



## Production Cost Report

**Process:** Dow's (Wolf, Bolnitz, 04) Prep of Alkali Cellulose Slurry, HP Ethn w/ MC & PO in Excess MC (MC/Cell=2) in 1 Train Autoclave Reactor, Steam/Water Stripping, 2 Hot Water Washings w/ Membrane Filtn Walocel HM F/P (DS=1.8, MS=0.15, AI=95%)

**Product:** Hydroxypropyl Methylcellulose (HPMC, Premium)  
[93.3-96.65%, DS=1.5-1.9, MS=0.25-0.3, Mw=0.8-0.9 MM]

**Design Capacity:** 50.60 MMlb/y

**Utilization:** 90.0 %

**CE Index:** 599

### Raw Materials

	Unit Cost	Units/lb	Cents/lb
Cellulose, Wood Pulp (Sheet, 97.3% Alpha, DPw=1530) (R)	40.0 c/lb	0.8427 lb	33.71
Hydrochloric Acid, 33% (R)	13.0	0.0415	0.54
Methyl Chloride (R)	35.1	1.1735	41.14
Propylene Oxide, Major Consumer (R)	72.8	0.2020	14.70
Polyether Sulphone Membrane (R)	800.0	0.0020	1.60
Sodium Hydroxide, 50%, Major Consumer (R)	17.2	0.7972	13.67
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Total Raw Materials			105.36

### Utilities

Steam	12.05 \$/Mlb	10.8000 lb	13.01
Cooling Water	0.10 \$/MG	105.0000 G	1.05
Process Water	0.66 \$/MG	1.9000 G	0.13
Electricity	0.09 \$/kWh	0.7000 kWh	6.16
Inert Gas	3.09 \$/MSCF	0.1000 SCF	0.03
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Total Utilities			20.38

### Waste Treatment

Settling			0.07
Thickening and Clarification			0.01
Oil Separation			0.29
Neutralization (H SO eq)	4.60 c/lb	0.0260 lb	0.12

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Biological Oxidation (BOD)	34.30	c/lb	0.2120 lb	7.27
Active Carbon Adsrb. (DOD)	28.90	c/lb	0.3280 lb	9.47
Gas Redox				-0.10
Landfill	90.00	c/cu ft	0.01278cu ft	1.15
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Total Waste Treatment				18.28
Operating Labor	25.80	\$/hr	0.00241 hr	6.21
Maintenance Materials	3.00	% BLI		7.02
Maintenance Labor	3.00	% BLI		7.02
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<b>Total Direct Operating Cost</b>				<b>164.27</b>
Plant Overhead	110.0	% total labor		14.55
Taxes & Insurance	2.0	% FC		7.85
Depreciation	10.0	% FC		39.24
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<b>Plant Gate Cost</b>				<b>225.91</b>
SG & A, R & D	19.0	% sales price		68.19
Working Capital	8.4	% per annum		5.12
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<b>Total Production Cost</b>				<b>299.22</b>
<b>Byproduct Credits</b>				
Methyl Alcohol	15.2	c/lb	0.1245lb	-1.89
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Total Byproduct Credit				-1.89
Return on Investment	25.0	% FC		98.09
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<b>Product Value</b>				<b>395.42</b>
<b>Market Value of Product</b>				
Hydroxypropyl Methylcellulose (HPMC, Premium)			334.65 -	383.19

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**Product:** Hydroxypropyl Methylcellulose (HPMC, Premium)  
[93.3-96.65%, DS=1.5-1.9, MS=0.25-0.3, Mw=0.8-0.9 MM]

**Design Capacity:** 50.60 MMlb/y

**Utilization:** 90.0 %

**CE Index:** 599

### Raw Materials

	Unit Cost	Units/lb	Cents/lb
Cellulose, Wood Pulp (Sheet, 97.3% Alpha, DPw=1530) (R)	40.0 c/lb	0.8129 lb	32.52
Hydrochloric Acid, 33% (R)	13.0	0.0415	0.54
Methyl Chloride (R)	35.1	1.1949	41.89
Propylene Oxide, Major Consumer (R)	72.8	0.3248	23.63
Polyether Sulphone Membrane (R)	800.0	0.0020	1.60
Sodium Hydroxide, 50%, Major Consumer (R)	17.2	0.9096	15.60
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Total Raw Materials			115.78

### Utilities

Steam	12.04 \$/Mlb	11.0000 lb	13.24
Cooling Water	0.10 \$/MG	105.0000 G	1.05
Process Water	0.66 \$/MG	1.9000 G	0.13
Electricity	0.09 \$/kWh	0.7000 kWh	6.16
Inert Gas	3.09 \$/MSCF	0.1000 SCF	0.03
			-----
Total Utilities			20.61

### Waste Treatment

Settling			0.07
Thickening and Clarification			0.01
Oil Separation			0.29
Neutralization (H <sub>2</sub> SO <sub>4</sub> eq)	4.60 c/lb	0.0260 lb	0.12

## Production Cost Report

Biological Oxidation (BOD)	32.10	c/lb	0.2870 lb	9.21
Active Carbon Adsrb. (DOD)	28.30	c/lb	0.4030 lb	11.41
Gas Redox				-0.10
Landfill	90.00	c/cu ft	0.01646cu ft	1.48
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Total Waste Treatment				22.49
Operating Labor	25.80	\$/hr	0.00241 hr	6.21
Maintenance Materials	3.00	% BLI		7.11
Maintenance Labor	3.00	% BLI		7.11
				-----
<b>Total Direct Operating Cost</b>				<b>179.31</b>
Plant Overhead	110.0	% total labor		14.65
Taxes & Insurance	2.0	% FC		8.13
Depreciation	10.0	% FC		40.64
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<b>Plant Gate Cost</b>				<b>242.73</b>
SG & A, R & D	19.0	% sales price		68.19
Working Capital	8.4	% per annum		5.43
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<b>Total Production Cost</b>				<b>316.35</b>
<b>Byproduct Credits</b>				
Methyl Alcohol	15.2	c/lb	0.1459lb	-2.21
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Total Byproduct Credit				-2.21
Return on Investment	25.0	% FC		101.59
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<b>Product Value</b>				<b>415.73</b>
<b>Market Value of Product</b>				
Hydroxypropyl Methylcellulose (HPMC, Premium)			334.65 -	383.19