaptic Linked	0.0005

Thus our 200 trader has dynamic linked controls and must devote at least 2% of its internal space to command and control (flight deck and other spaces). This equates to 4 tons, the cost per to is 0.0014 (1,400 per ton) (4 x 0.0014) = Cr5, 600. Controls only require minimal power input equal to its cost in MW

**Sensors (size in displacement tons) for the sensor factor**

TL	Type	1	2	3	4	5	6	7	8	9
10	Active EMS	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
11	Active EMS	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.44
12	Active EMS	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36
14	Active EMS	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27
16	Active EMS	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18
18	Active EMS	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

**EMS jammer all values x 2**

**MW = Size in displacement tons x 50.0**

**Mcr = volume x 2**

E.g. our 200 ton trader installing an active array (factor 3) would require 0.30 tons of space to be devoted to it, MW15.0 to power the array and cost Mcr0.60 (Cr600, 000)

TL	Type	1	2	3	4	5	6	7	8	9
08	HRT	0.35	0.70	1.05	1.40	1.75	2.1	2.45	2.8	3.15
10+	Passive EMS	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

**MW = Size in displacement tons x 50.0**

**Mcr = Vol x 1.0 (HRT)**

**Mcr = Vol x 1.0 (PEMS)**

**Survey Instruments**

Densitometer (Grav Shielded)

Densitometers are survey instruments that allow determination of an object's mass in addition to the mapping of mineral deposits and gravitic anomalies.

TL	Type	Volume	Mcr	Notes
11	Densitometer	2.2	0.75	High Pen – 1m
12	Densitometer	1.2	0.90	High Pen – 50m
13	Densitometer	0.9	0.95	High Pen – 100m
14	Densitometer	0.8	1.0	High Pen – 250m
15	Densitometer	0.7	1.5	High Pen – 1Km
16	Densitometer	0.3	1.5	High Pen – 25Km
18	Densitometer	0.2	1.3	High Pen – 2,500Km
20	Densitometer	0.01	1.0	High Pen – 250,000Km

Volume is in tons

**Neutrino Sensor**

TL	Type	MW	Volume	Mcr	Notes
10	Neutrino	0.005	0.008	0.001	---- *1
11	Neutrino	0.500	0.014	0.060	1GW
12	Neutrino	0.400	0.010	0.075	1MW
13	Neutrino	0.300	0.020	0.090	100 KW
14	Neutrino	0.200	0.010	0.110	10 KW
16	Neutrino	0.100	0.007	0.120	1 KW
18	Neutrino	0.050	0.007	0.120	1 KW
20	Neutrino	0.025	0.007	0.120	1 KW

**\*1 Non discriminative sensor only – indicates if nuclear processes are taking place**

Volume is in tons

**Commo**

TL	Type	1	2	3	4	5	6	7	8	9
05	Radio	0.4	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36
08	Laser	0.4	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36
10+	Maser	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
15+	Meson	10.0	20.0	30.0	----	----	----	----	----	----

MW = Size in displacement tons x 5.0

Mcr = model no x Cr 10,000 (Radio)

Mcr = model no x Cr 10,000 (Laser)

Mcr = model no x Cr 100,000(Maser)

Mcr = model no x MCr5.0

**Stealth Coating**

TL	Type	Cost	MW
09	Stealth	1400	----
10	Chameleon Hull	140	----
10	EMMask	70,000	0.014
12	EMMask	56,000	0.014
14	EMMask	42,000	0.014
16	EMMask	28,000	0.014
18	EMMask	14,000	0.014
20	EMMask	7,000	0.007

All values are per ton of hull enclosed.

**Avionics**

Size = Model no x 0.1 Cost = Mcr 0.250 x model no. MW – Not required as command and control supports this.

**Computer must be the same factor as the highest sensors/commo factor.**

The price quoted is for 3 computers, 1 primary, 1 backup and dedicated to continual systems maintenance and diagnostic testing.

Model	No	Size	Mcr	TL	S/C	Jump	Avionics
Model	1	0.1	1.2	05	1	1	600 tons
Model	2	0.2	5.7	07	2	2	1000 tons
Model	3	0.3	11.4	09	3	3	4000 tons
Model	4	0.4	19.2	10	4	4	10,000 tons
Model	5	0.5	29.1	11	5	5	50,000 tons
Model	6	0.6	35.4	12	6	6	100,000 tons
Model	7	0.7	52.2	13	7	6	100,000+
Model	8	0.8	71.7	14	8	6	
Model	9	0.9	91.5	15	9	6	
Model	10	1.0	129.0	16		6	Artificially Intelligent
Model	11	1.1	196.5	17		6	
Model	12	1.2	261.0	18		6	
Model	13	1.3	325.5	19		6	
Model	14	1.4	390.0	20		6	
Model	15	1.5	451.5	21		6	

MW = Size in displacement tons.

Size = displacement tons.

S/C= max model number of sensors/communicators supported by this computer.

Bis computer price x 1.5 – Model 1 & 2 may be bis computers in which case multiply cost by 1.5

A bis computer functions as one level higher for jump and avionics support.

Fib (fibre optic radiation hardened computers) Price x 2

**Armament**

A vessel may fit as many weapons and defensive systems as space will allow within it's hulls, though Imperial Naval Tradition (from the Villani First Imperium) typically sees 1 weapon placed per 100 tons displacement of vessel, this evolved out of the vast economies of scale available to first Imperium builders, in which enormous fleets could quickly be built, allowing the attacking Villani Imperium to overwhelm it's enemies with sheer weight of numbers, a fact that was rapidly exploited by the Terrans during the Interstellar wars.

Starships and Spacecraft require Turrets if their weaponry is going to accurately bear on a target, Some small vessels may have a fixed position Laser Lance in which case divide the volume by 0.5 (cost is the same), although the pilot must orientate the vessel in order to fire upon a target.

Laser's come in three configurations, the Light Laser, the Heavy Laser and the Laser Barbette.

**Ship Mounted Turrets**

The most common weapon options in known space, small, light and very potent, ideal for smaller ships (less than 1000 tons).

Type	Volume	Cost
Empty Turrets	1 Ton Light Single Turret	0.100
	1 ton Light Double Turret	0.200
	1 ton Light Triple Turret	0.300
	3 Ton Heavy Turret	0.500
	6 Ton Barbette	1.000

**Mining Laser**    **MCr0.25**    **Max 3 weapons per individual 1 ton turret.**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL9	1	4	8	12	25	50				
Weapons TL13	-	1	4	8	12	25	50			
Weapons TL16	-	-	1	4	8	12	25	50		

Each turret may have 1, 2 or 3 light beam lasers. Each laser costs MCr1.0 each and requires MW1.0 each.

**Light Pulse Laser**    **MCr0.5**    **Max 3 weapons per individual 1 ton turret.**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL9	1	3	6	10	21	30				
Weapons TL13	-	1	3	6	10	21	30			
Weapons TL16	-	-	1	3	6	10	21	30		

Each turret may have 1, 2 or 3 light pulse lasers. Each laser costs MCr0.5 each and requires MW 0.5 each.

**Heavy Pulse Laser**    **MCr1.0**    **Max 1 weapons per individual 3 ton turret.**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL9	-	-	1	3	6	10	15	21	30	
Weapons TL13	-	-	-	1	3	6	10	15	21	21
Weapons TL16	-	-	-	-	1	3	6	10	15	15

Each turret may have 1 heavy pulse laser. Each laser costs MCr4.5 each and requires MW 5.0 each.

**Light Beam Laser**    **MCr1.0**    **Max 3 weapons per individual 1 ton turret**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL9	1	2	3	6	10	15	21	30		
Weapons TL13	-	1	2	3	6	10	15	21	30	
Weapons TL16	-	-	1	2	3	6	10	15	21	30

Each turret may have 1, 2 or 3 light beam lasers. Each laser costs MCr1.0 each and requires MW1.0 each.

**Heavy Beam Laser MCr1.0 Max 1 weapons per individual 3 ton turret**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL9	-	-	-	1	2	3	5	10		
Weapons TL13	-	-	-	-	1	2	3		10	
Weapons TL16	-	-	-	-	-	1	2	3	5	10

Each turret may have 1 heavy beam laser. Each laser costs MCr4.5 each and requires MW 5.0 each.

**Beam Laser Barbette MCr4.5 Max 1 weapons per individual 6 ton turret**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL9	-	-	-	-	1	2	3	5	10	
Weapons TL13	-	-	-	-	-	1	2	3	5	10
Weapons TL16	-	-	-	-	-	-	1	2	3	5

Each turret may have 1, laser Barbette, each laser costs MCr4.5 each and requires MW 5.0 each.

At Tech 16 10 lasers linked into a single battery provides a UCP weapon factor of B

<b>Tactical Missiles TL7+←</b>	<b>UCP FACTOR</b>									<b>→</b>
	1	2	3	4	5	6	7	8	9	A
Weapons TL7	1	3	6	12	18	30				
Weapons TL13	-	1	3	6	12	18	30			
Weapons TL21	-	-	1	3	6	12	18	30		

Each turret may have 1, 2 or 3 launchers; each launcher costs MCr0.75 each and requires no additional power.

Type	Size		Mcr	MW	
KEAP	0.05 ton	Standard Civilian Missile	0.02	----	
Nuclear Tipped	0.05 ton	Standard Military Issue	0.15	----	Requires a radiation shielded magazine.
Bomb Pumped	0.50 ton	Heavy Military Issue	1.50	----	Requires a radiation shielded magazine.

**Bomb Pumped Nuclear Missiles. – Heavy Military Issue Only.**

<b>Torpedos TL7+←</b>	<b>UCP FACTOR</b>								<b>→</b>
	9	A	B	C	D	E	F	G	H
Weapons TL8	1	2	4	8	12	16			
Weapons TL13	-	1	2	4	8	12	16		
Weapons TL21	-	-	1	2	4	8	12	16	

Each missile (torp) displaces ½ ton (0.5) and 2 may fit in a standard 3 ton launcher – all magazines must be radiation shielded.

Alternatively a 6 ton Heavy Turret may be built which holds 5 ready missiles.

Costs	3 Ton	McCr0.80	Light Turret	+ MCr 0.85 per missile
Costs	6 Ton	McCr0.11	Missile Barbette	+ MCr 0.85 per missile

An autoloader can also be supplied at 2 additional tons (per weapon), which will quickly reload a turret/barbette in under 1 combat round for MCr0.250 – sufficient space must be available in cargo to hold the missiles in a radiation shielded magazine (Mcr 0.1 per ton of missile storage).

**Plasma Gun Turret MCr1.5 Max 2 weapons per individual 2 ton turret**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL10	1	4	10	16	20					
Weapons TL11	-	1	4	10	16	20				
Weapons TL12	-	-	1	4	10	16	20			
Weapons TL16	-	-	1	2	4	10	16	20		

Each turret may have 1 or 2 weapons. Each plasma gun costs MCr1.5 each and requires MW10.0 each.

**Fusion Gun Turret MCr1.0 Max 2 weapons per individual 2 ton turret**

	← UCP FACTOR →									A
	1	2	3	4	5	6	7	8	9	
Weapons TL10	-	-	-	-	1	4	10	16	20	
Weapons TL11	-	-	-	-	-	1	4	10	16	20
Weapons TL12	-	-	-	-	-	-	1	4	10	16
Weapons TL16	-	-	-	-	-	-	-	1	4	10

Each turret may have 1 or 2 weapons. Each plasma gun costs MCr1.5 each and requires MW20.0 each.

**Disintegrator Turret MCr1.0 Max 2 weapons per individual 2 ton turret**

	← UCP FACTOR →									A
	1	2	3	4	5	6	7	8	9	
Weapons TL18	1	4	10	16	20					

Each turret may have 1 or 2 weapons. Each plasma gun costs MCr1.5 each and requires MW20.0 each.

**50 ton bay weaponry**

TL	Type	MW	← MCr	TL of weapon →															
				10	11	12	13	14	15	16	17	18	19	20	21				
7	Missile	----	12	7	7	8	8	9	9	A	A	B	C						
10	PA-Bay	75.0	20	3	3	4	4	5	5	6	6	7	8						
10	Plasma	25.0	5.0	4	5	6													
12	Fusion	50.0	8.0				7	8	9	A	B	C	D	E	F				
14	Repulsor	100.0	6.0					3	5	7	9	A	B	C	D				
15	Meson	125.0	50						4	6	9	B	D	F	H				
18	Disintegrator	150.0	90									6	6	7	7				
20	Tractors	250.0	24											3	5				
21	Jump Damper	300.0	120														1		

50 ton missile bays fire 50 missiles per combat round,

**100 ton bay weaponry**

TL	Type	MW	← MCr	TL of weapon →															
				8	9	10	11	12	13	14	15	16	17	18	19	21			
7	Missile	----	24.0	7	7	8	8	9	9	9	9	A	B	C					
10	PA-Bay	15.0	40.0	6	6	7	7	8	8	9	9	A	A	B	B	C			
14	Repulsor	200.0	12.0			2	4	6	7	8	9	A	B	C	D	E			
15	Meson	250.0	70.0						3	5	9	B	D	F	H				
16	Tractors	300.0	180.0											7	7	8	8		
21	Jump Damper	600.0	240.0														2		

50 ton missile bays fire 50 missiles per combat round.

**Particle Accelerators (Spinal Mount)**

UCP	MW	Tons	Mcr	TL
A	1250	5555	3500	8
B	1250	4814	3000	9
C	1250	4444	2400	10
D	1500	4000	1500	11
E	1500	3333	1200	12
F	1500	2962	1200	13
G	1750	2592	800	14
H	1750	2592	500	15
J	2000	4444	3000	10
K	2000	4444	2000	11
L	2000	4074	1600	12
M	2250	3333	1200	13
N	2250	2962	1000	14
P	2250	2500	800	15
Q	2500	4444	2000	12
R	2500	4074	1500	13
S	2500	3333	1200	14
T	2500	2962	1000	15
U	2750	2500	1000	16
V	2750	1785	800	17
W	2750	1481	600	18
Y	3000	1111	800	18
Z	3000	1111	600	19

**Disintegrators (Spinal Mount)**

UCP	MW	Tons	Mcr	TL
A	5,000	4444	5000	17
B	5,500	4000	3500	18
C	5,500	3333	2400	19
D	5,750	3000	1500	20
E	5,750	2592	1200	21

**Jump Projector (Spinal Mount)**

UCP	MW	Tons	Mcr	TL
A	8000	4000	1000	21
B	9500	7000	1200	21

**Meson Gun Spinal Mount**

UCP	MW	TONS	Mcr	TL
A	1250	4814	10,000	11
B	1500	8148	12,000	11
C	1500	1785	3,000	12
D	1750	4814	5,000	12
E	1750	1111	800	13
F	2000	1785	1000	13
G	2000	1111	400	14
H	2250	1785	600	14
J	2250	1111	400	15
K	2500	8148	10,000	12
L	2500	4814	3,000	13
M	2500	4074	800	14
N	2500	1785	600	15
P	2750	8148	5,000	13
Q	2750	7037	1,000	14
R	2750	4814	800	15
S	3000	8148	2,000	14
T	3000	4814	1,000	15
U	3250	8148	2,000	16
V	3250	4814	1,200	17
W	3250	4814	1,000	18
X	3500	8148	2,000	17
Y	3500	4814	1,200	18
Z	3750	4814	800	19

**Defences**

**Sandcaster TL7+**

**Light Sand Caster MCr1.0 Max 3 weapons per individual 1 ton turret**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL7	1	3	6	8	10	20	30			
Weapons TL8	-	1	3	6	8	10	20	30		
Weapons TL10	-	-	1	3	6	8	10	20	30	
Weapons TL16	-	-	-	1	3	6	8	10	20	30

Each turret may have 1, 2 or 3 Sandcasters. Each caster costs MCr0.25 each and requires no additional energy.

**Heavy Sand Caster MCr1.0 Max 1 weapon per individual 3 ton turret**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL7	-	-	-	1	3	6	8	10	20	30
Weapons TL8	-	-	-	-	1	3	6	8	10	20
Weapons TL10	-	-	-	-	-	1	3	6	8	10
Weapons TL16	-	-	-	-	-	-	1	3	6	8

Each turret may have 1, 2 or 3 Sandcasters. Each caster costs MCr0.25 each and requires no additional energy.

**Sandcaster Barbette MCr1.0 Max 1 weapon per individual 6 ton turret**

	← UCP FACTOR →									
	1	2	3	4	5	6	7	8	9	A
Weapons TL7	-	-	-	-	1	3	6	8	10	20
Weapons TL8	-	-	-	-	-	1	3	6	8	10
Weapons TL10	-	-	-	-	-	-	1	3	6	8
Weapons TL16	-	-	-	-	-	-	-	1	3	6

Each turret may have 1, 2 or 3 Sandcasters. Each caster costs MCr0.25 each and requires no additional energy.

Light canister	Tons	0.01	Cr20,000
Heavy canister	Tons	0.03	Cr60,000
Barbette canisters	Tons	0.06	Cr110,000

Each Turret or barbette has sufficient magazine space for 50 canisters – additional may be carried in cargo space or an additional magazine (McCr0.1/ton dedicated to storage).

**Nuclear Dampers**

UCP	TL	MW	VOL	MCr
1	12	25	50	50
2	13	50	40	40
3	13	75	20	45
4	14	100	8	30
5	14	125	10	35
6	14	150	12	38
7	15	175	10	30
8	15	200	15	40
9	15	225	20	50
A	16	250	12	45
B	17	275	13	50
C	18	300	16	55
D	19	325	18	60
E	20	350	20	65
F	21	375	21	70

Vol – tons

MW is for the installation regardless of the size of the craft

**Optimised Nuclear Dampers**

UCP	TL	VOL	MW	MCr
1	14	2	7.5	40
1	15	1.5	5.0	35
1	16	1	4.5	25
1	17	1	4.25	15
1	18	0.85	4.0	10
1	19	0.7	4.5	5
1	20	0.7	5.5	4
1	21	0.6	6.1	3

**Optimised Meson Screens**

UCP	TL	VOL	MW	MCr
1	16	8	0.135	55.0
1	17	7	0.100	23.0
1	18	6	0.065	17.0
1	19	5	0.035	9.0
1	20	3	0.015	4.0
1	21	2	0.010	1.0

**Black Globes**

UCP	TL	MW	VOL	MCr
1	15	50.0	10	400
2	15	55.0	15	600
3	15	60.0	20	800
4	15	65.0	24	1000
5	16	65.0	20	500
6	16	70.0	30	700
7	16	75.0	35	900
8	17	75.0	20	500
9	18	75.0	20	500
A	19	75.0	20	500

**White Globes**

UCP	TL	MW	VOL	MCr
1	20	100.0	2	900
2	20	200.0	3	910
3	20	300.0	4	750
4	21	400.0	3	800
5	21	500.0	4	850
6	21	600.0	4	900

**Optimised White Globe**

UCP	TL	MW	VOL	MCr
1	21	50	4.5	850

**Meson Screens**

UCP	TL	VOL	MW	MCr
1	12	90	0.15	80.0
2	13	30	0.30	50.0
3	13	45	0.45	55.0
4	14	15	0.60	40.0
5	14	20	0.75	45.0
6	14	23	0.90	50.0
7	15	20	1.05	40.0
8	15	30	1.20	50.0
9	15	40	0.135	60.0
A	16	24	1.50	50.0
B	17	27	1.65	60.0
C	18	31	1.80	70.0
D	19	35	1.95	80.0
E	20	40	2.10	90.0
F	21	44	2.25	100.0

**Proton Screen**

UCP	TL	VOL	MW	MCr
1	19	7.4	250.0	75.0
2	20	2.0	300.0	60.0
3	20	3.0	350.0	70.0
4	21	3.0	400.0	45.0
5	21	1.5	450.0	55.0
6	21	1.7	500.0	60.0

**Optimised Proton Screens**

UCP	TL	VOL	MW	MCr
1	20	0.85	900.0	90.0
1	21	0.71	800.0	78.0

### Nuclear Power

<u>TL</u>	<u>Type</u>	<u>MW</u>	<u>VOL</u>	<u>Cost</u>	<u>Fuel</u>	<u>Fuel Type</u>
06	Fission	0.30	2.0	1.4	0.05	Radioactives
07	Fission	0.60	1.5	1.4	0.02	Radioactives
08	Fission	1.00	0.7	1.4	0.007	Radioactives

MW= Power Output per ton of plant

VOL – smallest size of plant available in tons

Cost in Mcr per ton of plant.

Fuel = the amount of fuel consumed per MW output per year of plant operation in tons.

Note Fission plants are incredibly heavy whilst mass/weight is not a factor of the design sequence should you need to compute the plant's mass for any reason multiply it's volume by 8 (in tonnes) to account for the necessary shielding, radioactive materials and the highly sophisticated water cooling system required to keep the plant from reaching 'Critical Mass'. Multiply fuel mass by 19 to account for the necessary shielding and tamper proof containments needed for the nuclear rods.

### Fusion

<u>TL</u>	<u>Type</u>	<u>MW</u>	<u>VOL</u>	<u>Cost</u>	<u>Fuel</u>	<u>Fuel Type</u>
09	Fusion	2.0	70.0	2.8	0.01	Deuterium
10	Fusion	2.0	35.0	2.8	0.01	Deuterium
11	Fusion	2.0	15.0	2.8	0.01	Deuterium
12	Fusion	2.0	0.71	2.8	0.01	Liquid Hydrogen
13	Fusion	3.0	0.07	2.8	0.01	Liquid Hydrogen
14	Fusion	3.0	0.017	2.8	0.01	Liquid Hydrogen
15	Fusion	6.0	0.007	2.8	0.01	Liquid Hydrogen

Fuel requirements 0.01 tons/MW output per year.

### Antimatter

<u>TL</u>	<u>Type</u>	<u>MW</u>	<u>VOL</u>	<u>Cost</u>	<u>Fuel</u>	<u>Fuel Type</u>
17	Antimatter	50.0	1.0	7.0	1.0	Antimatter
18	Antimatter	100.0	1.0	7.0	0.8	Antimatter
19	Antimatter	250.0	1.0	7.0	0.6	Antimatter
20	Antimatter	500.0	1.0	7.0	0.5	Antimatter
21	Antimatter	1,000.0	1.0	7.0	0.2	Antimatter
22	Total Conversion	1,000.0	1.0	7.0	0.2	Any Matter

### Fuel Requirements is in g of antimatter per year per mw output

Antimatter fuel comes in pods, each pod contains up to 1g of antimatter in a special gravitational/electromagnetic containment field, each pod requires (0.07 tons) and costs Cr1000.

### Environment & Life Support

<u>Type</u>	<u>Vol</u>	<u>MW</u>	<u>Cr</u>	<u>Notes</u>
Cramped Crew Position	0.14	----	Cr100	
Adequate Crew Position	0.21	----	Cr100	
Roomy Crew Position	0.28	----	Cr100	
Flight Station	0.28	0.001	Cr4, 000	Includes Acceleration Couch
Workstation	0.50	0.001	Cr5, 000	Includes Acceleration Couch
Bridge Workstation	1.0	0.001	Cr10, 000	Includes Acceleration Couch

### Extended Accommodations

Bunk	1.0		Cr5, 000
Low Berth	0.5	0.001	Cr50, 000
Emergency Low Berth	2.0	0.002	Cr100, 000

Small Cabin	2.0	0.002	Cr50, 000
Stateroom	4.0	0.004	Cr100, 000

### **Subordinate Craft**

Vehicles less than 280 m3 (20 tons displacement)	volume x 1.5	Cost 500 ton
Small Craft 280 m3 to 1400 m3 (20 to 80 tons)	volume x 1.3	Cost 400 ton
Larger subordinate vessels	volume x 1.1	Cost 200 ton

### **Additional Features**

External Grapple Cr5000 per ton of craft – does not require internal space.

Launch Tubes/rapid launch facilities Volume of subcraft x 25 Cost Cr150 per m3 of consumed space.

Basic Ls (Heat/Light ) No additional volume or cost  
 Standard Life Support (Pressured interior –climate control, ready liquid and consumable storage) Cr Disp x 30  
 Volume = displacement x 0.005

Extended Ls (Recycled water and atmosphere + consumable food stocks) Cr Disp x 50  
 Volume = displacement x 0.010

Artificial Gravity	0.01MW	Volume = MW	Cr100 ton
Inertial Compensation	0.005 MW	Volume = MW	Cr 50 ton
Combined AG/AC	0.015 MW	Volume = MW	Cr150 ton.

### **Optional Features**

Fuel scoops (Displacement x Cr1,000) allows scooping of entire hull tankage in 5 hours

### **Fuel processing plant**

Each plant shown will process 200 tons of fuel in 5 hours or 40 tons per hour.

TL	Tons	MW	Cost
TL06	10	1.0	Cr 20,000
TL07	9	1.0	Cr 18,000
TL08	8	1.0	Cr 16,000
TL09	7	0.5	Cr 14,000
TL10	6	0.6	Cr 12,000
TL11	5	0.5	Cr 10,000
TL12	4	0.5	Cr 8,000
TL13	3	0.4	Cr 6,000
TL14	2	0.4	Cr 4,000
TL15	1	0.3	Cr 2,000
TL16	0.9	0.2	Cr 1,800
TL17	0.8	0.1	Cr 1,600
TL18	0.7	0.1	Cr 1,400
TL19	0.6	0.1	Cr 1,200
TL20	0.5	0.1	Cr 1,000

## Crew Requirements

Pilot	Low Automation	2 per vessel
	Medium	1 per vessel
	High	1 per vessel
Sensor Operators	Low Automation	1 per sensor
	Medium	1 per 8 sensors (may be combined with another crew position)
	High	1
Astrogator	Low Automation	1 for any jump capable vessel.
Engineer `	Low Automation	1/35 tons of drive
	Medium	1/50 tons of drive
	High	1/100 tons of drive
Maintenance = 1/1000 tons of vessel		
Medic = 1/ 120 mid passengers/crew or 1 per 20 low berths.		
Gunner	Low Automation	1 per Turret + 1 battery commander
	Medium	1 per turret
	High	1 per battery
Flight Crew	Total crew required by all subcraft + 1 mechanic/maintenance per vessel.	
Ships Troops	Marines	Hull Displacement x (a multiple of between 1 and 30) designers preference
	Civilian Security	Crew+Passengers/30
Command Crew	Total Crew/6	
Stewards	1/8 High Passengers + Command Crew	
	1/50 non command crew or mid passengers	
	At least one steward is required if there are any high passengers	
Frozen Watch	Total Crew Count (not including medical crew)/Tonnage (if less than 1000 treat as 1)	

**Zhunastu Industries Blaine Class Free Trader TL12**

<b>Component</b>	<b>Cost</b>	<b>Volume</b>	<b>MW</b>	<b>Notes</b>
Hull – Superdense AV20	(3,920,000)	(200)	----	
Configuration – Wedge x1.2	(4, 704,000)	-----	----	
Streamlined – x 1.3	6, 115,200	-----	----	
Streamlined waste vol	-----	6.0	----	
Thrusters TL11	2,000,000	4.0	5.6	
Jump 1 TL9	12,000,000	4.0	5.6	Energy only required in jump
Jump Fuel (1 x jump1)	-----	20.0	----	
Command & Control	5,600	4.0	0.0056	Dynamic Linked
Active EMS model 1	200,000	0.10	5.0	Active EMS
Pass EMS model 1	10,000	0.01	0.5	
Radio Model 1	10,000	0.4	2.0	
Avionics Model 1	25,000	0.1	----	
Computer Model 1	1,200,000	0.1	0.1	
2 x Triple Turret	600,000	2.0	----	(empty)
TL12 Fusion Plant	35,784,000	12.78	+18.0	
Fuel (1 year)	-----	0.18		
Flight Station x 4	20,000	2.0	0.004	
Low Berth x 20	1,000,000	10.0	0.010	
Small Cabin x 6	300,000	12.0	0.012	
Stateroom x 10	1,000,000	40.0	0.040	
3 Ton Air/raft hanger	2,250	4.5	----	
Standard LS	6,000	1.0	----	
AG/IC	30,000	3.0	3.0	
Fuel Scoops	200,000	----	----	
Fuel Processor	8,000	4.0	0.500	
Cargo	-----	69.83		
<b>Totals</b>	<b>65,182, 450</b>	<b>200.0</b>	<b>16.7716</b>	

Excess MW = 1.2284

**Craft ID: Zhunastu Industries Blaine Class Light Trader (IDP design) TL12      MCr: 32.591 (IDP discount)**

An IDP reinterpretation of the elementary trading vessel known to humanity for centuries, cheap to maintain and purchase these vessels are commonly encountered near the imperial core.

**Hull & Engineering**

Hull: 200 tons	Cargo: 69.83 tons	Total Fuel Tankage: 20.18 tons
Config: 1 SL	AV20: F	HI: 2400
Thrusters: 1G	Endurance: Unlimited	Reaction Mass: none
Jump = 1	Range: 1 x Jump 1	Jump Fuel: 20 Tons
MW+18 Fusion	Duration 1 Year	Reactor Fuel: 0.18 Tons
Subcraft: 1 x 3 ton air/raft		Hanger Space: 4.5 tons

**Electronics**

Command & Control: Dynamic Linked  
Model 1 STD Computer  
Sensors A: 1    P: 1    J: 0  
Commo R: 1    L: 0    M: 0    Me: 0  
Avionics M-1

**Armaments**

2 x Triple Turrets (Empty)    MW 1.2284 Excess

**Accommodations & Environment**

Workstation x 4  
Small Cabin (crew) x 6  
Low Berths x 20  
Staterooms x 10  
Standard Life Support AG/IC

**Additional Features**

Fuel Scoops      200 tons in 5 hours  
Fuel Refiner      40 tons per hour

## **Appendix 1 -**

Converting hull armour from the personal weapons scale (as per the design) to the basic ship combat system in T4 simply multiply the personal armour value by 10 and compare the USP chart on page 107 of the T4 Starships Book.

Reproduced here if you do not have the book.

Armour Value	USP Rating.
1+	0
20+	1
40+	2
80+	3
120+	4
160+	5
200+	6
250+	7
300+	8
400+	9
500+	10
750+	11
1000+	12
1250+	13
1500+	14
1750+	15
2000+	16
2500+	17
3000+	18
3500+	19
4000+	20
4500+	21
5000+	22
6000+	23
7000+	24
8000+	25
9000+	26
10,000+	27
11,000+	28
13,000+	29
15,000+	30
17,000+	31
19,000+	32
21,000+	32
23,000+	34
27,000+	35
31,000+	36
35,000+	37
39,000+	38
43,000+	39
47,000+	40
55,000+	41
63,000+	42
71,000+	43
79,000+	44
87,000+	45
95,000+	46
111,000+	47
127,000+	48
143,000+	49
159,000+	50
175,000+	51
191,000+	52
223,000+	53
255,000+	54
287,000+	55
319,000+	56
351,000+	57
383,000+	58
447,000+	59