

Equipment Name	Size	Units	Number	Price per Unit
M9 tank	375000.00	L	1	\$ 220,000.00
Bioreactor	170000.00	L	3	\$ 300,000.00
Blower	2.10	m <sup>3</sup> /s	3	\$ 80,000.00
Cross-flow filter	140000.00	L	2	\$ 35,000.00
Packed Bed Column	9000.00	L	2	\$ 1,000.00
Acid Storage Tank	550.00	gal	1	\$ 436.00
Mixing Tank 1	5450.00	L	1	\$ 25,000.00
Cooling Crystallizer	5450.00	L	1	\$ 168,500.00
Drum Vacuum Filter	15.00	m <sup>2</sup>	1	\$ 262,000.00
Ethanol Mixing Tank	50000.00	L	2	\$ 50,000.00
Filter	7.50	m <sup>2</sup>	1	\$ 60,000.00
Trickle Bed Reactor	45000.00	L	1	\$ 276,000.00
Hydrogen Compressor	400.00	psi	2	\$ 2,581.00
Evaporation Crystallizer	45000.00	L	1	\$ 311,800.00

Revenue	\$ 7,431,912.00	per year
Start-up	\$ 3,328,408.64	10% FCI+etoh
WC	\$ 2,656,743.39	FCI/6
Installation Factor	5.03	P&T

Total ISBL FOB
Delivery
Installed ISBL
OSBL
FCI FOB
<b>Installed&amp;Delivered FCI</b>

#### Fixed Cost

Labor
Laboratory
Maintenance
Utilities
Licensing & Bacteria
Taxes & Insurance
Overhead
<b>Total</b>

#### Feed/Product

Lignin
H2SO4
EtOH
Adipic Acid
Hydrogen
M9

#### Catalysts

AC
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Pd/C

**Variable Cost**

Lignin

H2SO4

EtOH

Hydrogen

M9

**Total**

Total Price	Supplier	Product Number/Name	Source
\$ 220,000.00	Pg. 557	Carbon-steel tank	Peters & Timmerhaus
\$ 900,000.00	Pg. 628	Stainless steel (50 psia)	Peters & Timmerhaus
\$ 240,000.00	Pg. 533	Centrifugal blower	Peters & Timmerhaus
\$ 70,000.00	NA	Ceramic cross-flow filter	<a href="https://www.alibaba.com">https://www.alibaba.com</a>
\$ 2,000.00	Machinery Manufacturing Co.	ST-L61	<a href="https://www.alibaba.com">https://www.alibaba.com</a>
\$ 436.00			<a href="https://www.ntotank.com">https://www.ntotank.com</a>
\$ 25,000.00			P&T Fig 12.52
\$ 168,500.00			<a href="http://www.matche.com">http://www.matche.com</a>
\$ 262,000.00			P&T p 864
\$ 100,000.00	haixin chemical equipment		alibaba
\$ 60,000.00			
\$ 276,000.00			P&T p. 793
\$ 5,162.00	Curtiss-Wright	S010P4BS010	<a href="http://www.cw-valve.com">http://www.cw-valve.com</a>
\$ 311,800.00			<a href="http://www.matche.com">http://www.matche.com</a>

\$ 2,640,898.00
\$ 264,089.80
\$ 2,904,987.80
\$ 264,089.80
\$ 3,169,077.60
<b>\$ 15,940,460.33</b>

\$	Reference
\$ 560,640.00	(2 operators at \$20/hr)
\$ 56,064.00	10% labor
\$ 637,618.41	4% FCI
\$ 70,000.00	Cellulosic Ethanol Plant
\$ 15,000.00	NREL
\$ 478,213.81	3% FCI
\$ 376,296.72	30% labor, lab., main.
<b>\$ 2,193,832.95</b>	<b>per year</b>

\$/ton	Reference
29.8	given/calculated
87	icis
1172	icis
1800	given
1100	given
10	\$/L

\$/ton	\$/yr	Assumptions
200	\$ 97,800.00	None

5760000 \$

691,200.00

4 month life

**\$/yr**

\$	232,440.00
\$	3,723.60
\$	16,699.10
\$	132,825.00
\$	3,660,000.00
<b>\$</b>	<b>4,834,687.70</b>

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[om/product-detail/ceramic-cross-flow-filter\\_60156053993.html](#)  
[om/product-detail/9000-litres-storage-fuel-oil-tank\\_1940924189.html](#)  
[om/vertical-storage-tanks?dir=asc&order=nto\\_prod\\_gallons](#)

[om/equipcost/Crystallizer.html](#)

[roup.com/getattachment/810c15cd-77f2-4240-ba36-851b374e7c27/Powerstar\\_GasBoosters\\_AirAmp\\_Bro](#)  
[om/equipcost/Crystallizer.html](#)

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