

# Bulk Winery Investment And Operating Costs



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### About the Authors and Project

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This is the third in a series of research bulletins dealing with the economics of wineries. The first two research bulletins, published by the Agriculture Research Center, College of Agricultural, Human, and Natural Resource Sciences, Washington State University, were: (1) *Investment and Operating Costs for Various Winery Sizes*, XB0963; and (2) *Economic Returns and Impacts of Alternative Pricing and Product Mixes in Wineries*, XB0968. Content reviewed by Ray Folwell, 2004.

# BULK WINERY INVESTMENT AND OPERATING COSTS

Raymond J. Folwell and Mark A. Castaldi

## Introduction

In 1984, there were 9,712 acres of wine grapes in Washington (2). If this acreage is coupled with acceptable viticultural yields for each variety, the production potential in 1988 could be 54,580 tons (Table 1). In comparison, the largest wine crops in Washington were 28,500 tons in 1986 and 44,500 tons in 1987. In 1987, 3,500 tons were not harvested because of a lack of winery demand and/or capacity for some varieties (7).

If 54,580 tons are harvested and the grapes yield an average of 160 gallons of juice per ton, the amount of wine produced would be 8.7 million gallons in 1988. However, total cooperage (storage) in Washington in 1986 was 6.4 million gallons (3). Not all of the cooperage is available to process, ferment, and store a crop. There will always be some inventories since some wines are aged more than one year and expansion space is needed for foaming during fermentation.

**TABLE 1. Estimated Wine Grape Production Potential in Washington, 1988**

Variety	Yield (tons/ac)	Acres	1988 Estimated Production (tons)
Cabernet Sauvignon	4.5	882	3,968
Chardonnay	5.0	1,479	7,396
Chenin Blanc	7.0	1,055	7,387
Gewurztraminer	5.0	645	3,223
Merlot	5.0	622	3,108
Sauvignon Blanc	4.0	702	2,806
Semillon	6.0	629	3,774
White Riesling	6.5	2,679	17,415
All Others	5.4 <sup>a</sup>	1,019	5,503
Total	5.4	9,712	54,580

<sup>a</sup>Based on an unweighted average of varieties explicitly identified in the table.

The potential imbalance between wine grape supply, demand, and cooperage has created interest in bulk winery operations in Washington. Bulk wineries traditionally process wine grapes in all aspects except the bottling and marketing of bottled wines. In some instances bulk wineries do not ferment the juice, but sell

the unfermented wine grape juice. The resulting products from a bulk winery are sold on the bulk wine market, which has been dominated by the California wine industry. The wine might be shipped in barrels, railroad tank cars, or tanker trucks to users in other geographical areas. This bulletin addresses the investment and operating costs associated with 100,000- and 300,000-gallon bulk wineries.

## Methodology

An economic-engineering approach was used to estimate the investment and operating costs in the 100,000- and 300,000-gallon wineries. Due to the numerous variables associated with the actual design and operation of a winery, a limited number of assumptions related to quality, production, winery design, and marketing were made so that the economic analysis could be conducted within a manageable framework.

Two basic assumptions made in this research were: (1) the wineries examined were separate entities from the vineyard operations; and (2) the wineries produce high-quality table wines. A high-quality table wine, while having many desirable enological characteristics, was defined as a bulk wine possessing sufficient quality to be sold at a minimum retail price of \$3.99 per 750-milliliter bottle once the wine had been bottled. Using a 33% markup at both the wholesale and retail levels results in a wholesale price of about \$36.00 per case and a winery price of about \$11.00 per gallon before taxes. The second assumption, that the wineries produce only high-quality wines, also impacts many of the production processes performed and hence many of the capital assets needed, particularly in the fermentation, filtration, and clarification processes. For example, a centrifuge will be utilized by the wineries to aid in the clarification process.

Each of the following subsections deals with a particular investment category such as buildings, equipment, etc. See references 4 and 5 for more detailed information about the assumptions. The references are particularly informative in relation to the financial arrangements.

## Buildings

A functionally designed winery building was chosen. The estimated cost per square foot was \$25.00. This cost is highly variable depending upon location, size, and degree of embellishment. Changes in cost/ft<sup>2</sup> can have a large impact on total investment cost. It was assumed that part of the winery, namely the fermentation and aging rooms, was constructed partially underground to help reduce both heating and cooling costs and the buildings were of sufficient size to house all of the tanks (cooperage).

### Product Mix and Number of Varieties

Most Washington wineries have a product mix ranging from 60% white wines and 40% red wines to 90% white wines and 10% red wines. The product mix chosen was 70% white and 30% red. The 70/30 proportion was chosen because: (1) it represented approximately the average of existing wineries; (2) the higher proportion of whites to reds would result from the fact that white wine grape varieties are in excess relative to red varieties in Washington; and (3) the current varietal mix of European grapes produced in Washington is about 70/30 white to red proportion.

## Equipment

All of the equipment was purchased new. The equipment costs were gathered from manufacturer price lists and reflect the price of individual pieces of equipment. They do not reflect price discounts given for large sales of multiple pieces of equipment. All cost figures given include shipping and installation costs. Appendix A contains the equipment listing by winery size.

### Crusher-Stemmer and Press

It was assumed that a ton of grapes would yield 150 gallons of pressed juice. Both wineries would utilize a continuous rather than a batch press. These technologies were necessitated by the volume to be processed and time constraints. The sizes and capacities of the crusher-stemmer and presses needed for the wineries were estimated by determining the harvest dates of the different varieties and then calculating the amount of time that was available between harvest dates

to complete the crushing operations. Harvest dates used to estimate crusher capacities are shown in Table 2. It was also assumed that all crushing and pressing operations would be completed in a 7-week period.

### Fermentation

The major assumptions made regarding the fermentation process were:

1. All fermentation tanks were stainless steel;
2. Red wines were fermented an average of 14 days;
3. White wines were fermented an average of 30 days;
4. Refrigeration for the fermentation of the white wines was achieved by cooling jackets; and
5. Thirty percent additional volume in tank size was allowed for foaming and agitation during the fermentation process.

### Filtration and Clarification

Both wineries utilized a plate and frame filter and a Lees filter. In addition, it was assumed that the wineries utilized centrifuges and decanters. These are relatively expensive pieces of equipment which were deemed necessary to produce quality wine.

**TABLE 2. Harvest Dates Used To Determine Crushing and Pressing Capacities<sup>a</sup>**

Variety	Average Harvest Dates	Range in Harvest Dates
Muscat Canelli	9/18	9/01–10/01
Gewurtztraminer	9/23	8/31–10/23
Pinot Noir	9/26	9/12–10/21
Limberger	9/27	9/08–10/21
Chardonnay	9/28	9/12–10/25
Merlot	10/03	9/26–10/07
Cabernet Sauvignon	10/04	9/08–10/22
Semillon	10/07	9/15–10/23
White Riesling	10/08	9/15–10/23
Sauvignon Blanc	10/08	9/24–10/17
Chenin Blanc	10/12	9/27–10/28
Muscat Alexandria	10/14	9/15–10/27

<sup>a</sup>Bulletin 823, *Ten Years of Grape Variety Responses and Wine-making Trials in Central Washington*, W.J. Clore, C. W. Nagel, G. H. Carter, Agricultural Research Center, Washington State University, April 1976.

## Capital Investment Costs

The total investment costs for the two wineries are presented in Table 3, which provides a summary of the total investment costs for each of the major equipment categories. Total investment costs were \$1,168,575 for the 100,000-gallon winery, and \$3,538,725 for the 300,000-gallon winery. On a percentage basis, building costs accounted for the largest proportion of the total investment costs (Table 4). Building costs ranged from 53.5% of total investment costs for the 100,000-gallon winery up to 63% for the 300,000-gallon winery.

Fermentation equipment costs calculated as a percentage of total investment costs increased between the 100,000-gallon winery and the 300,000-gallon winery. The larger number of tanks (66 versus 22) in the larger winery is the reason the fermentation investment cost increased as a percentage of total investment costs. It was assumed that if the larger winery is to do a significant amount of custom work for individual grape growers, then the number and size of tanks as shown in Appendix A are required. If a winery does not do large amounts of custom work, it would be possible to reduce the number of tanks by having fewer, but larger tanks which could reduce the investment costs. As an example, approximately \$0.10 per gallon in investment costs in fermenting/storage capacity can be saved if 10,000- rather than 5,000-gallon tanks are installed. This reduces the size of the building required, the largest investment item, and reduces hoses and fittings. The use of

**TABLE 3. Total Investment Cost by Bulk Winery Size (\$)**

Asset Category	Winery Size	
	100,000 Gallons	300,000 Gallons
Receiving Equipment	\$75,190	\$176,080
Cellar Equipment	163,825	384,165
Refrigeration	55,000	90,000
Fermentation Equipment	179,060	535,480
Materials Handling	25,500	35,000
Office	25,000	40,000
Land	20,000	28,000
Buildings	625,000	2,250,000
Total	\$1,168,575	\$3,538,725

**TABLE 4. Percent of Total Investment Cost by Major Equipment Category (%)**

Equipment Category	Winery Size	
	100,000 Gallons	300,000 Gallons
	<i>(% of Total Investment Cost)</i>	
Buildings	53.48%	63.58
Fermentation	15.32	15.13
Cellar	14.02	10.86
Receiving	6.43	4.98
Refrigeration	4.71	2.54
Materials Handling	2.18	1.00
Office	2.14	1.13
Land	1.71	0.79

centrifuges and decanters by the larger winery increases the cellar equipment costs, but these are less of the percentage of the total capital investment. The remaining equipment categories, on a percentage of total investment costs basis, were less with the larger winery.

The per gallon investment costs total \$11.69 for the 100,000-gallon winery and increase to \$11.79 per gallon for the 300,000-gallon winery (Table 5). On a per gallon basis, the investment costs were less for the larger winery for: (1) the receiving equipment, (2) cellar equipment, (3) refrigeration, (4) fermentation assignment, (5) materials handling, (6) office, and (7) land. Only the per gallon investment costs in building investment increased with the larger winery. The increasing building investment cost results from the simple fact that if high quality table wines are to be produced in such bulk wineries and a significant amount of custom work is done, it is necessary to have sufficient flexibility in the number and size of tanks to accommodate a large number of wines (see Appendix A).

## Production Costs

Production costs were estimated for each of the two wineries. The basic procedure followed in developing the operating cost estimates was to first specify the variable and fixed costs that existed for each winery. Variable costs were divided into the following cost categories: (1) grapes, (2) taxes, (3) full-time labor, (4) part-time labor, (5) utilities, (6) office supplies, and (7) miscellaneous expenses. Likewise, fixed costs were divided into

**TABLE 5. Per Gallon Investment Cost by Bulk Winery Size, (\$/gallon)**

Asset Category	Winery Size	
	100,000 Gallons	300,000 Gallons
Receiving Equipment	\$0.75	\$0.59
Cellar Equipment	1.64	1.28
Refrigeration	0.55	0.30
Fermentation Equipment	1.79	1.78
Materials Handling	0.26	0.12
Office	0.25	0.13
Land	0.20	0.09
Building	6.25	7.50
<b>Total</b>	<b>\$11.69</b>	<b>\$11.79</b>

the following cost categories: (1) insurance, (2) interest payments, (3) property taxes, (4) maintenance, and (5) depreciation. The second step was to place these total cost figures on a per gallon basis for each size winery to arrive at average fixed, variable, and total cost figures.

**Grape Costs**

Large variations exist for the prices paid for wine grapes by wineries due to variations in quality, contractual agreements, and unstable supply conditions in the market. An average grape price of \$300 per ton was used to calculate total annual grape costs used in the wines as reported in this section. Later, the grape prices are varied to ascertain the impact of grape costs on bulk wine production costs.

**Labor Costs**

Labor costs were divided into full-time and part-time personnel. Appendix Tables B.1 and B.2 list the total full-time and part-time positions assumed for each winery with a brief description of the individual job responsibilities and the associated pay scale. The pay scales differ between the wineries. The variation in pay scales was based on personal interviews and a survey of wineries in Washington.

**Insurance Costs**

Insurance costs were obtained by contacting various insurance agencies and obtaining estimates for health, liability, and fire coverage. An amount of \$140 per full-time employee per month was used in estimating the total annual insurance cost for each full-time employee for

each size winery. This amounts to \$760 per year per employee (part- and full-time) or about \$0.067 per gallon. The remaining insurance costs are for fire and liability.

**Taxes**

Tax costs included both federal and state taxes, which were \$0.17 per gallon and \$0.22 per liter, respectively. They were obtained from the Washington State Liquor Control Board and the Bureau of Alcohol, Tobacco and Firearms.

**Interest**

The interest cost associated with each winery was based on 30% equity capital and 70% debt capital. The cost of equity capital was 11%. The debt financing consisted of two separate loans. The first loan for machinery and equipment was amortized over a five-year period and carried a 13.5% interest rate with annual payments. The second loan was for land and buildings and was amortized over a twenty-year period at a 13% interest rate with annual payments. For this second loan, a loan fee was charged—\$3,500 or 2% of the mortgage amount, whichever is greater. The maximum size for each of these two loans was determined as follows: (a) for machinery and equipment, loan size would be equivalent to 70% of the total machinery and equipment cost; and (b) for the second loan, loan size would be equivalent to 75% of the total land and building cost. The maximum size loans which could be secured by each size winery are:

Winery	<i>Machinery and Equipment</i>	<i>Land and Buildings</i>
100,000-Gallon	\$569,435	\$562,275
300,000-Gallon	\$1,301,934	\$2,012,985

**Property Taxes**

Property taxes were determined by contacting the County Assessors' office in Yakima. The rate used was \$7.93 per \$1,000 of assessed value.

**Marketing and Management Costs**

Marketing of the bulk wine was assumed to be the responsibility of the general manager. The estimated annual cost of the general manager/marketing position reflects these responsibilities. With a bulk winery, it is not necessary to have a sales force since few customers or buyers of the product are served.

**TABLE 6. Pre-Tax Average Production Costs by Bulk Winery Size (\$/Gallon)**

Cost Classification	Winery Size	
	100,000 Gallons	300,000 Gallons
<b>Variable Costs</b>		
Grapes	\$2.00 <sup>a</sup>	\$2.00 <sup>a</sup>
State and Federal Taxes	.85	.85
Full-Time Labor	1.18	.47
Part-Time Labor	.04	.02
Utilities (10%)	.14	.11
Office Supplies	.04	.02
Miscellaneous	.06	.03
Average Total Variable Costs	\$4.31	\$3.50
<b>Fixed Costs</b>		
Insurance	\$.14	\$.09
Interest	.87	.91
Property Tax	.12	.10
Maintenance	.07	.05
Average Total Fixed Cost	\$1.20	\$1.15
<b>AVERAGE TOTAL COSTS</b>	<b>\$5.51</b>	<b>\$4.65</b>

<sup>a</sup>Based upon an average yield of 150 gallons of juice per ton of grapes valued at \$300.00 per ton.

### Average Cost Structure

The major cost item for the wineries examined was the cost of grapes, which ranged from 36.3% of the average total cost for the 100,000-gallon winery to a high of 43.0% of the average total cost for the 300,000-gallon winery (Table 6). Labor, taxes, and interest were the next largest cost items for the two wineries and accounted for 53.4% of average total cost for the 100,000-gallon winery and 48.4% for the 300,000-gallon winery. Management and marketing costs decreased with the larger winery. They comprised 9.1% of average total cost for the 100,000-gallon winery and 4.3% for the 300,000-gallon winery. As winery size increased, the cost of full-time labor as a percentage of average total cost decreased. Details of the capital costs were presented in the previous section. The interest cost item ranged from 15.8% to 19.6% of average total cost and represented the largest fixed cost for both wineries (see references 4 and 5 for further details on financing).

### Impact of Grape Prices and Juice Yields

The estimated costs of producing bulk table wine in Table 6 were based on a yield of 150 gallons per ton of juice and a grape price of \$300.00 per ton. Grape prices impact the costs per gallon for the two wineries the same on an absolute per unit cost basis (Table 7). As an example, increasing grape prices from \$300 to \$500 per ton increases the per gallon costs by \$1.34, \$1.25, and \$1.18 if the juice yields are 150, 160, and 170 gallons per ton.

If the grape price increases from \$300 to \$500 per ton or by 67%, the cost per gallon of wine increases 24.3% for the 100,000-gallon winery, and 28.6% for the 300,000-gallon winery even though the absolute price increase is \$1.34 per gallon for both wineries.

With \$300 per ton for grapes, if the juice yield is 160 rather than 150 gallons per ton, the absolute cost decrease is \$0.12 per gallon of wine for both wineries. If the juice yield increases

**TABLE 7. Average Cost of Producing Bulk Wine for Various Grape Prices and Juice Yields**

Grape \$/ton	Juice Yield (gallons/tons)		
	150	160	170
<i>100,000-Gallon Winery</i>			
300	\$5.51	\$5.39	5.27
325	5.68	5.55	5.42
350	5.84	5.70	5.56
375	6.01	5.86	5.71
400	6.18	6.02	5.86
425	6.35	6.17	6.01
450	6.51	6.33	6.15
475	6.68	6.48	6.30
500	6.85	6.64	6.45
<i>300,000-Gallon Winery</i>			
300	\$4.65	\$4.53	\$4.41
325	4.82	4.69	4.56
350	4.98	4.84	4.70
375	5.15	5.00	4.85
400	5.32	5.16	5.00
425	5.48	5.31	5.15
450	5.65	5.47	5.29
475	5.82	5.62	5.44
500	5.99	5.78	5.59

from 150 to 170 gallons per ton, the cost per gallon of bulk table wine decreases \$.24 if the grape price is \$300/ton, and \$.40 if the grape price is \$500/ton. Juice yields have a smaller impact on the production costs of bulk wine at lower grape prices than at higher grape prices.

### Summary

The estimated investment costs for a 100,000- and 300,000-gallon bulk winery producing high-quality table wines were \$1,168,575 and \$3,538,725, respectively. Buildings, fermentation, and cellar equipment dominated the investment costs. Buildings accounted for over one-half of the investment costs for both wineries. Cellar and fermentation investment costs followed buildings in terms of total investment costs. These costs could easily be altered from those reported in this study by the elimination of certain equipment items and a different array of tanks and tank sizes. The latter also has implications in terms of lower building costs.

The per gallon costs of bulk wine under the assumptions made in this research were \$5.51 and \$4.65 per gallon for the 100,000- and 300,000 gallon wineries, respectively. The major cost item was the grapes followed by labor, taxes, and interest.

The price of grapes impacts the total per unit costs more, on a relative basis, for the larger winery even though the absolute per unit impact on costs was the same for both wineries. Impact varies as the juice yield and the price level of the grapes vary. The impact of juice yield is greater at higher grape prices. An increase in juice yield of 20 gallons per ton decreases average costs by \$0.24 if grapes are priced at \$300 per ton and about \$0.40 if grapes are priced at \$500 per ton.

Overall, there are numerous interactions among grape prices, juice yield, and size of winery. Despite all of these considerations, the estimated production costs of bulk wine, given the configuration of wineries used in this study, do not

allow Washington bulk wines to compete with those wines moving out of California in the bulk wine market at prices of \$.90 to \$1.15 per gallon for whites and about \$1.25 per gallon for reds. However, the California bulk wine prices are for table wines that are lower in quality than those assumed to be produced by the bulk wineries analyzed in this study.

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## APPENDIX A. EQUIPMENT LISTINGS BY WINERY SIZE<sup>a</sup>

### 100,000-Gallon Winery

Equipment Name	Capacity and Description	Total Cost
<b><i>Receiving Equipment</i></b>		
Receiving Hopper & Hoist	5-ton	\$8,000
Crusher-Stemmer	Cingano 12–16 Tons/HR	16,000
Continuous Press	10–15 Tons/HR	21,500
Dejuicer	8–16 Tons/HR	14,500
Must Pump	Zambelli 3" 150 GPM	5,600
Must Lines	100' of 3" reinforced food grade plastic @ \$5.40/ft.	540
Pomace Pump	Ragazzini model ZAG 1, 1100 HL/HR	7,800
Pressure Hose	50' of 5 <sup>3</sup> / <sub>16</sub> " food grade @ \$25/ft.	1,250
TOTAL		\$75,190
<b><i>Cellar Equipment</i></b>		
Agitator	Model 211 with fittings	\$1,100
Fittings	General	1,500
	(2) Model #25, 25 GPM	3,800
	(1) Jabsco 10 GPM	1,000
	(1) Velo Centrifugal 120 HLJHR	2,400
Transfer Hose	500' of 2" food grade plastic @ \$2.85/ft.	1,425
Slurry Mixer	Mixer with stainless steel tank	3,500
Barrel Washer	(2) General	800
Centrifuge	5,000 Liters/HR5,	800
Decanter	6,000 Liters/HR	80,000
Laboratory Equipment	Miscellaneous	5,000
Miscellaneous Supplies	General @ .28/Gallon	28,000
Plate and Frame Filter	Schenk Model460	6,700
Doser	Schenk Model DOS-120	8,300
Lees Filter	Schenk Model KFP 470/40	14,500
TOTAL		\$163,825
<b><i>Refrigeration</i></b>		
Skid-mounted automatic Glycol chilling system containing the following major mechanical components:		
	Stainless steel Glycol storage tank and circulation pump	
	1,800 RPM Lincoln direct drive motor	
	Frigid coil air-cooled condenser	
	(2) 30-horsepower compressors	
	7.5-horsepower Glycol pump	
	Direct expansion Glycol chiller containing 352 ft <sup>2</sup> of effective cooling surface area	
	45 tons of Glycol	
TOTAL		\$55,000

*100,000-Gallon Winery (continued)*

### 100,000-Gallon Winery (cont.)

Equipment Name	Capacity and Description	Total Cost
<b><i>Fermentation Equipment</i></b>		
Fermentation Tanks, Jacketed Stainless Steel		
Quantity	Size (gallon)	Price per Tank
4	500	\$3,200
4	2,000	5,100
6	5,000	6,700
8	10,000	\$12,500
Shipping and Installation @ \$80.00 per tank		1,760
Fittings and Valves @ \$150.00 per tank		3,300
Miscellaneous		600
TOTAL		\$179,060
<b><i>Materials Handling</i></b>		
Forklift (1) and Pickup (1)		\$25,500
Office Supplies and Furnishings		25,000
Land, 5 acres @ \$4,000/acre		20,000
Building, 25,000 ft <sup>2</sup> @ \$25/ft <sup>2</sup>		\$625,000

<sup>a</sup>Winery equipment trade names have been used in Appendix A to simplify information; no endorsement of any particular equipment manufacturer or distributor is intended. All prices include shipping and installation charges unless otherwise stated.

### 300,000-Gallon Winery

Equipment Name	Capacity and Description	Total Cost
<b><i>Receiving Equipment</i></b>		
Overhead Dump Hoist	5-ton	\$16,000
Crusher-Stemmer	Model 135 rotary crusher-stemmer 30–35 tons/hour	32,000
Continuous Press	15–25 Tons/HR	42,000
Dejuicer	20–28 Tons/HR	25,000
Must Pump	Ragazzini 3' model #5NCM 260/90 GPM	
Must Lines	200' of 3" reinforced food grade plastic @ \$5.40/foot	12,000
		1,080
Pomace Pump	Egrettier model D-4, 180 HL/HR	10,500
Pressure Hose	100' of 5 <sup>3</sup> / <sub>16</sub> " food grade plastic @ \$25/ft.	2,500
Hopper and Dump Conveyor	Screw type dump trough and incline conveyor	35,000
TOTAL		\$176,080

*300,000-Gallon Winery (continued)*

### 300,000-Gallon Winery (cont.)

Equipment Name	Capacity and Description	Total Cost
<b>Cellar Equipment</b>		
Agitators	Model 211 with fittings	\$1,100
	Guth model RA-45	1,100
Fittings	General	3,000
Transfer Pump	(2) Model #25, 25 GPM	3,800
	(2) Jabsco 10 GPM	2,000
	(2) Variable speed racking	1,300
	(1) Velo centrifugal 120 HUHR	2,400
Transfer Hose	900' of 2" food grade plastic @ \$2.85/ft.	2,565
Slurry Mixer	(2) dosing heads with stainless steel tank	4,500
Barrel Washer	(2) General	800
Centrifuge	17,000 Liters/HR	100,500
Decanter	15,000 Liters/HR	130,000
Laboratory Equipment	Miscellaneous	10,000
Miscellaneous Supplies	General @ .27/Gallon	81,000
Plate and Frame Filter	Schenk Model 490	9,000
Lees Filter	Schenk Model KFP 430/40	22,800
Doser	Schenk Model DOS-120	8,300
TOTAL		\$384,165

#### **Refrigeration**

Skid-mounted automatic Glycol chilling system containing the following major mechanical components:

Stainless steel Glycol storage tank and circulation pump  
 1,800 RPM Lincoln direct drive motor  
 Frigid coil air-cooled condenser  
 50 horsepower compressor  
 75 horsepower compressor  
 (2) 7+ horsepower Glycol pump  
 Direct expansion Glycol chiller containing 75 ft<sup>2</sup> of effective cooling surface area  
 28 tons of Glycol

TOTAL \$90,000

#### **Fermentation Equipment**

Fermentation Tanks, Jacketed Stainless Steel

Quantity	Size (gallon)	Price per Tank	Total
4	500	\$3,200	\$12,800
8	1,000	3,600	28,800
10	2,000	5,100	51,000
19	5,000	6,700	127,300
6	7,500	9,700	58,200
19	10,000	12,500	237,500

*300,000-Gallon Winery (continued)*

### 300,000-Gallon Winery (cont.)

<b>Equipment Name</b>	<b>Capacity and Description</b>	<b>Total Cost</b>
Shipping and Installation @ \$80.00 per tank		\$5,280
Fittings and Valves @ \$150.00 per tank		9,900
Tank Washer Fury turbo disc model 100		300
(2) Fury model 40 LP MK IV		4,400
TOTAL		\$535,480
<b>Materials Handling</b>		
Forklift (1) and Pickup (1)		\$35,000
Office Supplies and Furnishings		40,000
Land, 7 acres @ \$4,000/acre		28,000
Building, 90,000 ft <sup>2</sup> @ \$25/ft <sup>2</sup>		\$2,250,000

<sup>a</sup>Winery equipment trade names have been used in Appendix A to simplify information; no endorsement of any particular equipment manufacturer or distributor is intended. All prices include shipping and installation charges unless otherwise stated.

**APPENDIX B.1.**  
**ASSUMED PERSONNEL REQUIREMENTS FOR A 100,000-GALLON WINERY**

**FULL-TIME PERSONNEL**

<b>Job Title</b>	<b>Number Employed</b>	<b>Job Responsibilities</b>	<b>Annual cost (\$)</b>
Winemaker	1	Oversee and coordinate all winemaking operations and laboratory-related research and quality control	\$30,000
Assistant Winemaker	1	Assist winemaker with job responsibilities and winery maintenance	20,000
General Manager/Sales	1	Oversee and coordinate all merchandising and transportation of wine	50,000
Clerical	1	Assist general manager, sales directors, and public relations personnel in overseeing winery operations and the keeping of financial records	18,000
TOTAL	4		\$118,000

**PART-TIME PERSONNEL**

<b>Job Description</b>	<b>Number Employed</b>	<b>Pay Scale</b>	<b>Annual Cost (\$)</b>
Crush and Press Operations	3	\$4.25/hour, 7 weeks/year	\$3,570
TOTAL ANNUAL LABOR COST			\$121,570

**APPENDIX B.2.**  
**ASSUMED PERSONNEL REQUIREMENTS FOR A 300,000-GALLON WINERY**

**FULL-TIME PERSONNEL**

<b>Job Title</b>	<b>Number Employed</b>	<b>Job Responsibilities</b>	<b>Annual cost (\$)</b>
Winemaker	1	Oversee and direct all winemaking activities, assist with laboratory-related work	\$35,000
Assistant Winemaker	1	Assist winemaker with job responsibilities and winery maintenance	25,000
General Manager/Sales	1	Oversee and coordinate all winery operations	60,000
Clerical	1	Assist general manager, sales directors, and public relations personnel in overseeing winery operations and the keeping of financial records	22,000
TOTAL	4		\$142,000

**PART-TIME PERSONNEL**

<b>Job Description</b>	<b>Number Employed</b>	<b>Pay Scale</b>	<b>Annual Cost (\$)</b>
Crush and Press Operations	4	\$6.00/hour, 7 weeks/year	\$6,720
TOTAL ANNUAL LABOR COST			\$148,720



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