

# Memorandum

To: Mr. Ramon J. Hirsig  
Executive Director

Date: October 31, 2008

From: David J. Gau, Deputy Director  
Property and Special Taxes Department



Subject: *Assessors' Handbook Section 534, Rural Building Costs  
(November 2008 Administrative Consent Agenda)*

I am requesting that Assessors' Handbook Section 534, *Rural Building Costs*, be approved for publication. Revenue and Taxation Code section 401.5 requires that the Board issue to county assessors data relating to costs of property to promote uniformity in appraisal practices and in assessed values throughout the state. Pursuant to that mandate, staff developed the January 2009 version of AH 534 which contains current cost data for rural buildings and equipment.

Please place this item on the Board's November 2008 Administrative Consent Agenda for approval.

DJG:sk  
Attachment

cc: Ms. Diane Olson

Approved:   
Ramon J. Hirsig, Executive Director

BOARD APPROVED  
at the \_\_\_\_\_ Board Meeting

\_\_\_\_\_  
Diane Olson, Chief  
Board Proceedings

ASSESSORS' HANDBOOK  
SECTION 534

RURAL BUILDING COSTS

JANUARY 2009

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## FOREWORD

This edition of Assessors' Handbook Section 534, *Rural Building Costs*, updates some costs contained in previous editions and includes new data. As with prior editions, pages are printed in loose-leaf form to allow for insertion of revisions by section or page.

There are increases throughout the state for permits and fees to construct buildings. Because of the variations in costs both within and among the counties, it is incumbent on the appraiser to research and analyze permits and fees of jurisdictions within the region and to make adjustments accordingly. In other words, AH 534 should serve as a guide, but an appraiser must research the market to determine which costs are most applicable for the appraisal assignment and temper the data provided in the AH 534 with local cost data.

General instructions and pertinent information concerning the use of this handbook are contained in an introductory section. Specific instructions and comments applicable to each building type will be found in the introductory pages of the section of the manual devoted to that particular type.

Although diligent efforts have been made to supply accurate and reliable information, it is very important to temper this data with local costs, since construction costs may vary both within and among counties.

This revision was prepared by County-Assessed Properties Division staff under the direction of the Property and Special Taxes Department.

David J. Gau  
Deputy Director  
Property and Special Taxes Department  
California State Board of Equalization  
January 2009

## **AH 534.10: BASIC FARM BUILDINGS**

This section contains specifications and costs for various basic farm buildings including the following:

- Prefabricated horse barns/riding arenas
- General purpose barns
- Hay storage barns
- Feed barns
- Pole buildings
- Shops
- Machinery and equipment sheds
- Prefabricated wood storage sheds
- Small sheds

## PREFABRICATED HORSE BARNs

### SPECIFICATIONS

Structure	6" steel purlins on 6' centers; enamel exterior
Foundation	Concrete piers
Floor	Dirt
Door	Sliding stall (inside tract)
Roof	2" x 12" pitch; skylight in each stall
Roofing	White 26 gauge steel hi-rib
Walls	Laminated wall panels; grilled fronts; top 4'; 5" colored gutter trim

### IN LINE SHED ROW BARN

Stall Size	First Stall	Each Additional Stall
12' x 12'	\$3,800	\$3,400
12' x 16'	4,400	3,800

Shed roof overhang per square foot:   8' — **\$5.00**  
   12' — **\$5.60**

### GABLE ROOF BARN—STANDARD BREEZEWAY

Stall Size	First Two Stalls	Each Additional Two
12' x 12' with 12' breezeway	\$9,600	\$8,200
12' x 12' with 16' breezeway	10,000	8,500
12' x 16' with 12' breezeway	11,000	9,700
12' x 16' with 16' breezeway	11,700	10,200

### GABLE ROOF BARN—RAISED BREEZEWAY

Stall Size	First Two Stalls	Each Additional Two
12' x 12' with 12' breezeway	\$10,470	\$9,000
12' x 12' with 16' breezeway	11,200	9,700
12' x 16' with 12' breezeway	11,850	10,700
12' x 16' with 16' breezeway	12,000	11,500

Roof extension per square foot—**\$5.50**  
 12-foot Breezeway Doors—**\$750 each**  
 16-foot Breezeway Doors—**\$850 each**

### ADDITIVES

Item	Cost
Concrete floor	\$4.50 - \$5.50 per square foot
Full footing	\$12.50 per lineal foot
Portable 5'-4 rail corral panels	\$8.00 - \$10.00 per lineal foot
Portable 5'-5 rail corral panels	\$9.00 - \$11.00 per lineal foot
Portable 6' rail corral panels with metal roof	\$5.50 - \$6.50 per square foot

## STEEL FRAME RIDING ARENA

Frame	Good quality steel frame, 14' to 16' eave height
Roof	Gable roof with 26-gauge panels
Walls	None
Floor	Sand
Plumbing	Minimum water outlets
Electrical	None—or add \$.30 to \$.50 per square foot
Cost	<b>\$9.25 to \$10.50</b> per square foot

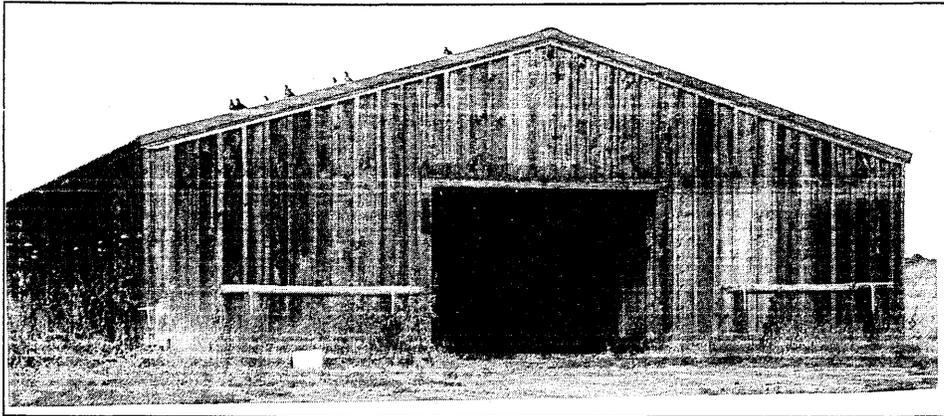
Vinyl Fencing – **\$9.70 to \$10.75** per foot



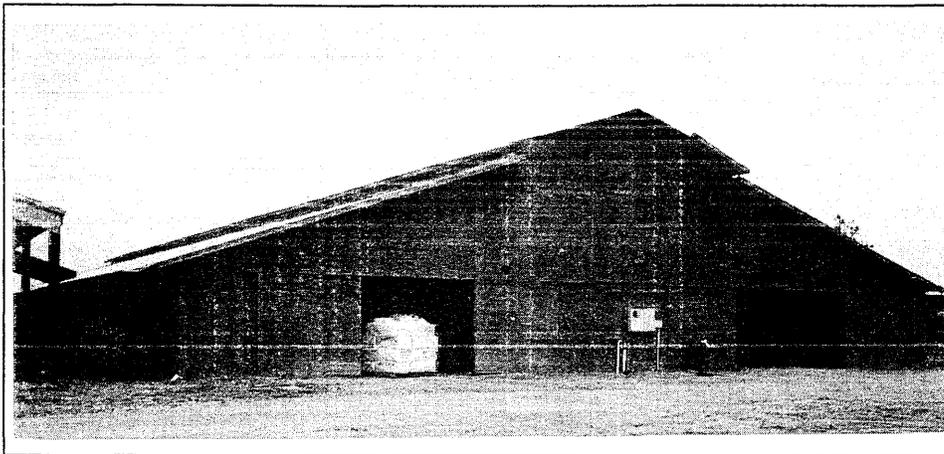
**GOOD QUALITY ARENA**



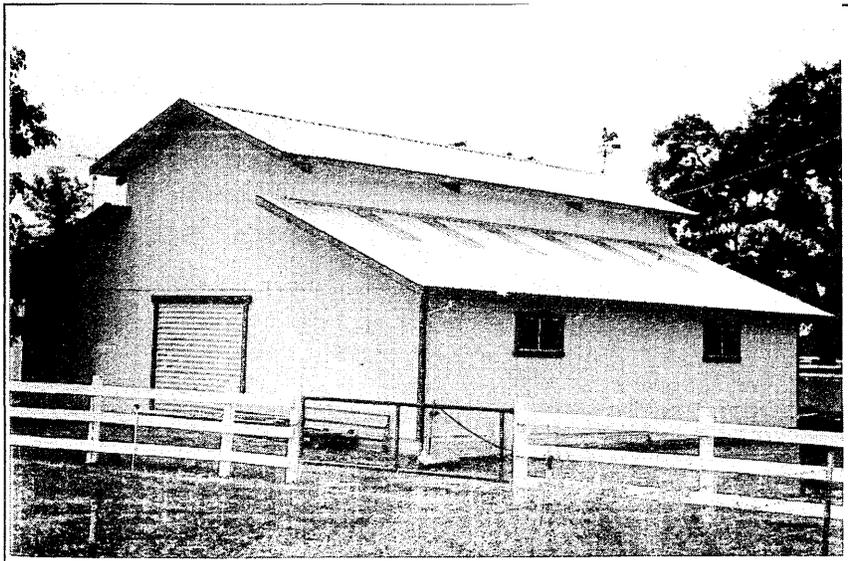
## GENERAL PURPOSE BARN



**FAIR QUALITY**



**AVERAGE QUALITY**



**GOOD QUALITY**

## GENERAL PURPOSE BARNs

### BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt/some concrete	Concrete
Wall Structure	Light wood frame, 10' eave height	Average wood frame, 10' eave height	Good wood frame, 10' eave height
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to high pitch—average wood trusses	Medium to high pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets

### SQUARE-FOOT COSTS

Class	Square-Foot Area					
	1,000	3,000	5,000	7,000	9,000	11,000
1	14.50	11.25	10.45	10.05	9.65	9.45
2	18.65	15.20	14.15	13.60	13.30	12.85
3	27.20	22.30	20.60	19.85	19.40	18.95

## HAY STORAGE BARNs

### BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt	Concrete
Wall Structure	Light wood frame, 20' eave height	Average wood frame, 20' eave height	Good wood frame, 20' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum	Good wood siding, painted or 26-gauge steel
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to high pitch—average wood trusses	Medium to high pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets
Shape	Nearly square, length between one and two times width	Nearly square, length between one and two times width	Nearly square, length between one and two times width

### SQUARE-FOOT COSTS

Class	Square-Foot Area					
	1,000	3,000	5,000	7,000	9,000	11,000
1	11.95	9.95	9.05	8.40	8.05	7.65
2	13.70	11.35	10.35	9.65	9.15	8.85
3	22.35	18.60	17.20	15.70	15.00	14.40

**Adjustments:** Pole Buildings – Deduct 10% from above costs  
 No Electricity/No Water – Deduct \$.75 to \$1.00 per square foot

## FEED BARNs

### BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Concrete in center section	Concrete
Wall Structure	Light wood frame, 8' eave height at drip line	Average wood frame, 8' eave height at drip line	Good wood frame, 8' eave height at drip line
Exterior Wall Cover	Open sides and ends	Open sides, standard gauge corrugated iron, aluminum, or average wood siding on ends	Open sides, good siding painted on ends
Roof Construction	Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses	Medium to low pitch—average wood trusses	Medium to low pitch—good wood trusses
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	26-gauge steel
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Plumbing	None	One cold water outlet	Two cold water outlets

### SQUARE-FOOT COSTS

Class	Square-Foot Area					
	1,000	3,000	5,000	7,000	9,000	11,000
1	7.65	7.05	6.75	6.65	6.60	6.55
2	12.10	11.10	10.70	10.55	10.45	10.40
3	14.00	12.90	12.55	12.35	12.25	12.20

## POLE BUILDINGS

### BUILDING SPECIFICATIONS

Structure	Poles: 15' to 20' on center; wood or steel
Floor	Dirt
Roof	Light trusses; low to medium pitch; wood or steel
Roofing	Galvanized steel or colored steel with gutter
Walls	None, wall height: 18' - 21' to plate

### SQUARE-FOOT COSTS

### ALL SIDES OPEN

### GOOD QUALITY

End Width	Side Length									
	30	50	80	100	120	140	150	160	180	200
20	7.50	7.20	6.95	6.80	6.70	6.55	6.50	6.45	6.40	6.40
30	6.85	6.70	6.50	6.30	6.20	6.10	6.00	5.95	5.90	5.85
40	6.45	6.25	5.90	5.85	5.70	5.60	5.55	5.55	5.55	5.55
50	6.10	5.90	5.70	5.53	5.35	5.25	5.25	5.25	5.25	5.25
60	5.75	5.60	5.35	5.25	5.30	5.25	5.25	5.25	5.25	5.25
70	5.75	5.55	5.35	5.25	5.30	5.25	5.25	5.20	5.20	5.20
80	5.75	5.55	5.35	5.25	5.30	5.25	5.25	5.20	5.20	5.20

Deduct 15 percent for light duty, fair quality construction.

Skylights (2' x 10')	<b>\$100</b> each
Vents (14", Rotary)	<b>\$200</b> each
Poles, In-Place	<b>\$160 to \$220</b> each
Covered wall area add	<b>\$3.65</b> per square foot of wall surface
Reinforced Concrete Floors:	
4"	<b>\$4.00</b> per square foot
6"	<b>\$4.50</b> per square foot

# SHOPS

## BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Light concrete	Light concrete	Standard concrete
Floor	3" concrete	4" concrete	4" reinforced concrete
Wall Structure	Light wood frame, 15' eave height	Average wood frame, 15' eave height	Good wood frame, insulated, 15' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron, aluminum, or average wood siding	Good wood siding painted or 26-gauge steel
Roof Construction	Low to medium pitch— 2" x 4" rafters, 24" to 36" on center, or light wood trusses	Low to medium pitch— average wood trusses	Medium pitch— good wood trusses, insulated roof
Roof Cover	Light aluminum corrugated	Standard gauge corrugated iron or aluminum	26-gauge steel, with skylights
Electrical	Two outlets per 1,000 square feet	Two outlets per 1,000 square feet	Excellent lighting and ample outlets
Plumbing	None	One cold water outlet	Two cold water outlets
Doors	One light sliding or swinging door per 2,000 square feet	One average sliding or swinging door per 2,000 square feet	One drive-thru door per 1,000 square feet plus one walk-thru door
Windows	None	None or few low cost	5 percent of floor area
Shape	Nearly square, length between one to three times width	Nearly square, length between one to three times width	Nearly square, length between one to three times width

## SQUARE-FOOT COSTS

Class	Square-Foot Area									
	1,000	1,500	2,000	2,500	3,000	4,000	5,000	6,000	8,000	10,000
1	17.36	15.90	14.90	14.15	13.50	13.20	12.80	12.15	12.10	11.80
2	21.70	19.85	18.70	18.05	17.40	16.60	15.90	15.60	15.25	14.90
3	25.05	24.50	23.75	22.75	21.75	21.05	20.40	19.70	19.00	18.30

## MACHINERY AND EQUIPMENT SHEDS

### BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Concrete	Concrete
Wall Structure	Light wood frame, 10' to 12' eave height	Average wood frame, 10' to 12' eave height	Good wood frame, 10' to 12' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum	Good wood siding, painted or 26-gauge steel
Roof Construction	Low to medium pitch—shed type, light wood framing	Low to medium pitch—gable or shed type, average wood framing	Low to medium pitch—gable or shed type, good wood framing
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	26-gauge steel, with skylights
Electrical	None	Two outlets per 1,000 square feet	Four outlets per 1,000 square feet
Shape	Usually elongated, width between 20 and 40 feet, any length	Usually elongated, width between 20 and 40 feet, any length	Usually elongated, width between 20 and 40 feet, any length

### SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

Class	Square-Foot Area										
	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	10.50	9.45	8.80	8.50	8.35	8.25	8.20	8.15	8.05	7.95	7.85
2	15.45	13.50	12.80	12.55	12.25	12.15	12.00	11.85	11.80	11.75	11.65
3	20.00	18.05	16.80	16.50	16.10	16.00	15.85	15.70	15.60	15.50	15.30

### SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

Class	Square-Foot Area										
	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	9.25	7.75	7.30	7.05	6.95	6.85	6.75	6.70	6.65	6.60	6.55
2	14.15	12.15	11.20	10.85	10.55	10.45	10.20	10.20	10.15	10.05	10.00
3	16.40	15.40	14.85	14.25	13.85	13.65	13.55	13.40	13.35	13.25	13.20

Pole Buildings – Deduct 10% to 15% from above costs.

## PREFABRICATED WOOD STORAGE SHEDS

Prefabricated wood storage sheds are normally purchased at lumber yards and home improvement centers.

### BUILDING SPECIFICATIONS

Foundation	4" x 4" pressure treated skids
Floor	Plywood or particleboard on 2" x 6" floor joists
Walls Structure	2" x 4" framing on 24" centers, 6 ½' to 7 ½' eave height
Exterior Wall Cover	Plywood or T-1-11 with one 4' x 6' door
Roof	Gable low to medium pitch, 2" x 4" rafters
Roof Cover	Metal or composition shingles

### SQUARE-FOOT COSTS

Square Feet	Price Per Square Foot
50 to 74	\$24.50
75 to 99	\$21.50
100 to 139	\$19.50
140 to 199	\$18.50
200 and up	\$16.00 - \$18.00

### ADDITIVES

Windows	2' x 2'	<b>\$125</b>
	3' x 2'	<b>\$145</b>
Doors—Double 6' Wide		<b>\$150</b>
Skylight—2' x 2'		<b>\$140</b>
Turbine Vent		<b>\$90</b>
Shelves—16" wide		<b>\$4.50</b> per linear foot
Shelves—24" wide		<b>\$5.00</b> per linear foot
Workbench—24" wide		<b>\$7.00</b> per linear foot
Steel roll-up door		<b>\$60</b> per foot (width)
Loft		<b>\$4.00</b> per square foot
Extra Concrete		<b>\$5.00 - \$6.00</b> per square foot

## SMALL SHEDS

### BUILDING SPECIFICATIONS

Components	Class 1 Fair Quality	Class 2 Average Quality	Class 3 Good Quality
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Boards	Concrete
Wall Structure	Light wood frame, 8' eave height	Average wood frame, 8' eave height	Good wood frame, 8' eave height
Exterior Wall Cover	Light aluminum or low cost boards	Standard gauge corrugated iron or aluminum, or average framing	Good wood siding, painted, or steel
Roof Construction	Low to medium pitch—shed type, light wood framing	Low to medium pitch—gable or shed type, average wood framing	Low to medium pitch—gable or shed type, good wood framing
Roof Cover	Light aluminum	Standard gauge corrugated iron or aluminum	Good steel cover; composition shingles
Electrical	None	None	None
Shape	Usually elongated, width between 6 and 12 feet, any length	Usually elongated, width between 6 and 12 feet, any length	Usually elongated, width between 6 and 12 feet, any length

### SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

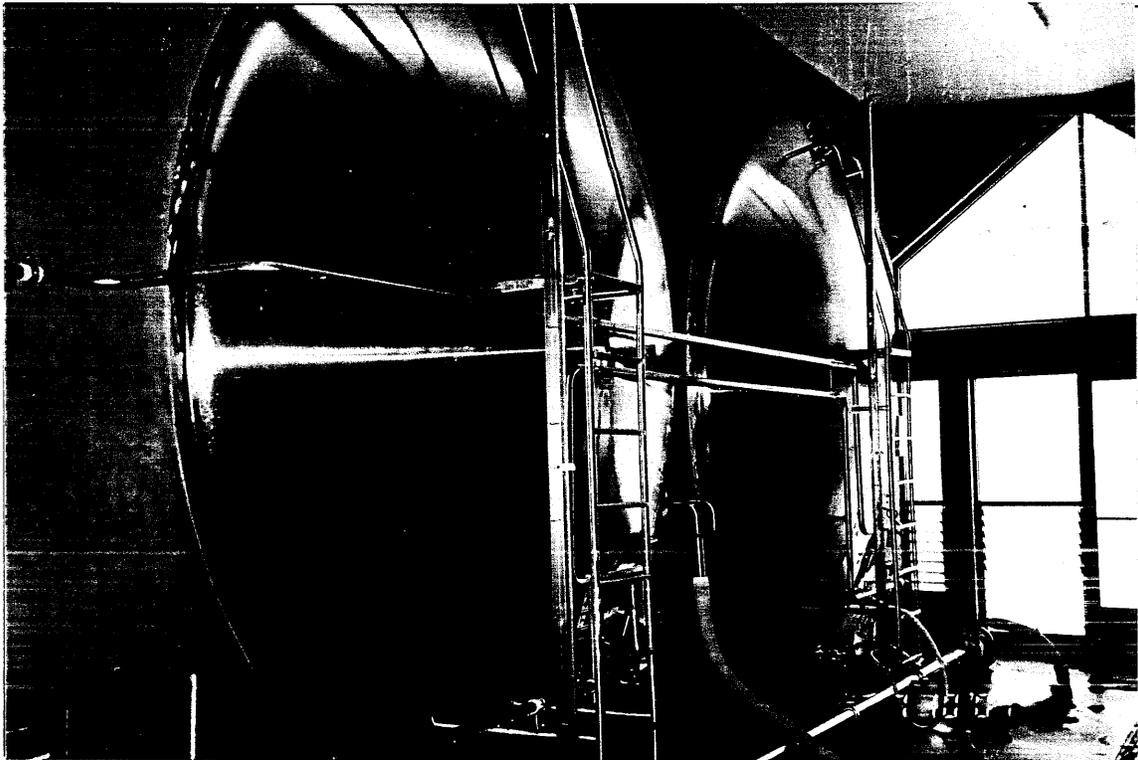
Class	Square-Foot Area										
	50	60	80	100	120	150	200	250	300	400	500
1	15.80	14.30	12.80	10.90	10.50	9.80	9.45	9.05	9.65	8.30	7.90
2	22.20	19.95	18.05	16.65	15.85	15.05	14.40	13.60	12.80	12.45	12.10
3	27.25	24.50	23.35	21.85	20.35	18.75	17.70	16.95	16.15	15.85	15.45

### SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

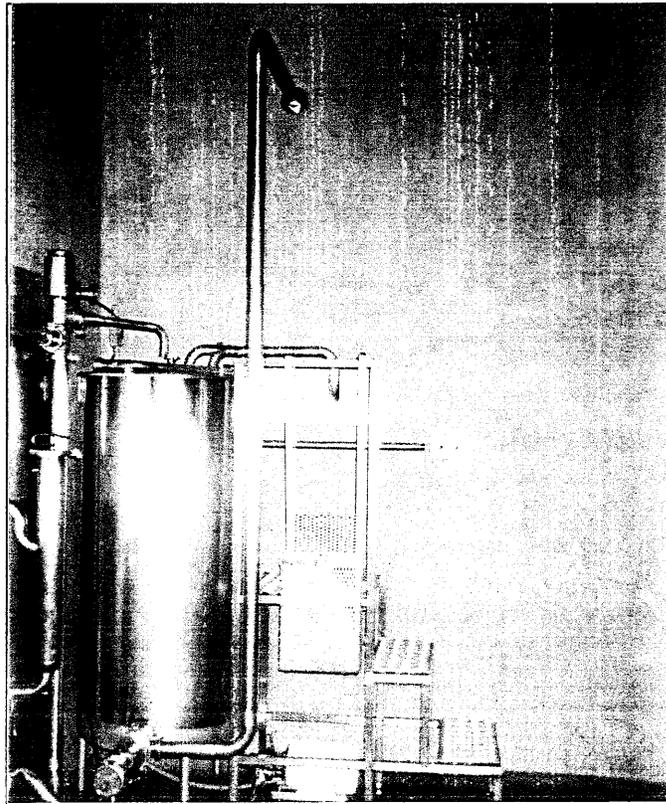
Class	Square-Foot Area										
	50	60	80	100	120	150	200	250	300	400	500
1	11.25	10.50	9.80	9.00	8.25	7.90	7.30	6.90	6.60	6.10	5.80
2	16.60	15.50	14.30	13.50	12.80	12.10	11.25	10.50	10.10	9.80	9.70
3	20.70	18.75	18.00	16.95	15.85	15.05	14.40	13.45	12.80	12.10	11.65

# DAIRY BARNS

INTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY



Milk room – average quality



## DAIRY BARNS

### MODERN HERRINGBONE, PARALLEL, OR ROTARY

High end of the range in cost is for Sacramento and Northern California

Major electrical to run milking equipment—mains and subpanels, breakers and master start switches—are considered fixtures and are not included in building costs.

#### EQUIPMENT ROOM, OFFICE, BREEZEWAY, MILK ROOM, RESTROOM, BATH

Components	Average Quality	Good Quality
Foundation	Reinforced concrete	Reinforced concrete
Floors	Concrete slab	Concrete slab, reinforced
Walls	8" concrete block	Concrete block
Exterior	Stucco or concrete block	Stucco and masonry veneer, split face
Roof Structure and Roofing	Average wood frame, corrugated iron roofing	Good wood frame, good quality roofing or steel beams and good steel roofing or tile, skylights, gutters
Windows	Metal sash 10 percent of wall area	Metal sash 10 percent of wall area
Interior	Smooth finish plaster—cove base	Tile floors and walls, many areas
Electrical	Conduit—average fixtures	Conduit—excellent lighting and ample outlets
Plumbing	One stainless steel sink, one water heater, one lavatory, one water closet, usual floor drains	One stainless steel sink, one water heater, ¾ bath, vinyl floor and tape textured walls, usual floor drains
<b>Square-Foot Cost</b>	<b>\$52.50 to \$60.00 per square foot</b>	<b>\$60.00 to \$66.00 per square foot</b>

#### MILKING PARLOR

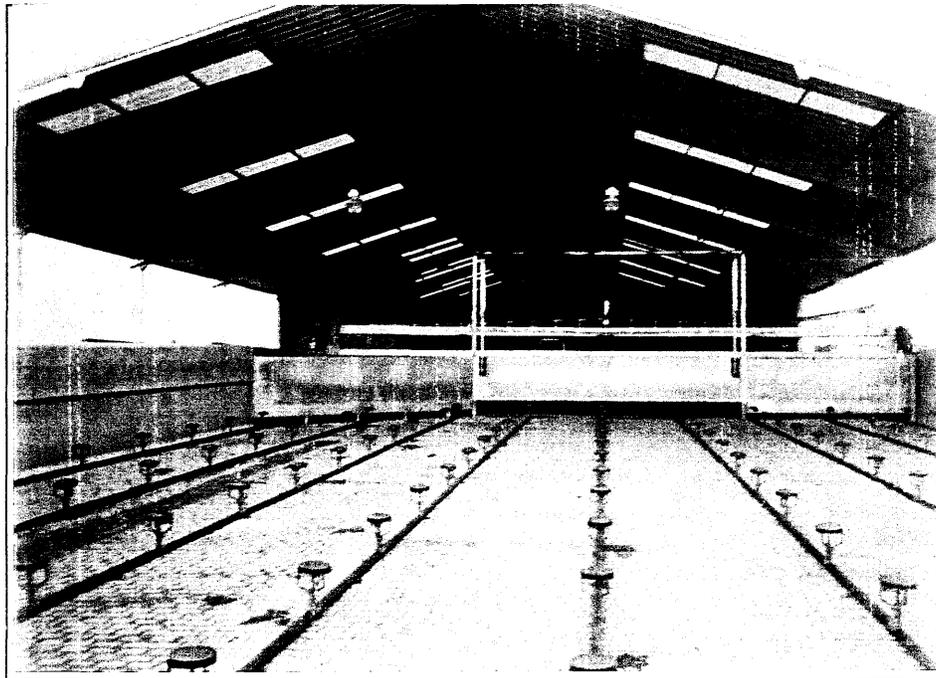
Foundation	6" reinforced concrete
Floors	Concrete slab—well-formed gutters and mangers
Walls	6" or 8" concrete block or reinforced concrete 60" high with 2" x 6"—16" on center framing above, or all concrete block
Roof Structure and Roofing	Average wood frame, corrugated iron roofing or steel beams, good steel roofing, skylights
Windows	Metal sash or metal louvers
Interior	Smooth plaster on entire surface of block walls or some combination of tile and plaster of good quality
Electrical	Conduit—average fixtures; ample lighting
Plumbing	Usual floor drains and hose bibs
<b>Square-Foot Cost</b>	<b>Without gates and feeding equipment—\$33.50 to \$42.00 per square foot</b>

**TOTAL BUILDING COST:** includes equipment room, milk room, office, bath, supply, milking parlor, and wash and drip area—Average quality **\$41.00 to \$52.50**  
 Good quality **\$50.50 to \$55.50**

## DAIRY BARNS

### HOLDING, WASH, AND DRIP AREA EQUIPMENT

Floor or Ramp	Sloping concrete with carborundum finish. <b>\$3.45 - \$4.00</b> per square foot
Walls	Concrete block 5' to 6' high with smooth plaster. <b>\$43.00 to \$48.00</b> per lineal foot
Metal Rail Fence	Welded pipe 7'—10' o.c. in concrete. <b>\$11.50 - \$13.50</b> per lineal foot
Cable Fence	1 1/4" top rail, 2 7/8" post, 7' o.c. 3 cable— <b>\$8.75 to \$9.25</b> per lineal foot 4 cable— <b>\$9.50 to \$10.50</b> per lineal foot
Gates	54" high, pipe with bracing. <b>\$14</b> per lineal foot of gate width
Sprinkler System	Hooded Rainbird, including pump. <b>\$145 - \$180</b> per Rainbird, or per double 30 barn—60 cows <b>\$18,250 - \$20,500</b>
Roof Structure and Roofing	Average quality: Pipe supports, wood or light steel frame and corrugated iron roofing— <b>\$5.00 to \$7.50</b> per square foot  Good quality: Box beam columns, hot-dip galvanized and box beam galvanized rafters and purlins; quality steel roofing with skylights and electric lighting— <b>\$8.25 to \$9.65</b> per square foot
Total Area Cost Including All Components	<b>\$20.50 - \$24.70</b> per square foot



Wash Pen

## DAIRY BARNs

### DAIRY EQUIPMENT

#### PARALLEL STALLS (DOUBLE 30)

2' x 30' parallel stall package includes galvanized reels, reel support post, sequencing panels, galvanized rump rail assembly, kick bar support, entrance gate, and hardware. 2' x 30' parallel drive kit includes air controls, air tubing, rump panels, drive guards, air cylinders, hardware, stainless steel curbing, and top rail. Air operated catch lane gates include air control ram, hardware to mount, step ladders with hand rails (front), and miscellaneous hardware.	\$93,000
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#### VACUUM PUMP

Air vacuum pump with 30 H.P. motor, stand, pulleys, belts, guards, filter assembly, miscellaneous pipe valves, and electrical.	\$11,000
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#### PIPELINE AND EQUIPMENT

Claws with pulsators and pulsator controller, master control panel, 2 H.P. milk pump, milk receiver, jetter assembly and hose, fresh air kit, C.I.P. sink. Also includes all stainless steel pipelines, elbows, valves, all PVC lines, electrical wiring and panels, and miscellaneous hardware.	\$93,000
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#### MILK TRANSFER SYSTEM

Control assembly and miscellaneous equipment.	\$4,800
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#### DETACHERS

Air operated retraction with both manual and automatic operation, indicator lights indicating milking mode and milk flow, air operated shutoff valve/sensor combination, all related electric wiring, air filter, and hardware.	\$80,000
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#### MILK TANKS (7,000 GALLON)

2 stainless steel 7,000-gallon tanks with agitators and wash pumps. Includes control panel, calibration gauge, temperature recorder with probe assembly, hot milk alarm, miscellaneous piping, and electrical.	\$113,000
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#### REFRIGERATION SYSTEM

Freon compressor, air condensers, related hardware, pipes, valves, and electrical. Plate cooler with 100 plates and all hardware.	\$50,000
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Above costs include tax and labor

## DAIRY BARNS

### DAIRY EQUIPMENT

#### HEAT RECOVERY SYSTEM

Heat recovery system and all hardware.	\$11,500
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#### HOT WATER SYSTEM

Boiler with insulated 500-gallon storage tank, insulated piping, and electrical.	\$15,700
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#### SPRINKLER PEN HARDWARE

Pumps, Rainbird, and all related pipelines and miscellaneous hardware.	\$21,700
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#### AIR COMPRESSOR

10 H.P. air compressor with 120-gallon tank. Includes miscellaneous hardware and electrical.	\$8,600
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#### ELECTRIC OR AIR CROWD GATE

30 to 50 foot electric gate with track and control kit, motor, panel, and electrical.	\$23,000
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Above costs include tax and labor

Total equipment cost for double 30 parallel \$525,000 Rounded

#### EQUIPMENT ONLY (Including tax and labor)

Double 14' Parallel	Total - \$305,000 to \$320,000
Double 16' Parallel	Total - \$336,000 to \$350,000
Double 18' Parallel	Total - \$360,000 to \$400,000
Double 24' Herringbone	Total - \$440,000 to \$475,000
Double 25' Parallel	Total - \$455,000 to \$480,000
Double 30' Parallel	Total - \$500,000 to \$545,000
50-Cow Rotary Barn	Total - \$610,000 to \$700,000
70-Cow Rotary Barn	Total - \$720,000 to \$750,000

## DAIRY BARNS

### FREESTALL BARN

#### STANCHIONS, LOOPS, AND FENCES

Foundation	Reinforced concrete
Floors	Sloping concrete with dirt in loop areas. Concrete drive lanes and flush areas.
Walls	Open; poles with steel supports
Roof Structure	Steel frame with steel cover; good quality, with gutters
Electrical	Minimum lighting
Plumbing	Water troughs in each pen with underground flushing
Stanchions	Steel; self locking – 5 hole per 10 feet
Fencing	Cable with steel or wood posts
Capacity	250 to 600 cows; one stanchion per cow
Cost	<b>\$900 to \$1,150 per stanchion or \$9.00 to \$11.50 per square foot</b>

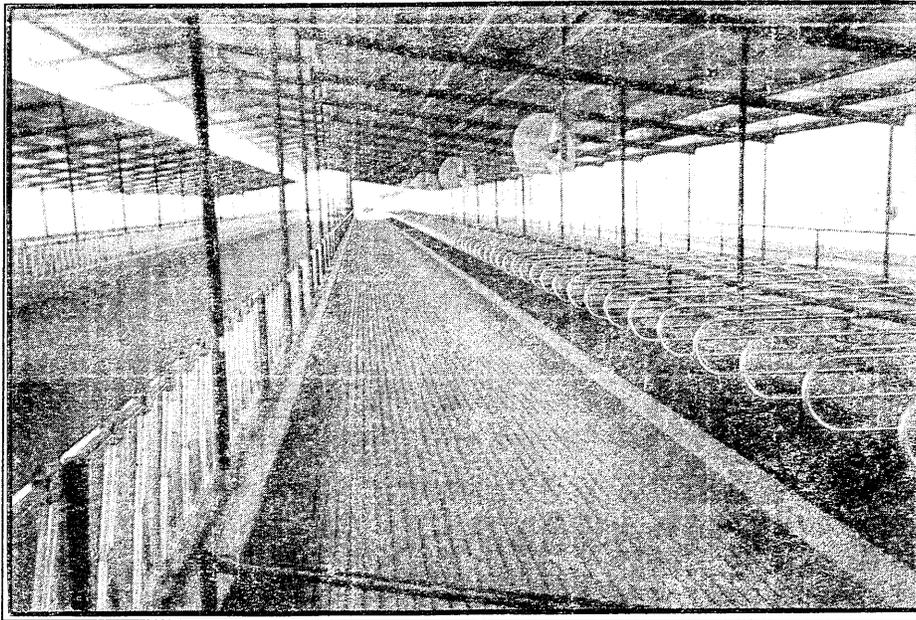
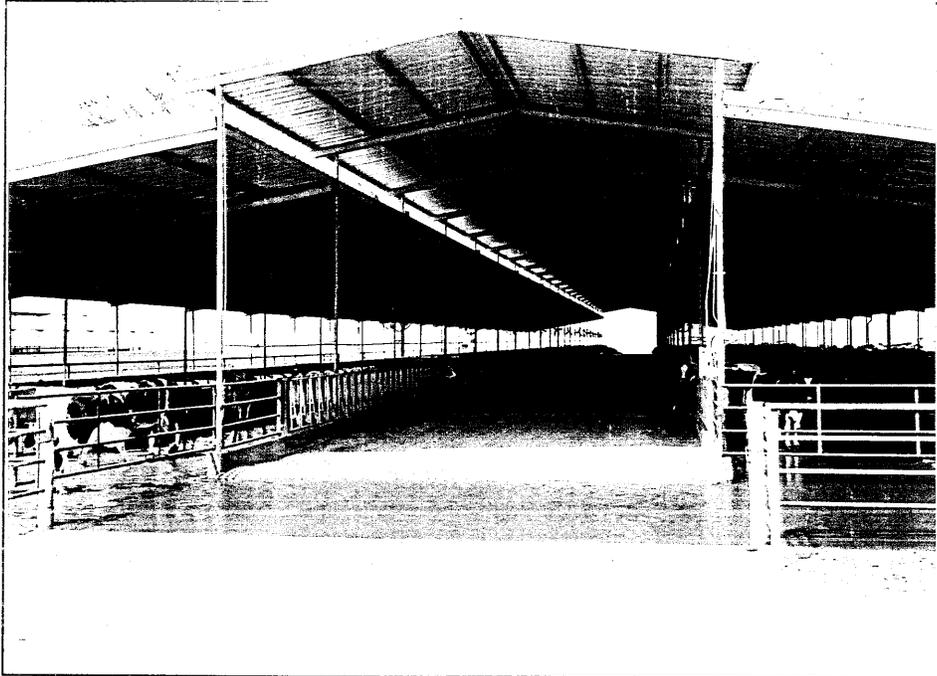
Some barns now have 10% more stanchions and cows than beds.

Hot dipped galvanized steel framed barns – add 5% to above costs.

Cow water beds – **\$150 to \$185** each

# DAIRY BARNS

## FREESTALL BARN



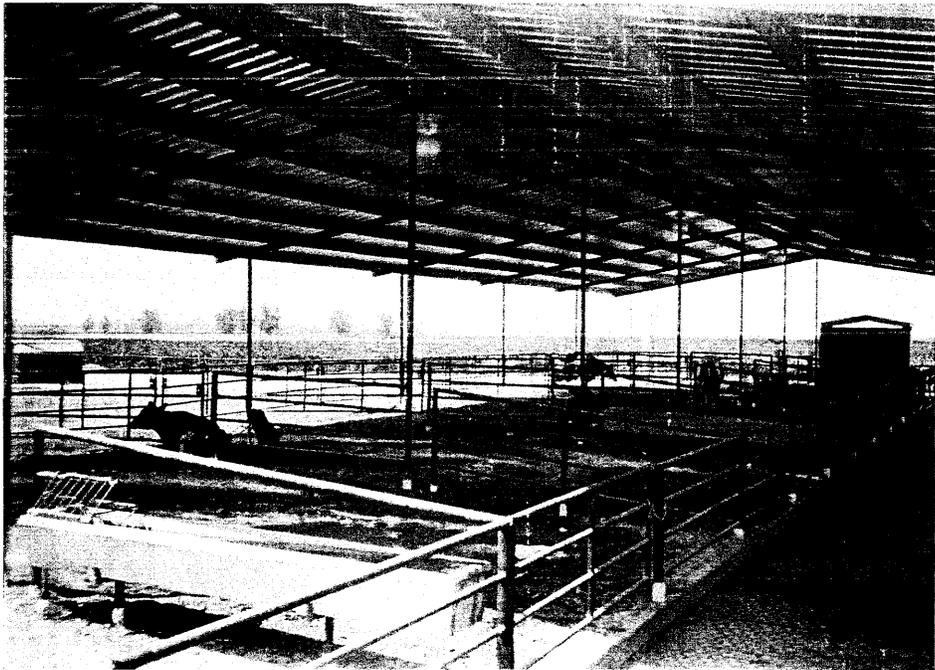
# DAIRY BARN

## HOSPITAL BARN

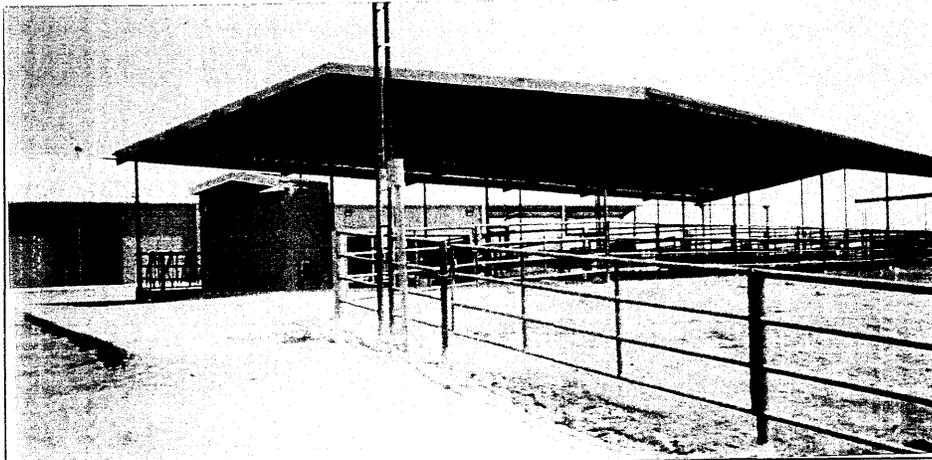
### AVERAGE QUALITY

Floors	Concret slab with flush curbs
Walls	Light steel poles, all sides open
Roof	Average wood frame or light metal, with metal cover
Interior	Several small pens with metal pipe fencing and gates and water troughs
Electrical	Average light fixtures
Plumbing	Concrete water troughs
Cost	<b>\$7.00 to \$7.75 per square foot</b>

Hospital barns without small divided pens, with dirt floors, low to average quality: **\$4.90 to \$5.65** per square foot



Hospital Barn – Average Quality



## DAIRY BARNS

### CORRALS

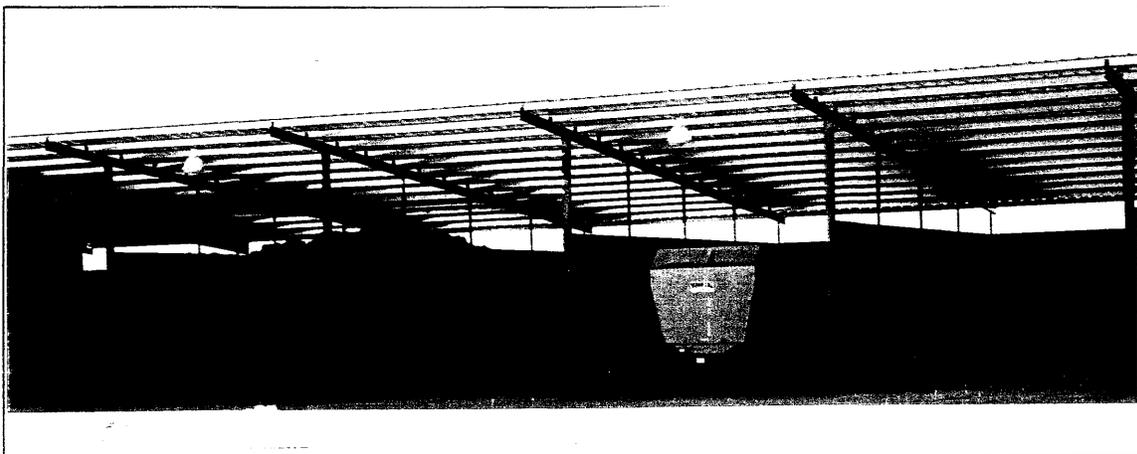
Components	Cost
Concrete Flatwork	4" to 4½"—\$2.00 to \$2.30 per square foot
Large areas/not reinforced	6"—\$2.40 to \$2.90 per square foot
Rubber Belting	\$1.50 to \$2.25 per square foot
Curbs	8" x 16"—\$7.00 per lineal foot 8" x 24"—\$8.50 per lineal foot
Cable Fence	2 3/8" top rail, 2 7/8" post—10' o.c. 3 cable—\$8.75 to \$9.25 per lineal foot 4 cable—\$9.25 to \$10.50 per lineal foot
Concrete Water Tank	\$550 to \$600 each
Steel Stanchions	\$43.00 to \$48.00 each hole
Without Stanchion Curb	\$22.00 to \$24.00 per lineal foot
Steel Self-Locking Stanchions	\$46.00 to \$50.00 each hole
Without Stanchion Curb	\$23.50 to \$26.50 per lineal foot
12" PVC Flush Line	\$11.00 to \$12.50 per foot
Sump Pumps	3 HP \$2,700 to \$2,900 5 HP \$3,650 to \$3,850
Floating Agitator Pump	75 HP \$17,500 to \$19,500 40 HP \$13,500 to \$14,500
Gates	12' to 16'—\$150 to \$180 each
Loafing Sheds	Wood—\$4.25 - \$5.40 per square foot Steel—\$5.00 - \$6.40 per square foot

### COMMODITY BARNS

	Per Square Foot
With Dividers	\$11.30 - \$16.50
Without Dividers	\$9.80 - \$12.50

### COMMODITY BARN ADDITIVES

Concrete Dividers—8' high 6" thick	\$116.00 per lineal foot or \$14.50 per square foot
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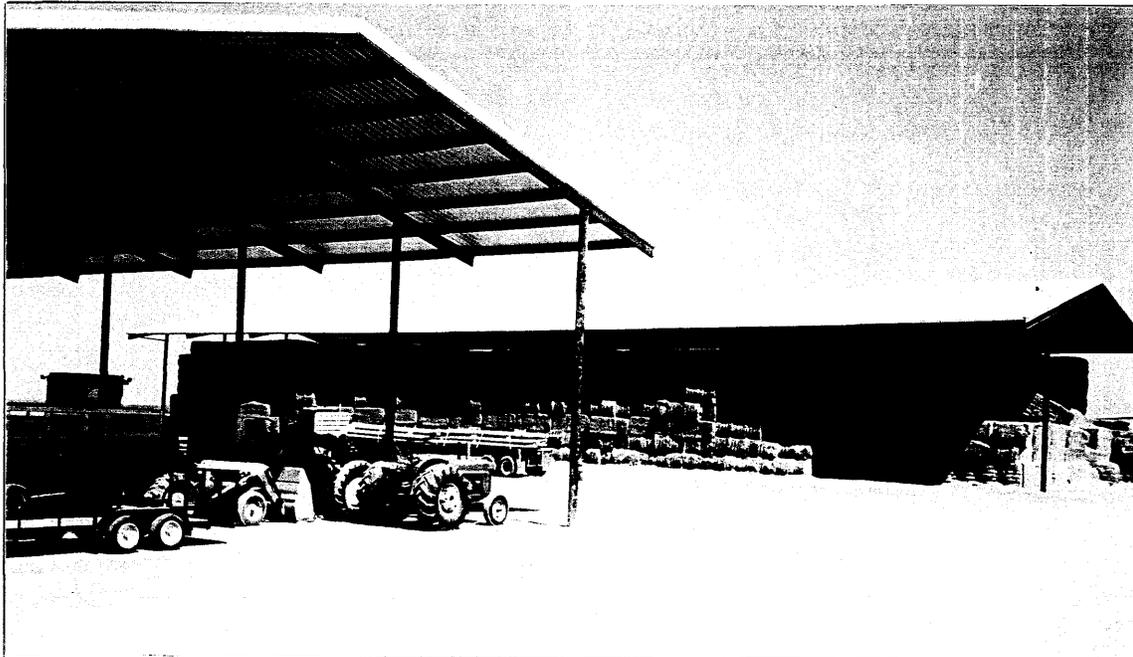
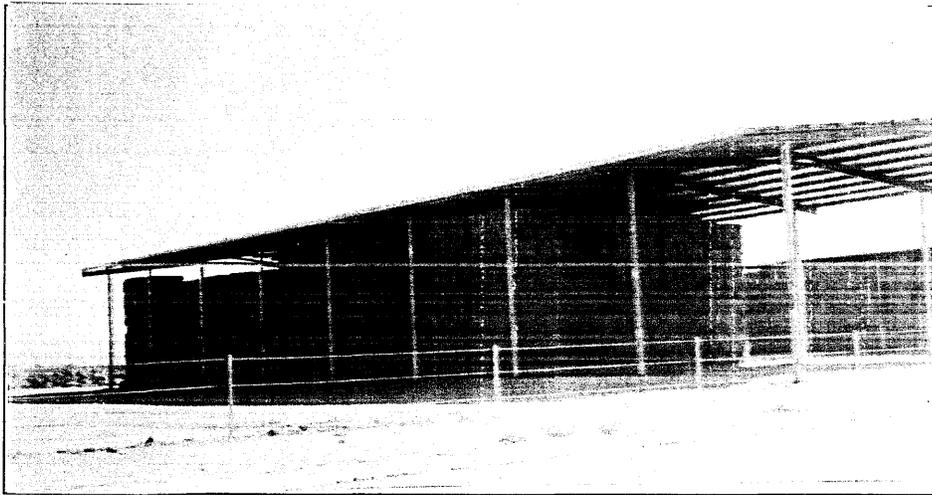


Commodity Barn with Dividers – Average Quality

## DAIRY BARNS

### HAY BARNS

Floors	Dirt
Walls	Open; used oil field pipe to support roof
Roof	20' eave; low pitch; light wood or steel frame; metal cover
Electrical	None
Plumbing	None
Cost	\$3.40 to \$4.20 per square foot



# DAIRY BARNs

## MISCELLANEOUS

### CURBS

	Per Lineal Foot
8" x 8"	\$3.50 to \$4.00
8" x 16"	\$7.00 to \$8.00
8" x 20"	\$8.00

### CABLE FENCE

	Per Lineal Foot
2 3/8" top rail with 2 7/8" post 10' o.c.	3 cable—\$8.75 to \$9.25 4 cable—\$9.25 to \$10.25 5 cable—\$9.75 to 10.75
Cattle guard	\$1,250 to \$1,800 each

### SOLID RAIL FENCE

	Per Lineal Foot
(4) 2 3/8" rails with 2 7/8" post 10' o.c.	\$12.00 to \$13.50

### TANKER PAD

	Per Square Foot
6" to 7" rebar reinforced concrete with footings	\$2.75 to \$3.25

### WATER TROUGHS

Concrete Water Troughs - 2' x 12'	\$425 to \$475
Concrete Water Troughs - 2' x 16'	\$475 to \$575
Mineral Troughs - 20'	\$160 to \$190

### CORRAL SHADES

	Per Square Foot
Pipe poles, wood frame, metal cover	\$2.10 to \$2.35
Pipe poles, steel frame, metal cover	\$2.35 to \$2.85

### WATER LINES

2" Water line	\$2.25 per lineal foot
3" Water line	\$2.50 per lineal foot
12" Flush line	\$12.00 per lineal foot
18" Drain line	\$21.00 per lineal foot
Flush valves	\$1,500 each
Drain boxes	\$1,600 each

# DAIRY BARNS

## MISCELLANEOUS

### SEPTIC TANKS

1,000 – 1,500 gallon with lines	\$3,500 - \$4,000
Cistern - per gallon	\$.60 to \$.65

### BARN FANS

With misters and automatic controls	\$700 to \$900 each—installed
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### FEEDLANE STANCHIONS WITH CURB

Galvanized stanchions, 5-hole/10'  
Cow-type self-locking with release  
with 2 7/8" post in 8" x 16" concrete curb

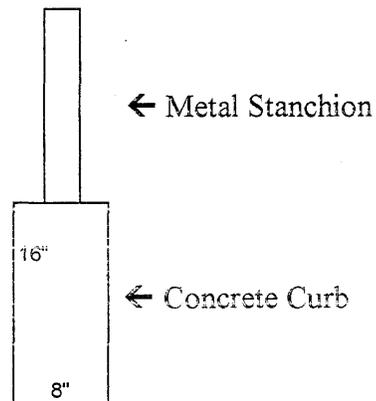
Cost Per Lineal Foot: \$32.00 to \$33.50, stanchion and curb only

Additional concrete

Drivelane 6" reinforced - \$2.40 - \$2.90 per sq. ft.

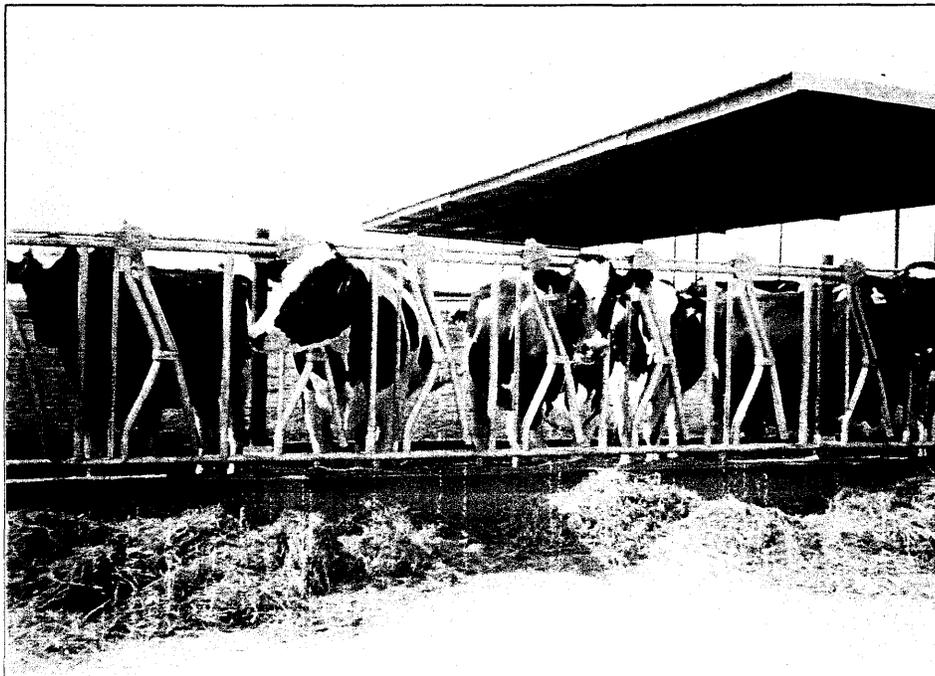
Walklane 4" concrete - \$2.00 - \$2.25 per sq. ft.

Flush curb 8" x 8" - \$3.80 per lineal foot



Cow lane 12' wide with locking stanchions and stanchion curb and 10' feed lane

\$80.00 to \$82.00 per lineal foot



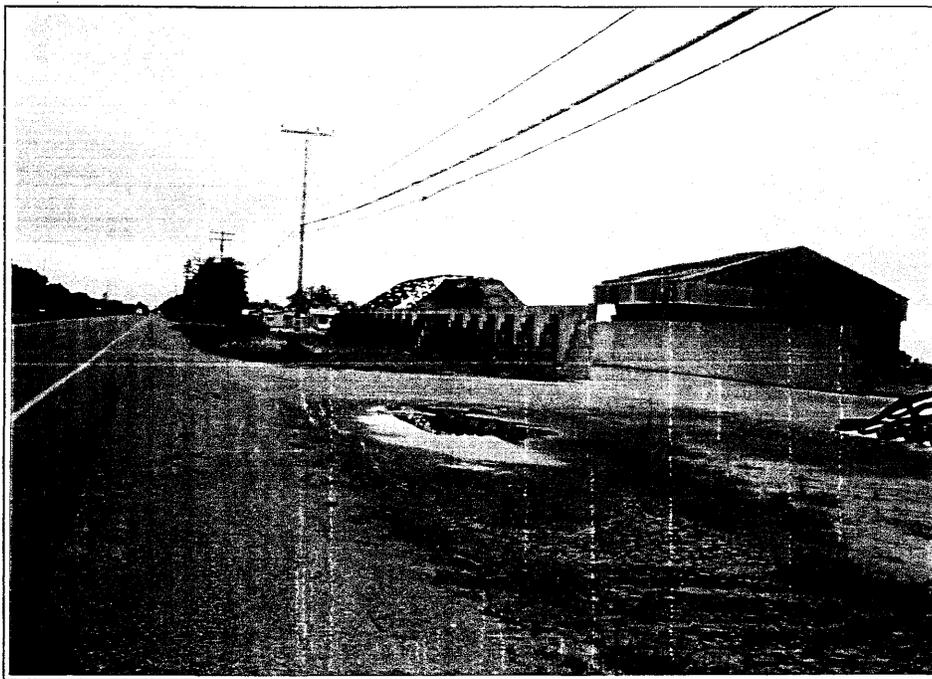
Feedlane Stanchions

## DAIRY BARN

### SILAGE PITS

Tilt-up of 6" concrete or 8" reinforced concrete block, 8' high, and enclosed on three sides with 6" concrete slabs.

<u>Size</u>	<u>Price Per Square Foot</u>
75 x 100	\$4.45
100 x 200	\$3.70
100 x 300	\$3.55



#### Concrete Silage Slab Only

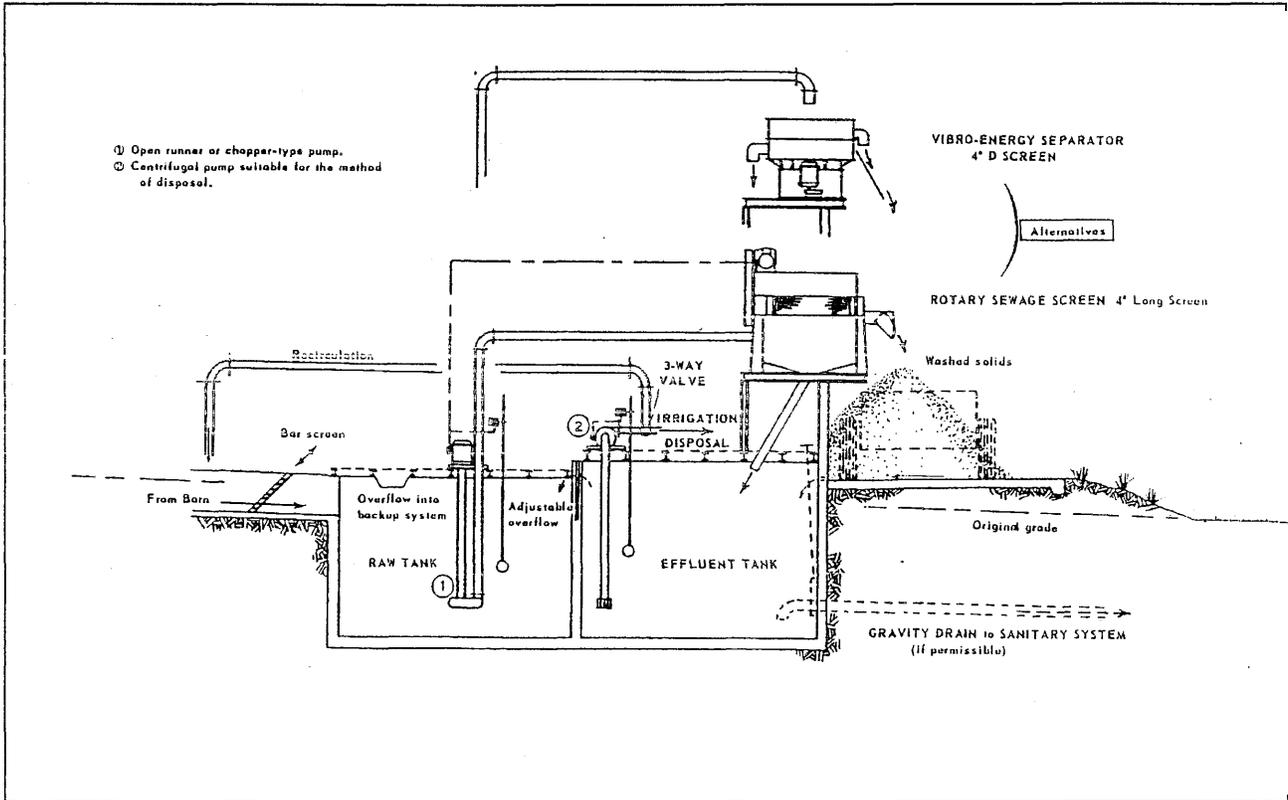
5 ½" to 6" reinforced with footings - **\$2.50 to \$3.30** with footings

6" rebar reinforced with footings - **\$3.00 to \$3.40**

# DAIRY BARNS

## LIQUID MANURE SYSTEMS (Manure Separator)

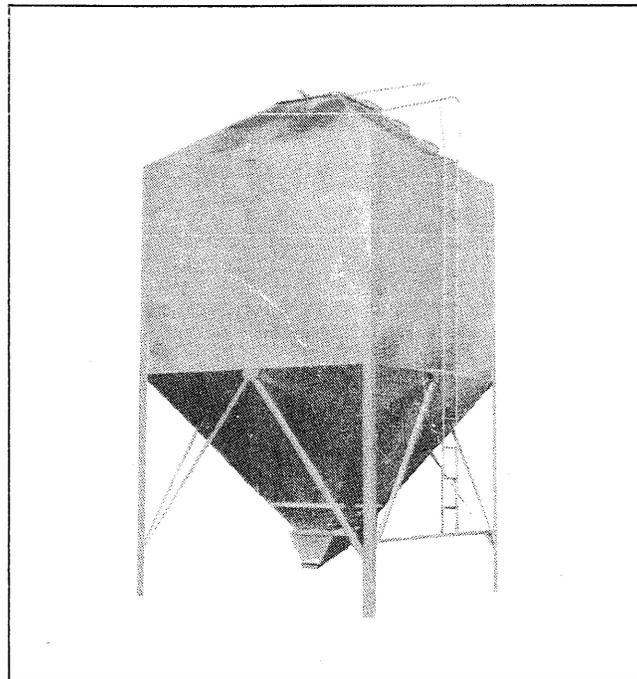
Cost includes tanks, pumps, screens, valves, pipes, sump, and drainage system, but excludes cost of all holding ponds or lagoons. Typically one unit per 800 to 1,000 cows. **\$42,000 - \$55,000**



## DAIRY BARNS

### PAINTED STEEL BULK FEED TANKS ON CONCRETE PAD/With Hopper Bottom

<u>Components</u>	<u>Cost</u>
5 Ton	\$1,800
9 Ton	2,500
10.5 Ton	2,650
13 Ton	3,000
15 Ton	3,700
20 Ton	4,400
25 Ton	4,800
31 Ton	5,800
34 Ton	6,000
40 Ton	6,800
45 Ton	7,800
60 Ton	8,600



### ADDITIVES AND ACCESSORIES

Feeder lines (Per lineal foot)	\$6.90
Partition	\$300
Ladder	\$200 to \$250
Auger	\$300 to \$400

## DAIRY BARNS

### GRADE "B" BARNS

Use upper end of cost range for Sacramento Valley and north

#### MILK HOUSE

Foundation	Concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 5 percent of wall area
Interior	Smooth finish plaster
Electrical	Fair fixtures
Plumbing	One wash basin
<b>Square-Foot Cost</b>	<b>\$36.00 to \$44.00 per square foot (including breezeway)</b>

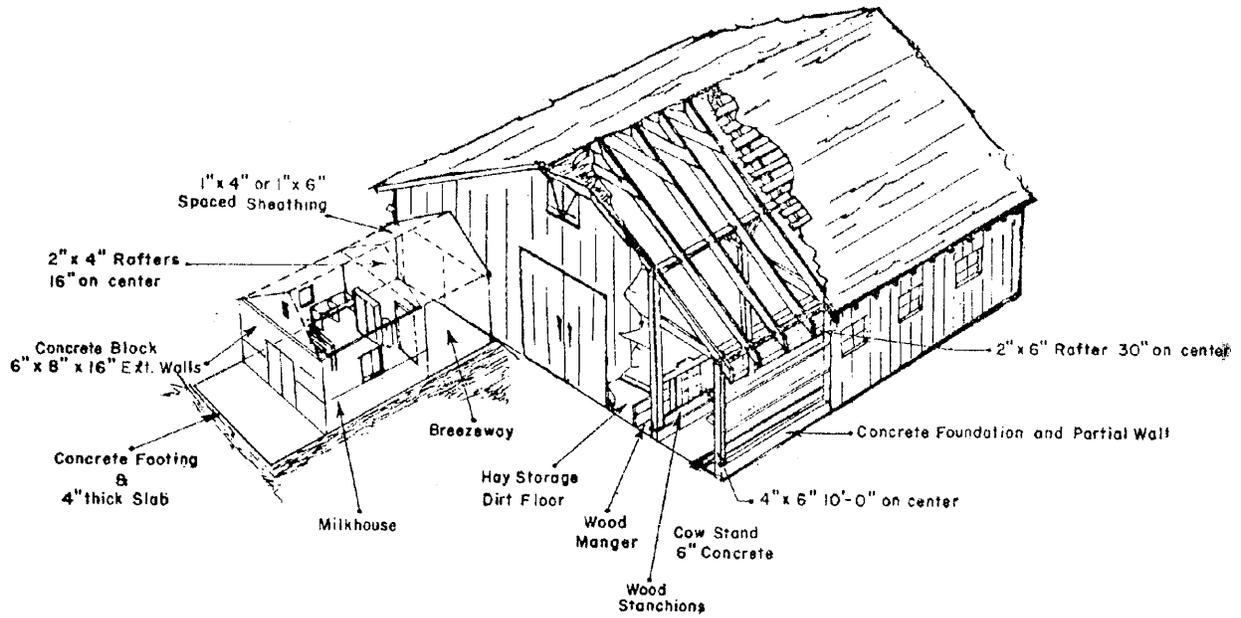
#### MILKING BARNS

Foundation	Light concrete
Floors	Concrete—cow stands
Walls	Box frame, 4" x 6"—10' on center
Roof	Average wood frame, wood shingles, corrugated iron, or aluminum cover
Windows	Barn sash
Interior	Unfinished
Electrical	None
Plumbing	None
Stanchions	Wood stanchions
<b>Square-Foot Costs</b>	<b>\$15.75 to \$19.75 per square foot</b>

Building costs do not include milking equipment

# DAIRY BARNS

## GRADE "B" BARN



TYPICAL GRADE "B" DAIRY BARN

## DAIRY BARNS

### STANCHION BARNS

High end of range in cost is for Sacramento and Northern California

#### MILK, WASH, AND EQUIPMENT ROOMS

Foundation	Reinforced concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 10 percent of wall area
Interior	Smooth finish plaster—cove base
Electrical	Conduit—average fixtures
Plumbing	One wash basin—usual floor drains
<b>Square-Foot Cost</b>	<b>\$39.00 to \$47.25</b> per square foot (including breezeway)

#### MILKING BARNS

Foundation	Reinforced concrete
Floors	Concrete—well-formed gutters and mangers
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers
Interior	Smooth plaster 36" high
Electrical	Conduit—average fixtures
Plumbing	Usual floor drains and hose bibs
Stanchions	Metal stanchions
<b>Square-Foot Cost</b>	<b>\$29.00 to \$33.00</b> per square foot

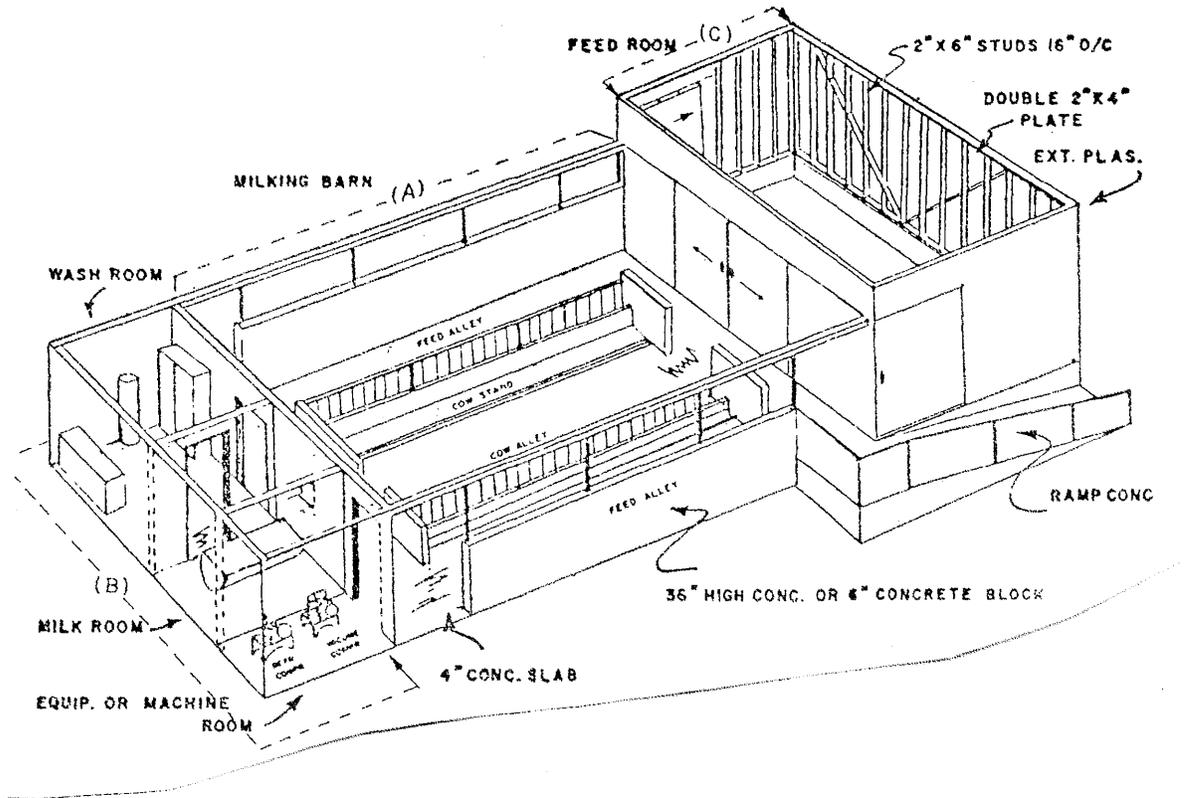
#### FEED ROOM

Foundation	Reinforced concrete
Floors	Concrete slab
Walls	2" x 4" or 2" x 6"—16" on center framing
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	None
Interior	Unfinished
Electrical	Conduit—average fixtures
Plumbing	None
<b>Square-Foot Cost</b>	<b>\$15.75 to \$26.50</b> per square feet

Building costs do not include milking equipment

# DAIRY BARNS

## STANCHION BARN



### Component Parts of This Dairy

- A. Milking Barn
- B. Feed Room
- C. Milk, Wash, and Equipment Rooms

### TYPICAL STANCHION BARN

# DAIRY BARNS

## WALK-THROUGH TYPE

High end of the range in cost is for Sacramento and Northern California

### MILK, WASH, AND EQUIPMENT ROOMS

Foundation	Reinforced concrete
Floors	Concrete slab
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above or all concrete block
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers, 10 percent of wall area
Interior	Smooth finish plaster—cove base
Electrical	Conduit—average fixtures
Plumbing	One wash basin—usual floor drains
<b>Square-Foot Cost</b>	<b>\$33.00 to \$35.00</b> per square foot (including breezeway)

### MILKING BARNS

Foundation	Reinforced concrete
Floors	Concrete—well-formed gutters and mangers
Walls	6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above, or all concrete block
Roof	Average wood frame, corrugated iron, or aluminum cover
Windows	Metal sash or metal louvers
Interior	Smooth plaster 36" high
Electrical	Conduit—average fixtures
Plumbing	Usual floor drains and hose bibs
Stanchions	Metal stanchions
<b>Square-Foot Cost</b>	<b>\$31.00 to \$34.00</b> per square foot

Building costs do not include milking equipment

## **AH 534.30: POULTRY HOUSES**

This section contains specifications and costs for poultry structures and equipment for modern controlled environment houses.

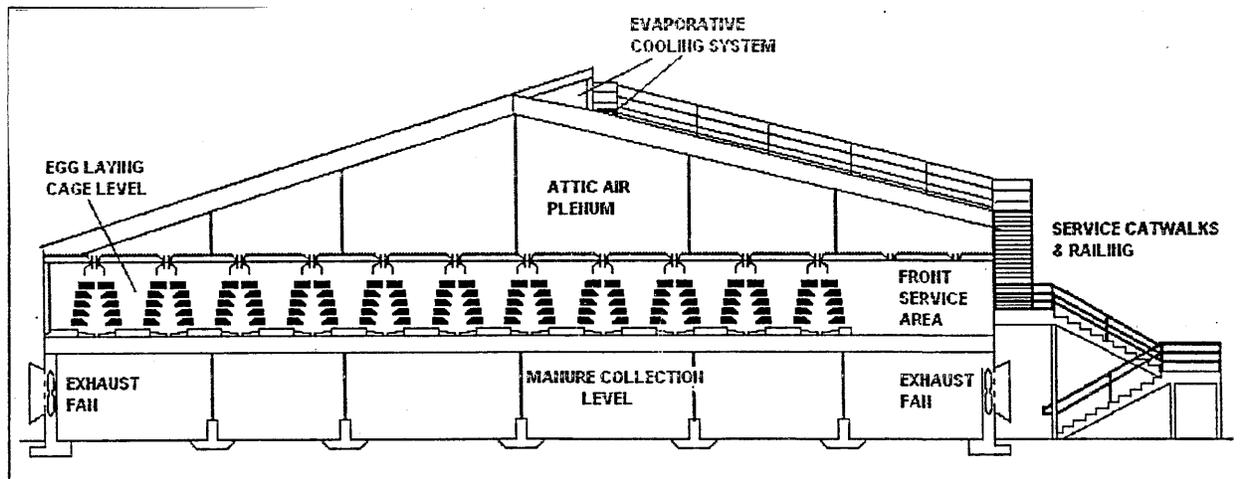
# POULTRY HOUSES

## MODERN CONTROLLED ENVIRONMENT HOUSES—GOOD QUALITY

Foundation	Concrete
Floor	Concrete slab
Wall Frame	Heavy steel beam, 20' to 22' to eave
Roof Frame	Steel truss and steel purlins, insulated
Exterior	26-gauge steel panels with R-11 insulation
Lighting	Good quality lighting
Plumbing	Good plumbing
Basic Building Cost Per Square Foot	\$25.00 to \$28.50

Typical Size 80' x 400'

Basic building costs are for building only and include only those components specified. The cost of all items of equipment such as cages, drinking water systems, fogging systems, feeding systems, egg-gathering systems, heating and cooling systems, etc., must be added to basic building cost to arrive at total cost.



TYPICAL CROSS SECTION

## **AH:534.61: IRRIGATION SYSTEMS**

The following costs of irrigation system components have been tabulated from information gathered, for the most part, in the San Joaquin and Sacramento Valleys. Costs have been collected for only the more widely used components. Many areas will have types of equipment not usually found in other locations. These costs should be checked locally.

## IRRIGATION SYSTEMS

### CONCRETE PIPE—INSTALLED

Size in Inches	Cost Installed Per Lineal Foot		Vertical Stand Pipe Including Base Installed Cost Per Foot of Height	
	Fresno Area	Sacramento North	Fresno Area	Sacramento North
8	\$7.40	\$4.40	\$18.72	\$19.75
10	7.70	7.85	22.85	23.80
12	8.55	8.85	23.90	25.50
14	9.35	9.60	26.00	27.50
16	10.40	10.70	40.50	42.60
18	11.10	11.40	45.75	48.00
20	13.50	13.90	46.80	51.00
24	21.80	22.85	83.00	87.00
30	52.00	54.00	145.00	152.00
36	67.50		161.00	165.00
42			228.00	235.00
48			322.00	333.00

The above prices are for installations over 700 feet in length. Adjust the above prices for installations less than 700 feet by the following amount.

<u>Length of Pipe</u>	<u>Add to All Sizes</u>
Up to 100'	\$7.00 per foot
100' to 200'	5.50 per foot
200' to 300'	4.60 per foot
300' to 400'	3.00 per foot
400' to 500'	2.50 per foot
500' to 600'	2.00 per foot
600' to 700'	1.50 per foot

## IRRIGATION SYSTEMS

### PRESSURE BOXES (Reinforced concrete with capped top)

Size	Price Per Lineal Foot of Height
24"	\$355
30"	495
36"	615

### STAND PIPE INCLUDING THE BASE

Size	6'	9'	12'	15'
24"	\$498	\$ 747	\$ 996	\$1,245
30"	870	1,305	1,740	2,175
36"	966	1,450	1,932	2,415
42"	1,968	2,052	2,736	3,420
48"	1,932	2,898	3,864	4,830

### VENT PIPE—PLASTIC

Size	9' Height Limit
2"	\$11 per foot
3"	12 per foot
4"	16 per foot

### VENT PIPE—STEEL

Size	9' Height Limit
2"	\$14 per foot
4"	18 per foot
6"	22 per foot
8"	28 per foot
10"	36 per foot
12"	39 per foot

### ADD HOOK-UP (When new concrete pipe is connected to old concrete pipe, add the following)

Size	Add
8", 10", and 12"	\$250
14", 16", and 18"	300
20" and 24"	350

# IRRIGATION SYSTEMS

## P.V.C. PIPE

Cost includes components and installation, but not hook-up to pump. As pressure requirements rise, the pipe becomes more costly.

### P.V.C. PIPE—INSTALLED (PER LINEAL FOOT)

Size	Class 63 Low Head (Flood)	100 P S I (Sprinkler)
6"	\$4.30	\$5.50
8"	5.50	6.80
10"	8.25	9.35
12"	11.00	12.40
15"	15.40	16.50
18"	22.00	23.00

P.V.C. hook-up to pump—includes relief valves, check valves, dresser couplings, elbows, and labor.

### ADD HOOK-UP

Size	Cost
6"	\$ 800
8"	1,200
10"	1,600
12"	2,100

### VALVE, SADDLE, AND RISER (FOR SURFACE LATERALS)

Size	Sprinkler	Flood
4"	\$ 82	\$110
8"	-	190
10"	-	235
12"	-	400
14"	-	480

# IRRIGATION SYSTEMS

## ALUMINUM PIPE

Aluminum pipe costs include sales tax, but exclude installation costs due to their portable nature.

Main Lines Per Linear Foot	Diameter			
	6"	8"	10"	12"
Ring Lock Type				
40' joints <u>without</u> valve	\$4.00	\$5.35	\$6.20	\$7.30
40' joints <u>with</u> valve	4.50	6.30	7.35	8.70
Latch Type				
30' joints <u>without</u> valve	\$1.22	\$2.10	\$3.00	

## SPRINKLER LINES

18" Risers—30' lengths      3"—\$1.65 per linear foot      4"—\$2.30 per linear foot

## GALVANIZED FITTINGS

Valve Openers		End Plugs		90° Elbows	
Size	Cost	Size	Cost	Size	Cost
4"	\$150	6"	\$40	6"	\$ 76
6"	180	8"	55	8"	100
8"	250	10"	80	10"	140

# IRRIGATION SYSTEMS

## IRRIGATION VALVES

Flood valves are set near the top or flush on top of a concrete pipe riser. Several types are in general use, i.e., Yakima and Alfalfa. They are made with either a solid arch or a removable arch. The removable arch type is more expensive, but it allows for replacement of the arch without complete valve removal when breakage occurs. The solid arch is usually found to be a Yakima and the removable arch is an Alfalfa.

### FLOOD VALVES

Size in Inches	Solid Arch Yakima	Size in Inches	Alfalfa
3 x 8	\$ 88		
4 x 8	91	8 x 8	\$ 198
5 x 8	99	10 x 10	250
6 x 10	125	12 x 12	300
8 x 12	156	14 x 14	355
10 x 14	208		
12 x 16	255		
14 x 18	315		
16 x 20	490		
18 x 20	520		
20 x 20	630		

### OVERFLOW VALVES

Size in Inches	Cost Installed
3 x 8	\$ 81
3 1/2 x 8	81
4 x 8	83
5 x 8	93
5 x 10	93
6 x 10	125
6 1/2 x 10	125
8 x 12	148
10 x 14	210
12 x 16	270
14 x 18	333
16 x 20	480
18 x 20	595
20 x 24	745

# IRRIGATION SYSTEMS

## IRRIGATION VALVES

The orchard valve is a solid arch set down in a riser. Although it is generally used in orchards, it may also be found in row crops and pastures.

### PVC ORCHARD VALVE

Valve Size	Riser Size	Cost
3 1/2"	8"	\$ 78
4"	8"	98
5"	8"	98
6"	10"	126
6 1/2"	10"	126
8"	12"	150
10"	14"	210
12"	16"	265
14"	18"	312
16"	20"	465
18"	21"	570
20"	24"	695

# IRRIGATION SYSTEMS

## IRRIGATION VALVES

The vineyard valve is a modification of the orchard valve. The riser is pierced with two or more small galvanized tubes which have small sliding galvanized gates. This arrangement allows a choice of direction and volume of water flow. This valve is found mainly in the Central San Joaquin Valley.

### VINEYARD VALVE

Valve Size	Riser Size	Number of Gates	Gate Size	Cost Installed
3 1/2"	8"	2	2"	\$83
3 1/2"	8"	2	2 1/2"	86
3 1/2"	8"	2	3"	91
3 1/2"	8"	3	2"	93
3 1/2"	10"	2	2"	89
3 1/2"	10"	2	2 1/2"	90
3 1/2"	10"	2	3"	90
4"	8"	2	2"	91
4"	8"	2	2 1/2"	92
4"	8"	2	3"	96
4"	10"	2	2"	93
4"	10"	2	2 1/2"	95
4"	10"	2	3"	101
4"	10"	3	2"	99
4"	10"	4	2"	103
5"	10"	4	2"	125
5"	12"	2	3"	122
6"	10"	2	3"	109
6"	10"	4	3"	125
6"	12"	2	3"	130
6"	12"	2	4"	137

# IRRIGATION SYSTEMS

## IRRIGATION VALVES

Gate valves have different designs depending on the use. The canal gate is for general low-pressure uses as canal discharges, pressure pipelines, etc. The screw-pressure gate is a high-pressure gate valve used for reservoirs, etc. The hub-end gate is designed for use in pipelines.

### GATE VALVES

Size in Inches	Screw Pressure	Canal Gate	Hub-End Gate	Clamp Gate	Baxter Gate	Galvanized Gate
6						\$ 85
8	\$650		\$1,120	\$470		115
10	750	\$ 750	1,410	730		125
12	850	810	1,530	780	\$1,250	145
14	1,090	970	1,920	1,040		175
16	1,750	1,140	2,340	1,250	1,560	205
18	2,390	1,300	3,010			225
20	2,700	1,450	3,540			250
24	3,100	1,970				345

Capped riser irrigation systems are generally found in old orange groves. The galvanized gates are diamond shaped.

### CAPPED RISERS

Size	Number of Gates	Size of Gates	Installed Cost
8"	2	2"	\$44
8"	3	1"	45
8"	4	1"	51

### AIR RELIEF VALVES

Size	Installed on PVC	Installed on Concrete Pipe
2"	\$130	\$150
3"	215	240
4"	275	350

# IRRIGATION SYSTEMS

## PERMANENT IRRIGATION SYSTEM

The larger set-ups are at lower end of range

### SPRINKLERS— "SOLID SET"—UNDER TREES

Type	Cost Per Acre
Manual System	\$ 900 to 1,200
Automatic System	1,000 to 1,500
Frost Protection System	1,000 to 1,500
Automatic system with frost protection	1,400 to 1,800

P.V.C. underground lines, 12" risers, impulse heads, sand filter

### SPRINKLERS—"SOLID SET"—OVER VINES

Type	Cost Per Acre
Manual System	\$1,000 to \$1,200
Automatic System	\$1,000 to \$1,300
Frost Protection System	\$1,800 to \$2,500
Automatic system with frost protection	\$2,100 to \$3,100

P.V.C. underground lines, 6" risers, impulse heads, sand filter

### DRIP SYSTEM—ORCHARD

Type	Cost Per Acre
New planting (1 to 4 emitters per tree)	\$ 950 to \$1,600
Mature orchard (4 emitters per tree)	\$1,100 to \$1,800

### DRIP SYSTEM—VINEYARD

Type	Cost Per Acre	Total Cost
Ratio of cost—70 percent above ground, 30 percent below ground, add	\$1,200 to \$1,800	
Elaborate sand filters (for dirty water-aqueduct and river water), add	\$200 to \$300	
Fertilizer application equipment, add		\$750 to \$900
When proportion pumps are used, add		\$1,350 to \$2,200

The linear overhead sprinkler system is used on a level parcel usually a one-half section of land. A concrete ditch runs through the parcel as a water supply. This type of irrigation system costs between **\$700 to \$825** per acre. The linear drive machine costs **\$135,000 - \$160,000**.

# IRRIGATION SYSTEMS

## PERMANENT IRRIGATION SYSTEM

### PULL HOSE SYSTEM

Type	Cost Per Acre
Plus pump and filter	\$550 to \$700

### ELECTRIC CENTER PIVOT SPRINKLER—Including concrete base

Size	Cost Each
160 acres (130 acres net)	\$46,000 to \$52,000
160 acres (130 acres net) – Used 12-15 years	\$19,000 to \$27,000

Concrete Structures	<b>\$400</b> per cubic yard
Control Gates	<b>\$200</b>
Hook-up and Connections	Between no charge and <b>\$240</b>

### CRIBBINGS

Size in Inches	Cost Per Linear Foot
24	\$150
30	200
36	220

The concrete riser above the valve is cut in half to direct the flow of water

## IRRIGATION SYSTEMS

### CONCRETE DITCH COSTS

Costs are for one-half to one mile runs. Shorter runs are a little higher.

<u>Bottom</u>	<u>Depth</u>	<u>Cost Per Foot</u>
1'	16"	\$7.80
1'	18"	8.10
1'	20"	8.50
1'	22"	9.00
1'	24"	9.25
1'	26"	9.75
1'	28"	10.10
1'	30"	10.60
2'	24"	13.50
2'	27"	14.04
2'	30"	15.60
2'	34"	16.90
2'	36"	17.50
2'	38"	18.10
2'	40"	18.60
2'	42"	19.30
2'	44"	20.60
2'	46"	21.30
2'	48"	23.10

The above costs do not include end gates and turn out gates. They range from **\$110 to \$140** each (three joints 12" x 14" in diameter). Check gates cost **\$375**.

The above prices do include the land shaping.

## **AH 534.62: PUMPS**

This section contains specifications and costs for various pumps used with irrigation systems, including:

- Turbine pumps
- Diesel powered pumps
- Wells
- Windmills

# PUMPS

## SAN JOAQUIN VALLEY BASE TURBINE 3-PHASE FREE FLOW DISCHARGE

1,800 RPM, 5 to 350 HP installed, including pump complete in place with normal stages, power pole, pads, and control panel. Well and casing excluded.

HP	Depth of Setting											
	40'	60'	80'	100'	120'	140'	160'	180'	200'	220'	260'	300'
5	7,200	7,270	8,270	8,950	10,120							
8	7,270	7,420	8,610	9,170	10,980	11,810	13,080	14,000	16,050			
10	7,590	8,610	9,620	10,460	11,470	11,970	13,320	14,350	15,350	16,360	18,400	
15	8,610	9,450	10,460	11,300	11,810	12,160	13,660	14,760	16,020	17,040	19,400	21,250
20	10,470	11,130	11,970	12,500	13,080	13,660	14,350	15,020	16,200	15,540	19,580	21,430
25	11,130	11,470	12,490	13,840	14,350	14,840	15,700	17,210	18,400	19,400	19,900	21,930
30	12,490	13,160	13,650	14,520	15,190	16,030	16,880	17,720	18,560	19,580	21,100	22,780
40	13,830	14,160	14,520	15,350	17,200	18,220	19,240	20,260	21,270	21,930	24,440	26,160
50	14,350	16,030	17,720	18,550	19,400	20,260	21,100	21,930	24,460	25,310	28,680	30,370
60		18,550	19,400	21,100	21,930	22,790	23,630	24,460	26,150	28,680	32,060	33,750
75		21,110	21,930	24,460	25,430	26,170	27,000	28,680	30,370	32,060	37,140	38,810
100		21,940	24,460	26,170	28,680	30,380	32,070	33,740	34,590	36,280	38,800	40,500
125		26,170	28,680	30,370	32,060	33,750	36,290	37,970	40,760	43,870	47,700	48,880
150			30,370	31,710	33,760	36,280	38,810	40,490	42,190	46,400	50,630	52,300
200			32,060	33,760	37,140	42,190	43,880	47,250	48,940	52,320	57,380	59,000
250						50,630	52,310	54,040	57,380	60,750	62,440	67,500
300						59,070	60,760	64,150	67,500	69,190	72,570	74,250
350						71,200	72,500	74,250	77,630	79,300	81,000	84,300

Note: The appraiser must know the horsepower and depth of setting in order to estimate the RCN from the chart.

Turbine pumps are more commonly used than submersibles, primarily due to accessibility of the pump for maintenance purposes. Submersibles tend to exceed the cost of turbines at high settings and tend to be less costly at lower settings.

Add 10 percent to the above RCN factors for irrigated sprinkler systems.

## PUMPS

### DIESEL POWERED DEEP WELL IRRIGATION PUMPS

The complete installation costs are divided into three parts: engines, gear heads, and below ground assembly. Costs are based on data from Fresno to the Southern San Joaquin Valley.

#### DIESEL ENGINES NEW (Includes Tax and Delivery)

HP	Cost
75 – 100	\$9,000 - \$12,000
100 – 150	\$11,500 - \$16,000
150 – 200	\$14,500 - \$19,000
200 – 250	\$19,000 - \$23,000
250 – 300	\$23,000 - \$27,000
300 – 400	\$27,000 - \$35,000

Reconditioned engines deduct 25 to 30 percent

#### GEAR HEADS

HP	DRIVE	SHAFT	FLANGES (2)	GUARD	LABOR	TOTAL
100	\$2,180	\$570	\$315	\$160	\$1,560	\$4,780
125	\$2,360	\$675	\$420	\$160	\$1,560	\$5,180
150	\$2,900	\$675	\$420	\$160	\$1,560	\$5,705
200	\$3,540	\$675	\$420	\$160	\$1,560	\$6,345
250	\$5,880	\$1,040	\$520	\$160	\$1,560	\$9,005
300	\$6,490	\$1,040	\$520	\$160	\$1,560	\$9,760
350	\$7,600	\$1,040	\$520	\$160	\$1,560	\$10,875
400	\$9,400	\$1,150	\$520	\$160	\$1,560	\$12,775

#### BELOW GROUND ASSEMBLY (Includes Column—Tube and Shaft and Bowls)

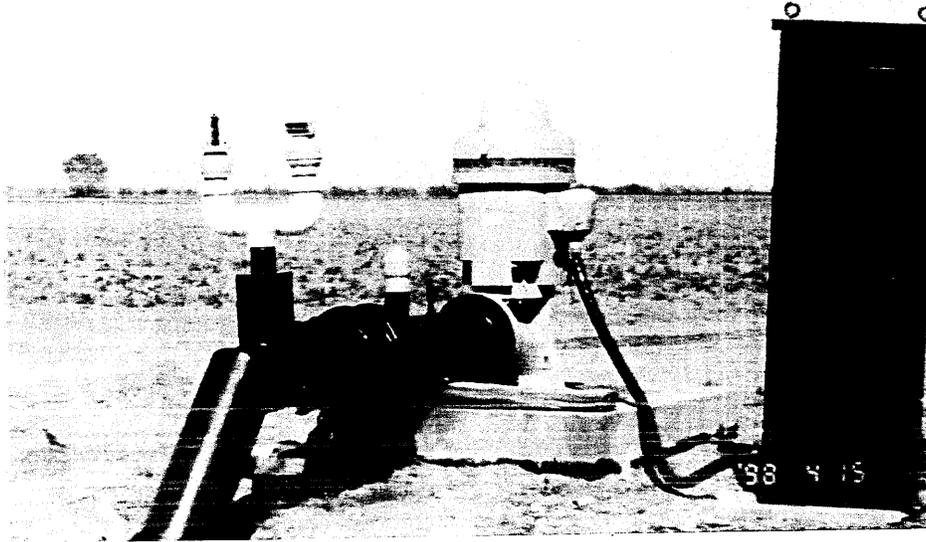
Gear Head HP	200' Lift	300' Lift	400' Lift	500' Lift	600' Lift	700' Lift
100	\$18,080	\$21,900				
125	\$23,400	\$27,380	\$30,400			
150	\$25,800	\$30,400	\$31,900			
200		\$32,800	\$34,680	\$37,100		
250				\$39,400	\$41,850	
300				\$41,000	\$43,450	\$45,900
400						\$48,900

Add to engine and gear head figures.

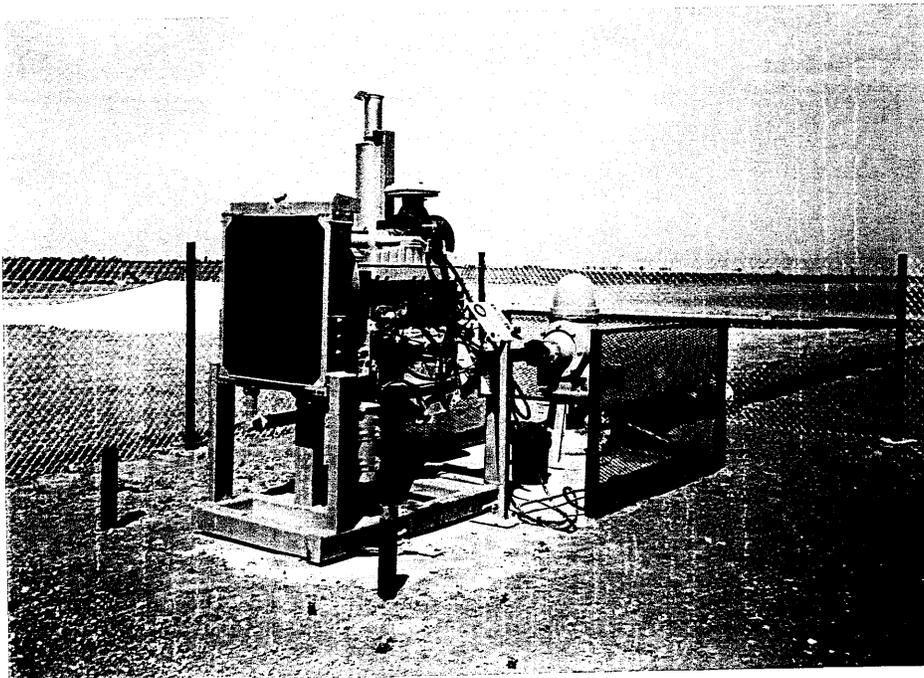
**RULE OF THUMB:** The horsepower of the gear head will require an engine with bulk or gross horsepower of about 1-1/2 times the size of the gear head, i.e., 200 HP gear head x 1.5 = 300 HP engine. 300 bulk HP engine x 80 percent = continuous HP x 80 percent = 192 HP to gear head.

**NOTE:** Costs do not include fuel tanks or fuel tank saddles.

## PUMPS



## TURBINE PUMP



## DIESEL ENGINE WITH GEAR HEAD DRIVE

## PUMPS

### DISCHARGE HEADS

<u>Discharge Size</u>	<u>Price Includes Head, Solenoid, Oiler, Column, Nipple, and Flange</u>
4 x 12	\$1,350
6 x 12	1,620
8 x 12	1,680
8 x 16 1/2	2,100
10 x 20	2,450

### COLUMN ASSEMBLY (In 20' lengths)

Column	Tube	Shaft	Price Per Foot
4"	1 1/2"	1"	\$33
6"	2"	1 1/4"	46
8"	2 1/2"	1 1/2"	55
10"	2 1/2"	1 11/16"	67
10"	3"	1 15/16"	73
12"	3"	1 15/16"	81
12"	3 1/2"	2 1/4"	90

NOTE: Column assembly in 10' lengths—add 10 percent.

Reduce the above costs 10 percent for the San Joaquin Valley.

## PUMPS

### BOWLS

Stages	8"	10"	12"	14"	16"
1	\$1,400	\$1,700	\$2,230	\$3,280	\$4,650
2	1,510	2,100	2,750	4,000	5,250
3	1,840	2,490	3,540	4,850	8,130
4	2,230	3,000	4,100	5,640	8,260
5	2,760	3,410	5,000	6,890	10,230
6	2,880	4,000	5,510	8,000	11,540
7	3,150	4,470	6,170	9,120	13,120
8	3,410	4,990	6,890	10,230	14,430
9	3,870	5,550	7,740	11,020	16,130
10	4,130	5,770	8,260	12,140	17,640
11	4,520	6,300	8,980		
12	4,980	6,890	9,640		
13	5,240	7,400			
14	5,510	7,870			
15	6,040	8,260			

Reduce the above costs 10 percent for the San Joaquin Valley

5 HP	to	7 1/2 HP	Use 8" bowls
10 HP	to	20 HP	Use 10" bowls
25 HP	to	60 HP	Use 12" bowls
75 HP	to	350 HP	Use 14" bowls up to 150' setting
8" bowls—25' per stage (100' = 4 stages)			
10" bowls—35' per stage (100' = 3 stages)			
12" bowls—50' per stage (100' = 2 stages)			
14" bowls—60' per stage (100' = 2 stages)			

**PUMPS  
WELL COSTS**

**REVERSE ROTARY DRILLING  
(Includes Casing, Gravel Pack, Cement Seal, Development of Well)**

Size	To 700'	Over 700'	Over 1,000'
6" 12 ga.	\$30	\$41	
6" 10 ga.	35		
8" 12 ga.	41		
8" 10 ga.	45		
8" 3/16 in.	49	47	
10" 10 ga.	52		
10" 3/16 in.	56		
10" 1/4 in.	63	70	
12" 10 ga.	64		
12" 3/16 in.	69		
12" 1/4 in.	77	83	\$83
14" 3/16 in.	80		
14" 1/4 in.	87	114	115
14" 5/16 in.	94	125	125
16" 3/16 in.	86		
16" 1/4 in.	98		
16" 5/16 in.	107	146	146
18" 3/16 in.	107		
18" 1/4 in.	120		
18" 5/16 in.	140	166	166
20" 3/16 in.	120		
20" 1/4 in.	145		
20" 5/16 in.	161	190	190

Cable Tool Drilling	Cost Per Foot of Depth
6"	\$22 - \$27
8"	\$26 - \$30
10"	\$30 - \$35
12"	\$44 - \$57
14"	\$49 - \$62
16"	\$59 - \$70
18"	\$68 - \$89

**State Law requires 20' seal in all well shafts.**

6"	\$ 500
8"	800
10"	1,000
12"	1,000
14"	1,250
16"	1,250
18"	1,250

## PUMPS

## WINDMILLS

### COST INSTALLED

Wheel or Fan Diameter	Weight (Pounds)	Cost	Installation	Total
6' mill	200	\$2,500	\$1,250	\$3,800
8' mill	370	2,850	1,265	4,100
10' mill	660	4,000	1,450	5,500
12' mill	1,100	5,700	1,750	7,100
14' mill	1,700	8,250	2,000	10,200
16' mill	2,500	10,900	2,400	13,300

### TOWER REQUIREMENTS FOR FAN SIZE IN DIAMETER

Tower Height	Windmill Size				
	6' - 8' Fan	10' Fan	12' Fan	14' Fan	16' Fan
21'	\$1,600	\$1,700			
27'	1,850	2,300	\$2,650	\$2,900	
33'	2,150	2,450	2,900	3,350	\$4,500
40'	2,650	2,900	3,400	3,700	5,200
47'	4,050	3,450	4,000	5,200	6,200

Windmill installation costs are determined by the following:

- Tower height
- Fan diameter
- Force pump: size and diameter
- Cylinder: size and type
- Pipe: size and length
- Rod: material, size and length.

Force pump, cylinder pipe, rod, and miscellaneous costs range from **\$800 to \$2,300**.

<u>Example</u>	
10' Fan	\$5,450
33' Tower	2,450
Force Pump, Cylinder Pipe, Rod and Miscellaneous Costs	<u>1,400</u>
	\$9,300

Refurbished Windmill: Deduct 35 to 40 percent from above prices.

## **AH 534.71: CORRALS AND FENCES**

This section contains various costs associated with corrals and fences. Specifications and costs are included for:

- Steel fencing
- Barbed wire fencing
- Wood fencing
- Wood gates
- Metal gates
- Metal panels
- Vinyl/P.V.C. fencing
- Cattle squeeze

## CORRALS AND FENCES

### STEEL FENCING

Height and Type	Fence Cost Per Lineal Foot	Additions
<b>11 Gauge</b>		
3' chain link	\$7.10	Top Rail: \$1.50 per lineal foot  Barbed wire, 3 strands: \$2.25 per lineal foot  Barbed coils: \$8.00 per lineal foot
4' chain link	7.95	
5' chain link	10.30	
6' chain link	11.50	
8' chain link	14.60	
10' chain link	17.90	
12' chain link	21.30	
<b>9 Gauge</b>		
3' chain link	\$8.00	Barbed wire, 3 strands: \$2.40 per lineal foot on 10' and 12' fence
4' chain link	8.60	
5' chain link	10.30	
6' chain link	12.60	
8' chain link	16.10	
10' chain link	20.50	
12' chain link	24.00	

Fences over 1,000 feet, deduct 10 percent.

### BARBED WIRE FENCING

Size and Type	Per Lineal Foot/1 Mile or More
Barbed wire, 3 strand	\$2.00 to \$2.45
Barbed wire, 4 strand	\$2.20 to \$2.65
Barbed wire, 5 strand	\$2.40 to \$2.90
2 strands barbed, 32" woven wire, steel posts	\$3.50 to \$3.90

Fence costs are complete—fencing and posts. Gates are to be added. Do not deduct fence for gates. Posts are set in concrete on 10' centers.

# CORRALS AND FENCES

## METAL PANELS

### 6-BAR ADJUSTABLE PANEL USED FOR STALLS OR PENS

Size	Cost Per Gate
8' to 10'	\$126.00
10' to 12'	140.00
12' to 14'	154.00
14' to 16'	178.00
16' to 18'	192.00
18' to 20'	218.00
20' to 22'	229.00
22' to 24'	246.00
24' to 26'	255.00

### 3-BAR FENCE PANEL

Size	Cost Per Gate
10'	\$ 70.00
12'	82.00
16'	95.00
18'	101.00
20'	113.00
24'	126.00

### PORTABLE LOADING CHUTE

Size	Cost Per Gate
30" x 5' High	\$1,500

### 5-BAR SOLID PANEL

Size	Cost Per Gate
10'	\$100.00
12'	111.00
16'	147.00
18'	157.00
20'	170.00
24'	191.00

### 6-BAR SOLID PANEL

Size	Cost Per Gate
10'	\$ 112.00
12'	126.00
16'	167.00
18'	174.00
20'	193.00
24'	221.00

## CORRALS AND FENCES

### VINYL/P.V.C. FENCING (White)

Post Size	Rail Size	Number of Rails	Cost Per Lineal Foot Installed
5" x 5"	1-1/2" x 5-1/2" x 16'	3	\$10.25
5" x 5"	1-1/2" x 5-1/2" x 16'	4	\$11.25

Prices based on 1,000' +

**Height:** 54 inches or 6 1/2 feet

**Posts:** Set in concrete—10" diameter, 30" deep, 8' on center

**Gates:** 12' Metal gates (preferred)—\$650 installed, plus paint

12' P.V.C. gates (have tendency to sag)—\$1,000 installed

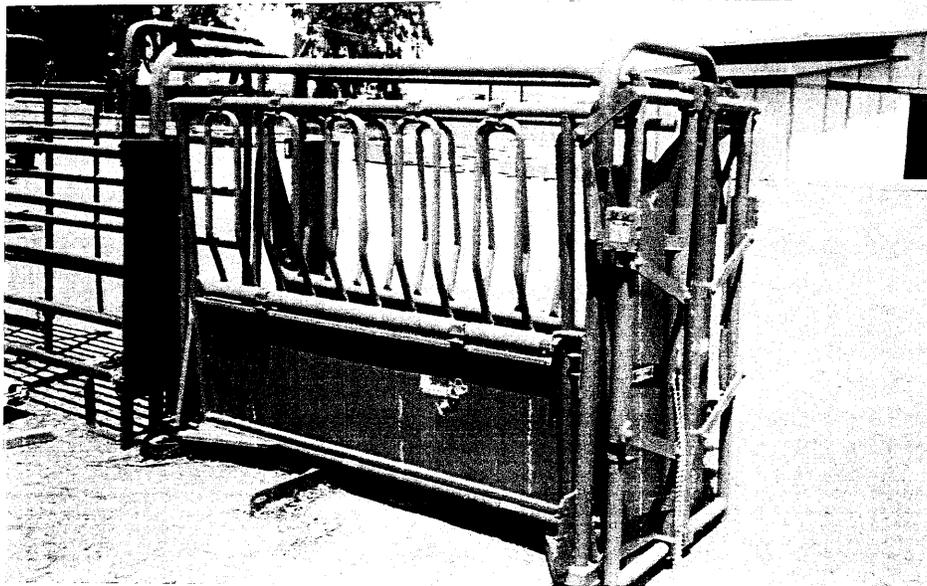
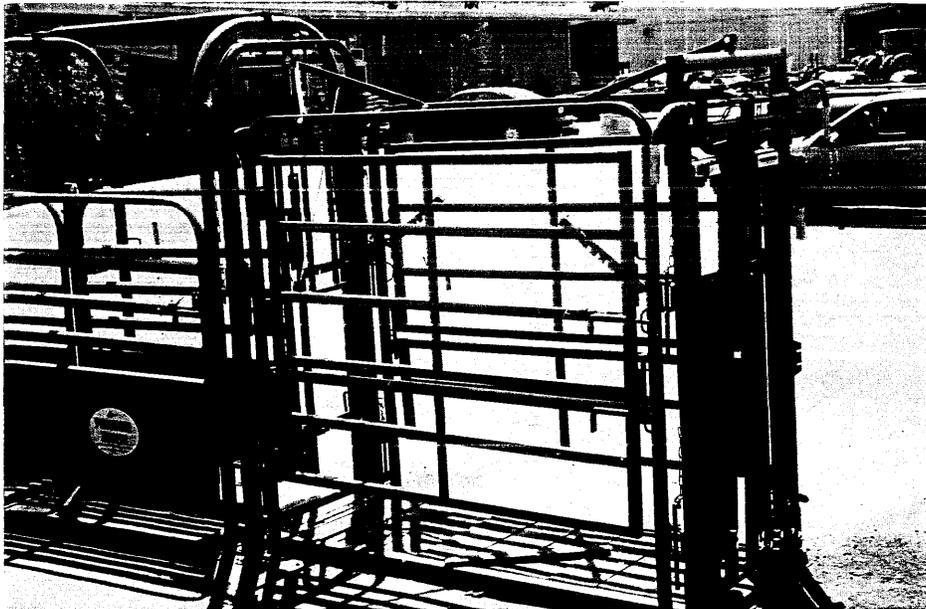
**Color:** Add 10 percent



# CORRALS AND FENCES

## CATTLE SQUEEZE

Hydraulic Metal	\$5,500 to \$6,500
Upright Metal	\$1,800 to \$2,000
Upright Metal Extended	\$2,000 to \$2,500
Calf Chute or Table	\$900 to \$1,000



## **AH 534.75: GREENHOUSES**

This section contains specifications and costs for greenhouses. Commercial greenhouses are constructed with steel or wood posts and trusses on 10' ± centers. Some of the greenhouses have a polycarbonate, fiberglass cover, glass cover, or a polyethylene plastic cover. The span of the truss is generally 20 to 40 feet.

- Some greenhouses are constructed as Quonset design metal ribs and fiberglass cover.
- Wall heights vary from 7 feet to 10 feet on the straight wall construction.

# GREENHOUSES

## BUILDING SPECIFICATIONS

Components	Low Quality	Average Quality	High Quality
Wall and Roof	Light pipe, 4' wall, single light polyethylene cover, fiberglass ends	Galvanized steel frame, 8' wall, double polycarbonate or fiberglass cover	Heavy steel frame, 8' wall, glass or multi-wall polycarbonate cover
Floor	Dirt—some gravel	Gravel—some concrete walks	Adequate concrete walks, concrete foundation
Interior	No lighting, minimum water	Average lighting, water, and roof vents	Ample lighting, water, roof vents, and exhaust fans

## SQUARE-FOOT COSTS

Quality	Square-Foot Area					
	3,000-5,000	10,000	20,000	30,000	40,000	50,000
Low	3.56	3.19	3.08	2.96	2.59	2.38
Average	14.80	13.90	11.79	11.13	10.70	10.30
High	19.72	18.38	16.17	15.14	14.27	13.90

## ADDITIVES

Additional concrete walk	\$2.90 to \$3.25 per square foot
Benching	\$2.60 to \$3.10 per square foot—average quality
Gravel floor	\$.30 - \$.35 per square foot

# GREENHOUSES

## SHADE CLOTH HOUSES

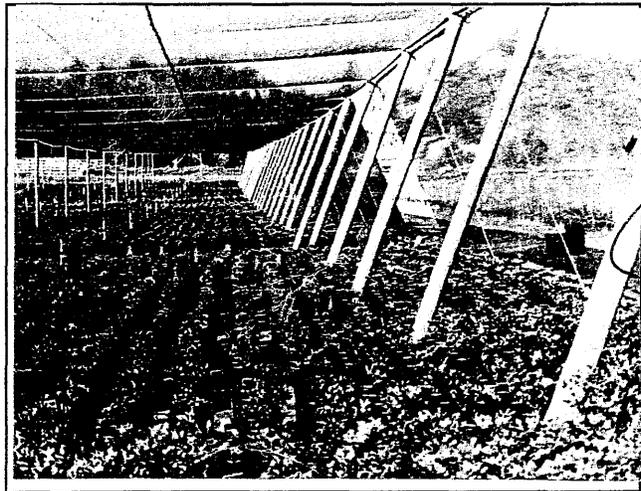
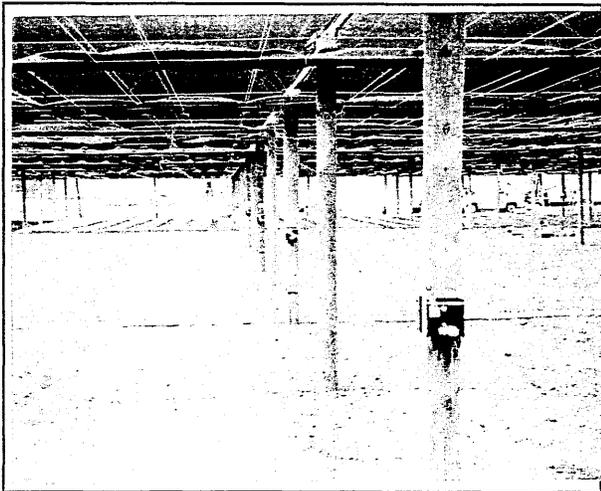
### FAIR TO LOW COST

Wood or steel post construction, no walls. Overhead cable support with wire, covered by a flat shade fabric normally 7' to 9' high. The following costs are with a dirt floor.

Square-Foot Area	Cost Per Square Foot
Under 10,000	\$1.30 to \$1.40
10,000 – 20,000	\$1.05 to \$1.15
20,000 – 40,000	\$.96 to \$1.06
40,000 Up	\$.90 to \$.96

### ADDITIVE

Gravel Floor      \$.30 to \$.35 per square foot



# AH 534.76: LAND DEVELOPMENT AND DRAINAGE TILE

## LEVELING COST

Item	Per Acre
Native Land	\$350 to \$700
Ripping and Relieving	\$400 to \$650
Touch-Up Leveling—Laser	\$110 to \$140
Rescaping	\$70 to \$90

## EARTH MOVING

Size	Cost
Per cubic yard	\$.70 to \$.90

## RIPPING

Item	Cost
Clay 5' deep	\$400 to \$475
Clay 6' deep	\$400 to \$600
Loamy or sandy soil	\$250 to \$400
Hard pan 4' - 6' deep	\$400 to \$650

### NOTE:

1. Ripping costs are based on four-foot centers.
2. Ripping cost with a slip plow attached to shank (superior mixing and breaking of soils) is typically done on six-foot centers, and the cost is equal to standard ripping on four-foot centers.
3. Typically takes ten hours to rip seven acres on four-foot centers.

## LAND DEVELOPMENT AND DRAINAGE TILE

Recent drainage tile installations use corrugated plastic tubing. The spacing varies from 100 feet to 400 feet on centers. The older type installation includes perforated tile with wide trenches. A 5-inch corrugated plastic drain tubing is installed in a 12-inch trench versus a 24-inch to 27-inch trench for the older type installation. The cost for gravel fill is much less because of the narrower trench.

The cost installed of 5-inch corrugated plastic tubing on 400-foot centers, 7 1/2-feet deep including sump and pump, and trench width of 12 inches with gravel fill over the pipe is as follows.

### DRAINAGE PIPE

Loamy Soils	\$450 to \$650 per acre
Rocky Soils	\$650 to \$1,000 per acre

Reduce the above cost 25 percent if system lacks a pump or sump.

Increase the above cost 25 percent if the system has 100-foot centers, with 4-inch lines

# VINEYARD STAKES AND TRELLISES

## TABLE GRAPES

### SINGLE CROSSARM

#### 10 FOOT ROWS

	Spacing—6' x 10' or 7' x 10' or 8' x 10'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$5.50		
Every 15 feet	\$5.50	290	\$1,595
Every 18 feet	\$5.50	242	\$1,331
Every 21 feet	\$5.50	207	\$1,138
Every 24 feet	\$5.50	182	\$1,000
Four wires			\$410
End post with anchor (installed)	\$36.00	14	\$504
End post without anchor (installed)	\$26.00	14	\$364

#### 11 FOOT ROWS

	Spacing—6' x 11' or 7' x 11' or 8' x 11'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$5.50		
Every 15 feet	\$5.50	264	\$1,452
Every 18 feet	\$5.50	220	\$1,210
Every 21 feet	\$5.50	188	\$1,034
Every 24 feet	\$5.50	165	\$908
Four wires			\$372
End post with anchor (installed)	\$36.00	13	\$468
End post without anchor (installed)	\$26.00	13	\$338

#### 12 FOOT ROWS

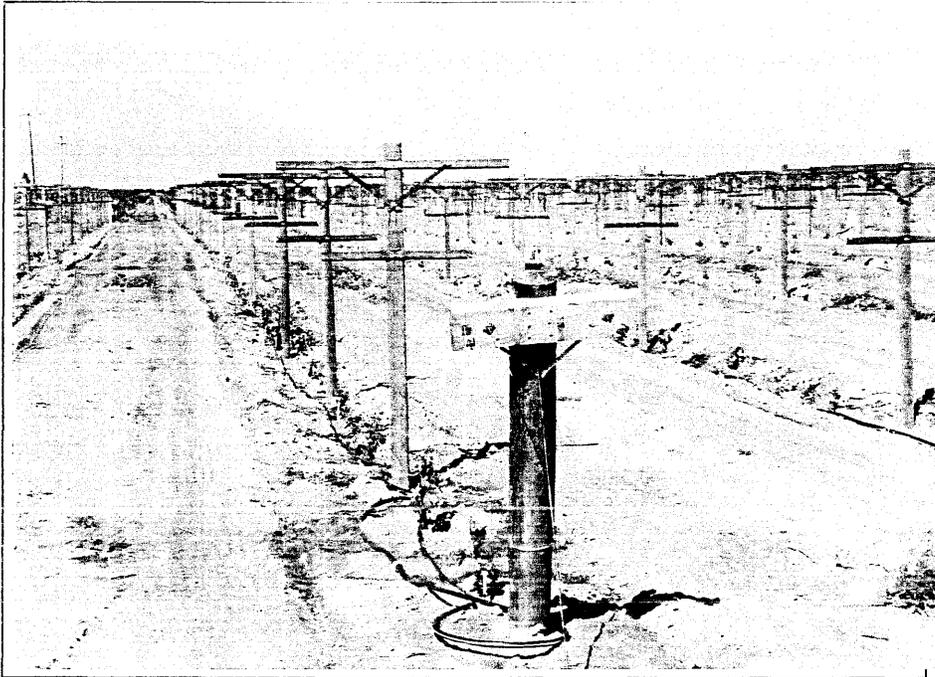
	Spacing—6' x 12' or 7' x 12' or 8' x 12'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$5.50		
Every 15 feet	\$5.50	242	\$1,331
Every 18 feet	\$5.50	201	\$1,105
Every 21 feet	\$5.50	172	\$946
Every 24 feet	\$5.50	151	\$830
Four wires			\$338
End post with anchor (installed)	\$36.00	12	\$432
End post without anchor (installed)	\$26.00	12	\$312

Based on 600 foot rows

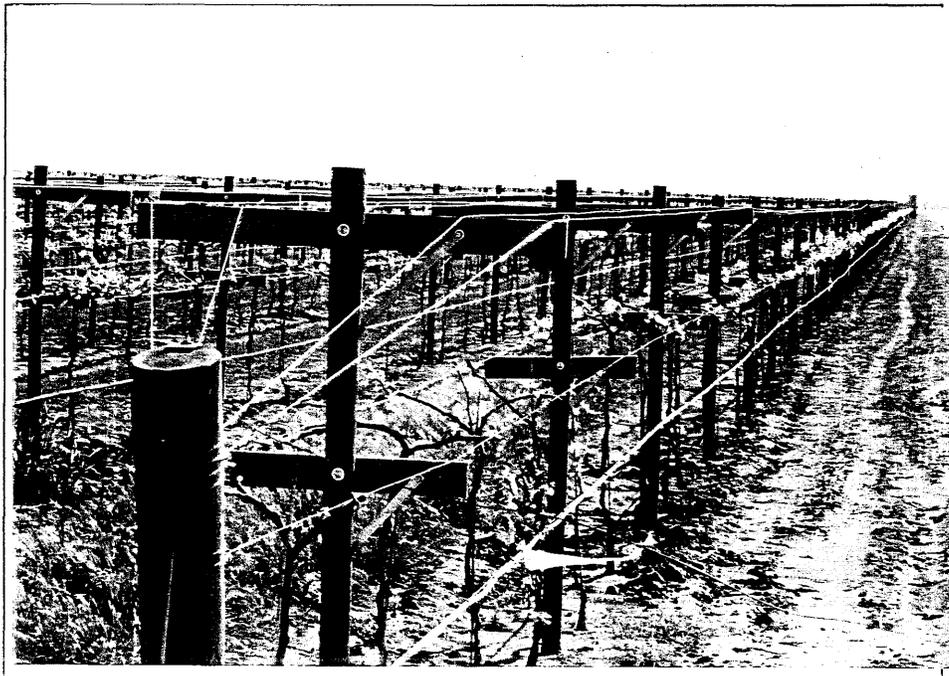
# VINEYARD STAKES AND TRELLISES

## TABLE GRAPES

### DOUBLE CROSSARM



Seven-foot stake, 42" top crossarm, 24" to 30" lower crossarm, with six wires (13-gauge)



# VINEYARD STAKES AND TRELLISES

## TABLE GRAPES

### DOUBLE CROSSARM

#### 10 FOOT ROWS

	Spacing—6' x 10' or 7' x 10' or 8' x 10'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$6.40		
Every 15 feet	\$6.40	290	\$1,856
Every 18 feet	\$6.40	242	\$1,548
Every 21 feet	\$6.40	207	\$1,325
Every 24 feet	\$6.40	182	\$1,165
Six wires			\$616
End post with anchor (installed)	\$36.00	14	\$504
End post without anchor (installed)	\$26.00	14	\$364

#### 11 FOOT ROWS

	Spacing—6' x 11' or 7' x 11' or 8' x 11'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$6.40		
Every 15 feet	\$6.40	264	\$1,690
Every 18 feet	\$6.40	220	\$1,408
Every 21 feet	\$6.40	188	\$1,203
Every 24 feet	\$6.40	165	\$1,056
Six wires			\$558
End post with anchor (installed)	\$36.00	13	\$468
End post without anchor (installed)	\$26.00	13	\$338

#### 12 FOOT ROWS

	Spacing—6' x 12' or 7' x 12' or 8' x 12'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$6.40		
Every 15 feet	\$6.40	242	\$1,548
Every 18 feet	\$6.40	201	\$1,286
Every 21 feet	\$6.40	172	\$1,100
Every 24 feet	\$6.40	151	\$966
Six wires			\$514
End post with anchor (installed)	\$36.00	12	\$432
End post without anchor (installed)	\$26.00	12	\$313

Based on 600 foot rows

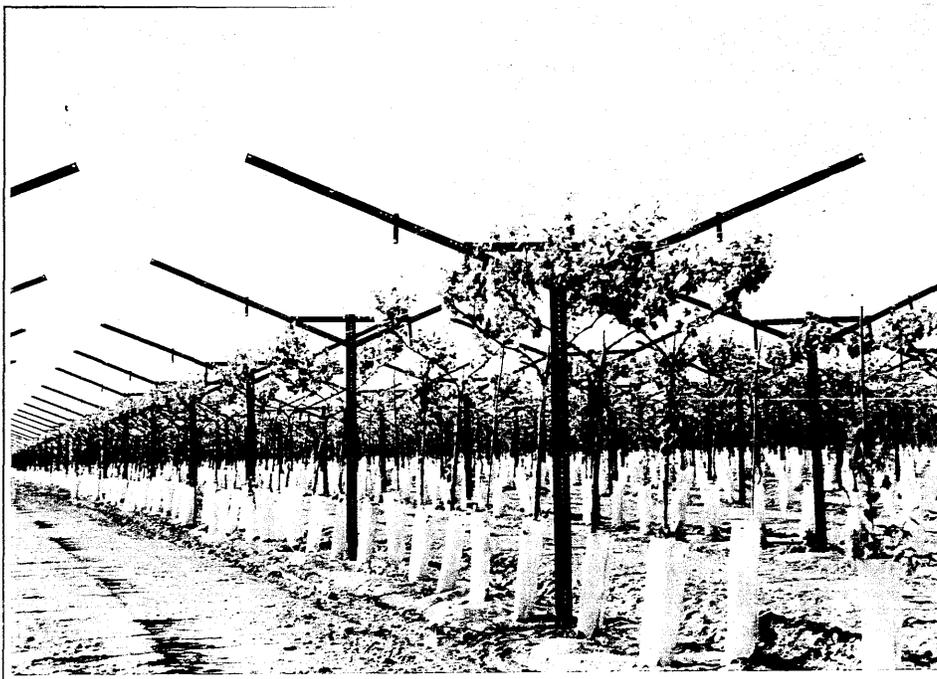
# VINEYARD STAKES AND TRELLISES

TABLE GRAPES/RAISINS

OPEN GABLE TRELLIS



Eight-foot steel post, 4' angle iron on each side of post forming V with the tops approximately 6' to 7' apart, with 3 to 4 wires (13-gauge) on each side



# VINEYARD STAKES AND TRELLISES

## TABLE GRAPES/RAISINS

### OPEN GABLE TRELLIS

#### 10 FOOT ROWS

	Spacing—6' x 10' or 7' x 10' or 8' x 10'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$13.50		
Every 18 feet	\$13.50	242	\$3,267
Every 21 feet	\$13.50	207	\$2,795
Every 24 feet	\$13.50	182	\$2,457
Six wires			\$616
Eight wires			\$821
End post with anchor (installed)	\$36.00	14	\$504

#### 11 FOOT ROWS

	Spacing—6' x 11' or 7' x 11' or 8' x 11'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$13.50		
Every 18 feet	\$13.50	220	\$2,970
Every 21 feet	\$13.50	188	\$2,538
Every 24 feet	\$13.50	165	\$2,228
Six wires			\$560
Eight wires			\$745
End post with anchor (installed)	\$36.00	13	\$468

#### 12 FOOT ROWS

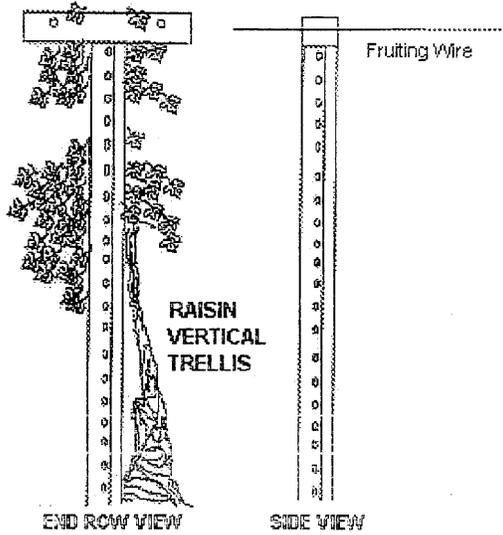
	Spacing—6' x 12' or 7' x 12' or 8' x 12'		
	Cost Per Unit	Posts Per Acre	Cost Per Acre
Post and crossarm assembly	\$13.50		
Every 18 feet	\$13.50	201	\$2,713
Every 21 feet	\$13.50	172	\$2,322
Every 24 feet	\$13.50	151	\$2,038
Six wires			\$514
Eight wires			\$684
End post with anchor (installed)	\$36.00	12	\$432

Based on 600 foot rows

# VINEYARD STAKES AND TRELLISES

## RAISIN GRAPES

### VERTICAL TRELLIS



Commonly used on raisins with 12' spacing.

**Materials:** 8' wooden end posts with 7' medium T stakes at each vine. A single 24" metal crossarm with two 13-gauge wires.



# VINEYARD STAKES AND TRELLISES

## RAISIN GRAPES

### TRELLIS

#### 10 FOOT ROWS

	Cost Per Unit	Posts Per Acre	Cost Per Acre		
			5' x 10'	6' x 10'	7' x 10'
Light 7' stake and 24" crossarm	\$4.70				
Every 5 feet	\$4.70	871	\$4,094		
Every 6 feet	\$4.70	726		\$3,412	
Every 7 feet	\$4.70	622			\$2,923
Two wires			\$205	\$205	\$205
End post	\$26.00	14	\$364	\$364	\$364
Light 7' stake with no crossarm	\$3.35		\$2,918	\$2,432	\$2,084
One wire			\$103	\$103	\$103

#### 11 FOOT ROWS

	Cost Per Unit	Posts Per Acre	Cost Per Acre		
			5' x 11'	6' x 11'	7' x 11'
Light 7' stake and 24" crossarm	\$4.70				
Every 5 feet	\$4.70	792	\$3,722		
Every 6 feet	\$4.70	660		\$3,102	
Every 7 feet	\$4.70	566			\$2,660
Two wires			\$186	\$186	\$186
End post	\$26.00	13	\$338	\$338	\$338
Light 7' stake with no crossarm	\$3.35		\$2,653	\$2,211	\$1,896
One wire			\$93	\$93	\$93

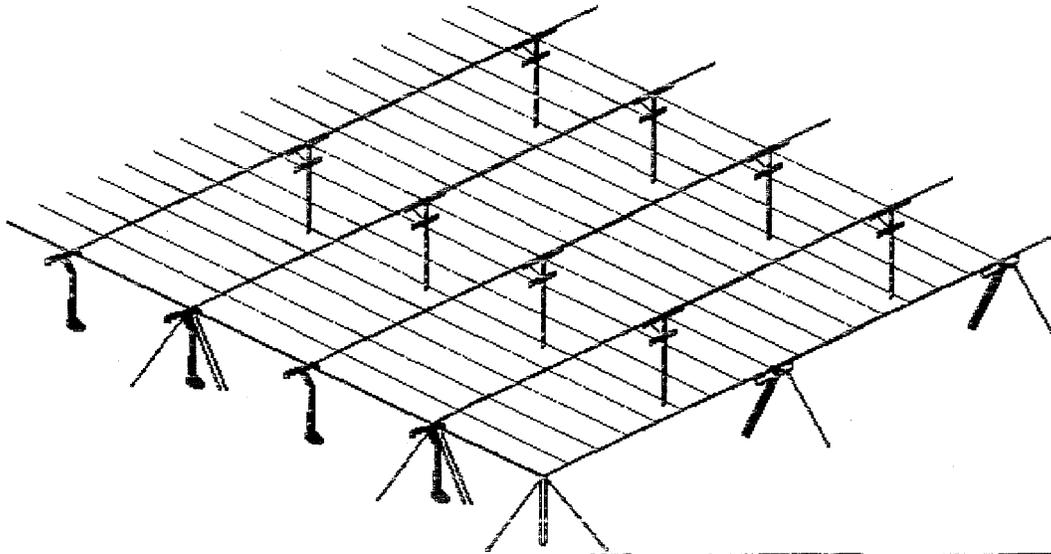
#### 12 FOOT ROWS

	Cost Per Unit	Posts Per Acre	Cost Per Acre		
			5' x 12'	6' x 12'	7' x 12'
Light 7' stake and 24" crossarm	\$4.70				
Every 5 feet	\$4.70	726	\$3,412		
Every 6 feet	\$4.70	605		\$2,843	
Every 7 feet	\$4.70	518			\$2,435
Two wires			\$156	\$156	\$156
End post	\$26.00	12	\$312	\$312	\$312
Light 7' stake with no crossarm	\$3.35		\$2,432	\$2,027	\$1,735
One wire			\$78	\$78	\$78

# VINEYARD STAKES AND TRELLISES

## RAISIN GRAPES

### OVERHEAD DRY ON VINE TRELLIS



Commonly used in 12' row with 6' between vines; occasionally used on 10' and 11' rows; a few 8' and 9' rows.

**Materials:** Wood post 12' on ends, 9' on sides, 10' wood post every third vine with 36" crossarm, 8 wires per row, and cable support.

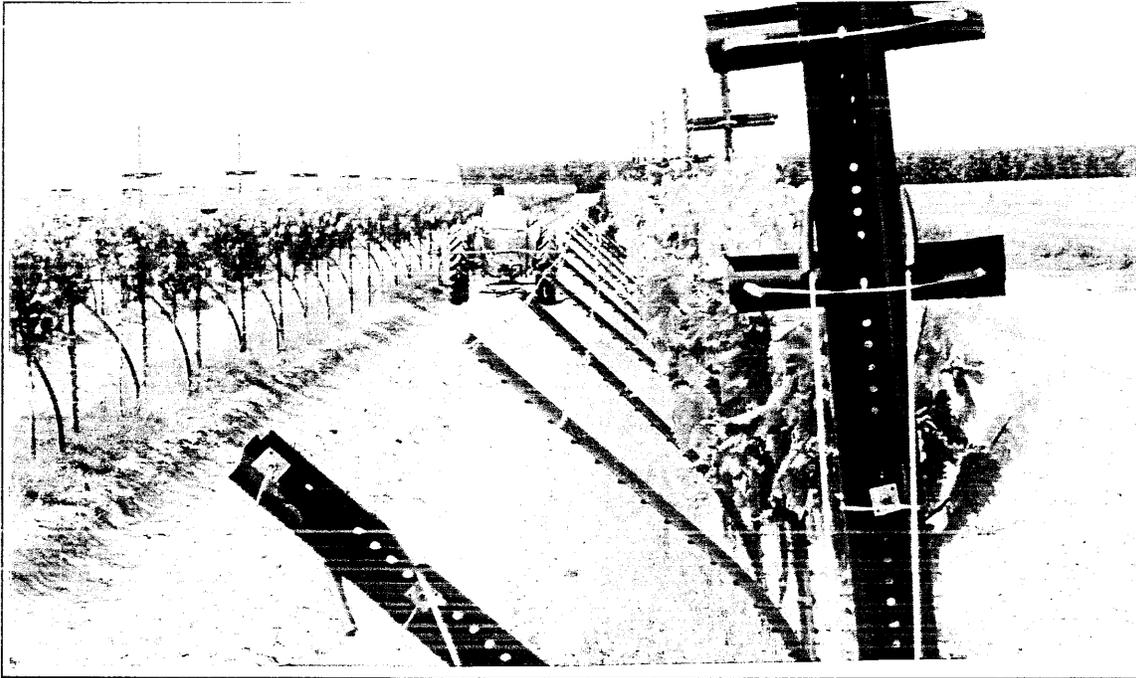
Trellising Cost Per Acre:

- \$4,600 to \$5,000 on 6' x 12' spacing
- \$5,000 to \$5,500 on 10' and 11' rows
- \$5,500 to \$6,500 on 8' and 9' rows

# VINEYARD STAKES AND TRELLISES

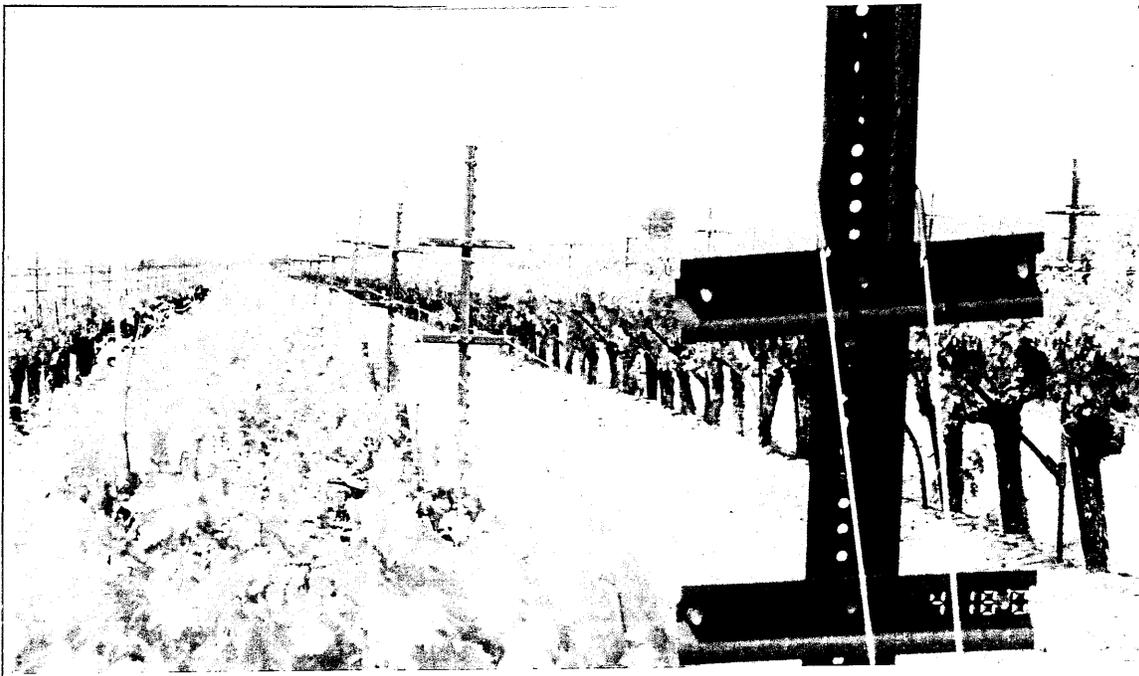
## RAISIN GRAPES

### SUN MAID SOUTHSIDE DRY ON VINE TRELLIS



8' T-post every 28' with two 10' crossarms and 5 wires. In between T-posts is 2 bent 7' to 8' T-posts with 2 wires. Each vine will have a training stake. Each end has a heavy steel post with anchors.

Cost: \$2,450 to \$3,000 for 7' x 12' spacing.



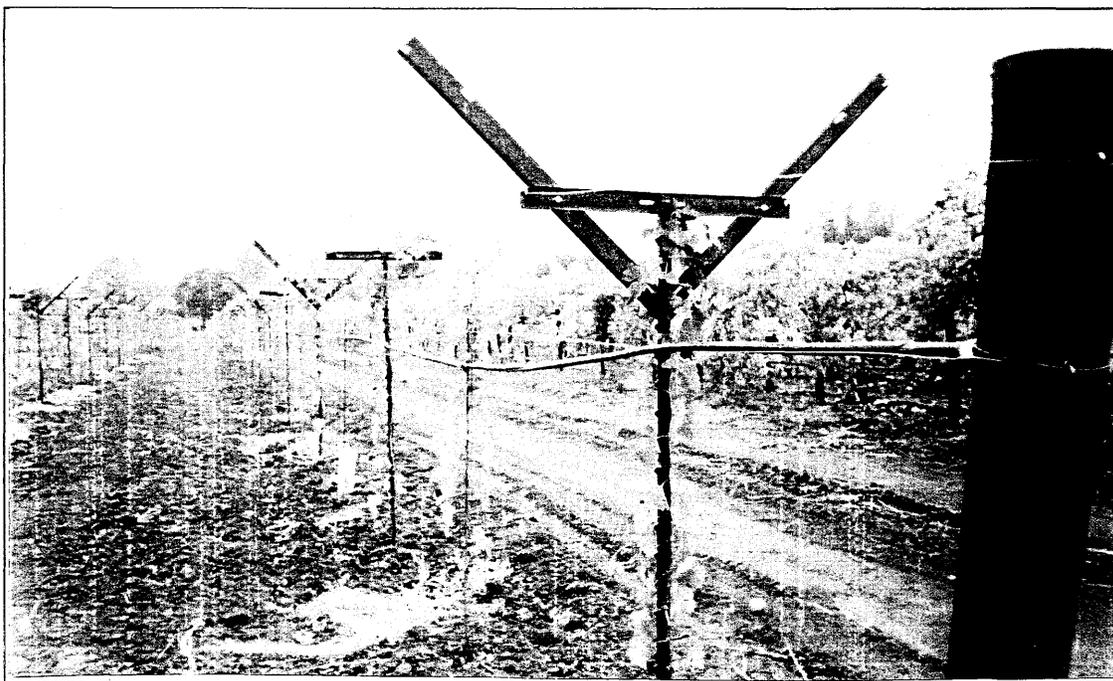
# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### TRELLIS



T-post with crossarm every vine

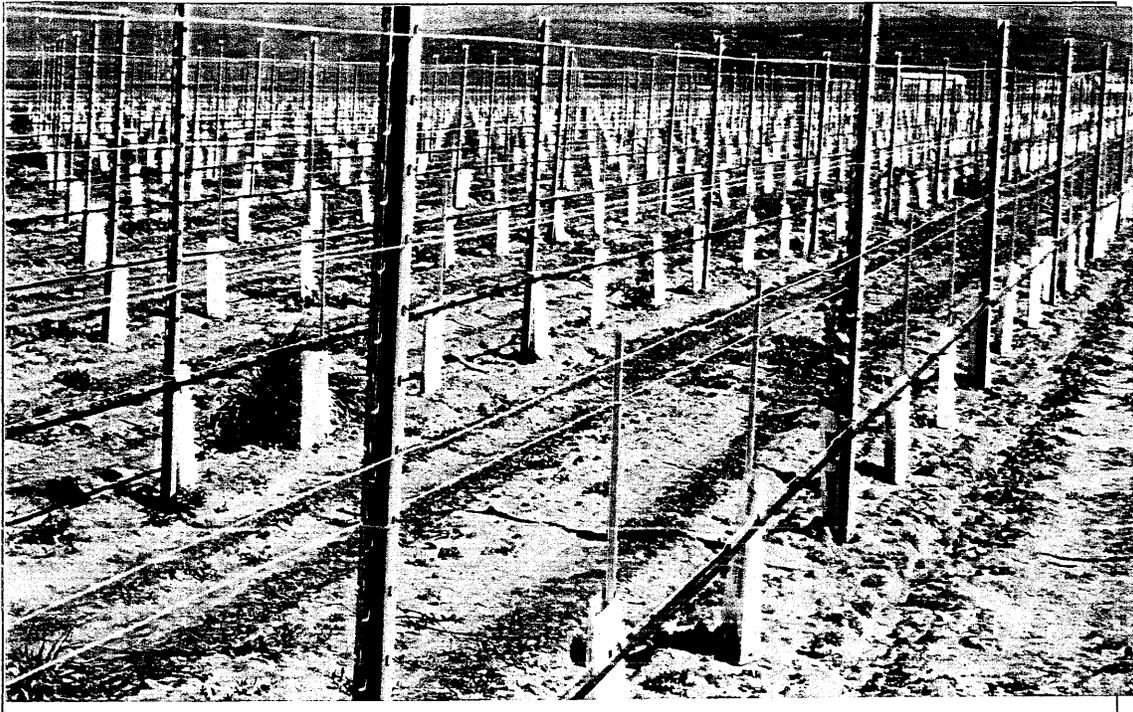


T-post and V crossarm

# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### TRELLIS



8' vertical line post with 4' T-posts in between



8' vertical line post with light grape stakes in between

# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### TRELLIS

#### 6 FOOT ROWS

	Cost Per Unit	Vines Per Acre		
		1,815	1,452	1,210
		Cost Per Acre		
		4' x 6'	5' x 6'	6' x 6'
22 end posts per acre with anchor	\$36	\$792	\$792	\$792
22 end posts per acre without anchor	\$27	\$594	\$594	\$594
7' Light T-post (Add 30% for heavy T-post)				
Every vine	\$3.30	\$5,990	\$4,792	\$3,993
Every other vine	\$1.65	\$2,995	\$2,396	\$1,996
Every third vine	\$1.10	\$1,996	\$1,597	\$1,331
Every fourth vine	\$.83	\$1,506	\$1,205	\$1,004
8' Vertical line post (13 ga.)				
Every vine	\$8.00	\$14,520	\$11,616	\$9,680
Every other vine	\$4.00	\$7,260	\$5,808	\$4,840
Every third vine	\$2.64	\$4,792	\$3,833	\$3,194
Every fourth vine	\$2.00	\$3,630	\$2,904	\$2,420
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.60			
One rebar between posts	\$.30	\$544	\$436	\$363
Two rebars between posts	\$.40	\$726	\$581	\$484
Three rebars between posts	\$.45	\$816	\$653	\$544
24" crossarm (Add 25% for 30" crossarm)				
Every vine	\$1.40	\$2,541	\$2,033	\$1,694
Every other vine	\$.70	\$1,270	\$1,016	\$847
Every third vine	\$.47	\$853	\$682	\$569
Every fourth vine	\$.35	\$635	\$508	\$424
Two wires		\$340	\$340	\$340
Three wires		\$511	\$511	\$511
Four wires		\$680	\$680	\$680
Five wires		\$851	\$851	\$851
Six wires		\$1,022	\$1,022	\$1,022
Seven wires		\$1,192	\$1,192	\$1,192
Eight wires		\$1,362	\$1,362	\$1,362

# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### TRELLIS

#### 7 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		1,555	1,245	1,037	889
		Cost Per Acre			
		4' x 7'	5' x 7'	6' x 7'	7' x 7'
20 end posts per acre with anchor	\$36	\$720	\$720	\$720	\$720
20 end posts per acre without anchor	\$27	\$540	\$540	\$540	\$540
7' Light T-post (Add 30% for heavy T-post)					
Every vine	\$3.30	\$5,131	\$4,109	\$3,422	\$2,934
Every other vine	\$1.65	\$2,566	\$2,054	\$1,711	\$1,467
Every third vine	\$1.10	\$1,710	\$1,370	\$1,140	\$978
Every fourth vine	\$.83	\$1,291	\$1,033	\$860	\$738
8' Vertical line post (13 ga.)					
Every vine	\$8.00	\$12,440	\$9,960	\$8,296	\$7,112
Every other vine	\$4.00	\$6,220	\$4,980	\$4,148	\$3,556
Every third vine	\$2.64	\$4,105	\$3,289	\$2,738	\$2,347
Every fourth vine	\$2.00	\$3,110	\$2,490	\$2,074	\$1,778
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.60				
One rebar between posts	\$.30	\$466	\$374	\$311	\$267
Two rebars between posts	\$.40	\$622	\$498	\$415	\$356
Three rebars between posts	\$.45	\$700	\$560	\$467	\$400
24" crossarm (Add 25% for 30" crossarm)					
Every vine	\$1.40	\$2,177	\$1,743	\$1,452	\$1,245
Every other vine	\$.70	\$1,088	\$871	\$726	\$622
Every third vine	\$.47	\$731	\$585	\$487	\$417
Every fourth vine	\$.35	\$544	\$436	\$363	\$311
Two wires		\$289	\$289	\$289	\$289
Three wires		\$438	\$438	\$438	\$438
Four wires		\$584	\$584	\$584	\$584
Five wires		\$730	\$730	\$730	\$730
Six wires		\$875	\$875	\$875	\$875
Seven wires		\$1,021	\$1,021	\$1,021	\$1,021
Eight wires		\$1,156	\$1,156	\$1,156	\$1,156

# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### TRELLIS

#### 8 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		1,089	907	778	681
		Cost Per Acre			
		5' x 8'	6' x 8'	7' x 8'	8' x 8'
18 end posts per acre with anchor	\$36	\$648	\$648	\$648	\$648
18 end posts per acre without anchor	\$27	\$486	\$486	\$486	\$486
7' Light T-post (Add 30% for heavy T-post)					
Every vine	\$3.30	\$3,595	\$2,993	\$2,567	\$2,247
Every other vine	\$1.65	\$1,797	\$1,496	\$1,284	\$1,124
Every third vine	\$1.10	\$1,198	\$998	\$856	\$749
Every fourth vine	\$.83	\$904	\$753	\$645	\$565
8' Vertical line post (13 ga.)					
Every vine	\$8.00	\$8,712	\$7,256	\$6,224	\$5,448
Every other vine	\$4.00	\$4,356	\$3,628	\$3,112	\$2,724
Every third vine	\$2.64	\$2,875	\$2,394	\$2,054	\$1,798
Every fourth vine	\$2.00	\$2,178	\$1,814	\$1,556	\$1,362
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.60				
One rebar between posts	\$.30	\$327	\$272	\$233	\$204
Two rebars between posts	\$.40	\$436	\$362	\$311	\$272
Three rebars between posts	\$.45	\$490	\$408	\$350	\$306
24" crossarm (Add 25% for 30" crossarm)					
Every vine	\$1.40	\$1,525	\$1,270	\$1,089	\$953
Every other vine	\$.70	\$762	\$635	\$545	\$477
Every third vine	\$.47	\$512	\$426	\$366	\$320
Every fourth vine	\$.35	\$381	\$317	\$272	\$238
Two wires		\$257	\$257	\$257	\$257
Three wires		\$385	\$385	\$385	\$385
Four wires		\$511	\$511	\$511	\$511
Five wires		\$639	\$639	\$639	\$639
Six wires		\$769	\$769	\$769	\$769
Seven wires		\$897	\$897	\$897	\$897
Eight wires		\$1,023	\$1,023	\$1,023	\$1,023

# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### TRELLIS

#### 9 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		968	807	691	605
		Cost Per Acre			
		5' x 9'	6' x 9'	7' x 9'	8' x 9'
16 end posts per acre with anchor	\$36	\$576	\$576	\$576	\$576
16 end posts per acre without anchor	\$27	\$432	\$432	\$432	\$432
7' Light T-post (Add 30% for heavy T-post)					
Every vine	\$3.30	\$3,194	\$2,663	\$2,280	\$1,996
Every other vine	\$1.65	\$1,597	\$1,331	\$1,140	\$998
Every third vine	\$1.10	\$1,065	\$888	\$760	\$665
Every fourth vine	\$.83	\$803	\$670	\$574	\$502
8' Vertical line post (13 ga.)					
Every vine	\$8.00	\$7,744	\$6,456	\$5,528	\$4,840
Every other vine	\$4.00	\$3,872	\$3,228	\$2,764	\$2,420
Every third vine	\$2.64	\$2,555	\$2,130	\$1,824	\$1,597
Every fourth vine	\$2.00	\$1,936	\$1,614	\$1,382	\$1,210
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.60				
One rebar between posts	\$.30	\$290	\$242	\$207	\$181
Two rebars between posts	\$.40	\$387	\$323	\$276	\$242
Three rebars between posts	\$.45	\$436	\$363	\$311	\$272
24" crossarm (Add 25% for 30" crossarm)					
Every vine	\$1.40	\$1,355	\$1,130	\$967	\$847
Every other vine	\$.70	\$678	\$565	\$483	\$423
Every third vine	\$.47	\$455	\$379	\$325	\$284
Every fourth vine	\$.35	\$399	\$282	\$242	\$212
Two wires		\$229	\$229	\$229	\$229
Three wires		\$342	\$342	\$342	\$342
Four wires		\$457	\$457	\$457	\$457
Five wires		\$571	\$571	\$571	\$571
Six wires		\$685	\$685	\$685	\$685
Seven wires		\$800	\$800	\$800	\$800
Eight wires		\$914	\$914	\$914	\$914

# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### TRELLIS

#### 10 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		871	726	622	544
		Cost Per Acre			
		5' x 10'	6' x 10'	7' x 10'	8' x 10'
14 end posts per acre with anchor	\$36	\$504	\$504	\$504	\$504
14 end posts per acre without anchor	\$27	\$378	\$378	\$378	\$378
7' Light T-post (Add 30% for heavy T-post)					
Every vine	\$3.30	\$2,874	\$2,396	\$2,053	\$1,795
Every other vine	\$1.65	\$1,437	\$1,198	\$1,026	\$898
Every third vine	\$1.10	\$958	\$799	\$684	\$598
Every fourth vine	\$.83	\$723	\$603	\$516	\$452
8' Vertical line post (13 ga.)					
Every vine	\$8.00	\$6,968	\$5,808	\$4,976	\$4,352
Every other vine	\$4.00	\$3,484	\$2,904	\$2,488	\$2,176
Every third vine	\$2.64	\$2,299	\$1,917	\$1,642	\$1,436
Every fourth vine	\$2.00	\$1,742	\$1,452	\$1,244	\$1,088
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.60				
One rebar between posts	\$.30	\$261	\$218	\$187	\$163
Two rebars between posts	\$.40	\$348	\$290	\$249	\$218
Three rebars between posts	\$.45	\$392	\$327	\$280	\$245
24" crossarm (Add 25% for 30" crossarm)					
Every vine	\$1.40	\$1,219	\$1,016	\$870	\$761
Every other vine	\$.70	\$610	\$508	\$435	\$380
Every third vine	\$.47	\$409	\$341	\$292	\$256
Every fourth vine	\$.35	\$305	\$254	\$218	\$190
Two wires		\$205	\$205	\$205	\$205
Three wires		\$308	\$308	\$308	\$308
Four wires		\$411	\$411	\$411	\$411
Five wires		\$492	\$492	\$492	\$492
Six wires		\$616	\$616	\$616	\$616
Seven wires		\$719	\$719	\$719	\$719
Eight wires		\$821	\$821	\$821	\$821

# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### TRELLIS

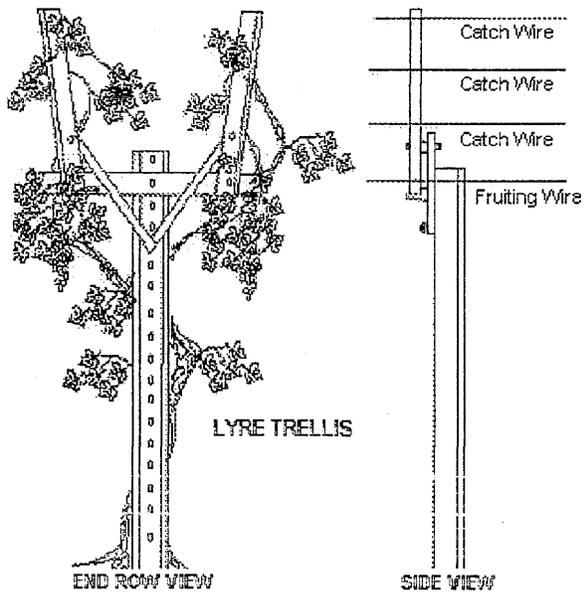
#### 11 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		792	660	566	495
		Cost Per Acre			
		5' x 11'	6' x 11'	7' x 11'	8' x 11'
13 end posts per acre with anchor	\$34	\$442	\$442	\$442	\$442
13 end posts per acre without anchor	\$26	\$338	\$338	\$338	\$338
7' Light T-post (Add 30% for heavy T-post)					
Every vine	\$3.30	\$2,613	\$2,178	\$1,867	\$1,633
Every other vine	\$1.65	\$1,307	\$1,089	\$934	\$816
Every third vine	\$1.10	\$871	\$726	\$622	\$545
Every fourth vine	\$.83	\$657	\$548	\$470	\$411
8' Vertical line post (13 ga.)					
Every vine	\$8.00	\$6,336	\$5,280	\$4,528	\$3,960
Every other vine	\$4.00	\$3,168	\$2,640	\$2,264	\$1,980
Every third vine	\$2.64	\$2,091	\$1,742	\$1,494	\$1,307
Every fourth vine	\$2.00	\$1,584	\$1,320	\$1,132	\$990
4' Rebar or pencil rod at each vine (between T-post or vertical line)	\$.60				
One rebar between posts	\$.30	\$238	\$198	\$170	\$148
Two rebars between posts	\$.40	\$316	\$264	\$226	\$198
Three rebars between posts	\$.45	\$356	\$297	\$255	\$223
24" crossarm (Add 25% for 30" crossarm)					
Every vine	\$1.40	\$1,108	\$924	\$792	\$693
Every other vine	\$.70	\$554	\$462	\$396	\$346
Every third vine	\$.47	\$372	\$310	\$266	\$233
Every fourth vine	\$.35	\$277	\$231	\$198	\$173
Two wires		\$186	\$186	\$186	\$186
Three wires		\$280	\$280	\$280	\$280
Four wires		\$372	\$372	\$372	\$372
Five wires		\$464	\$464	\$464	\$464
Six wires		\$560	\$560	\$560	\$560
Seven wires		\$653	\$653	\$653	\$653
Eight wires		\$745	\$745	\$745	\$745

# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### LYRE TRELLIS



Commonly used in wide row of 11' to 12'.

**Materials:** Heavy steel or wood end posts; heavy and medium T stakes with anchor plates; 8' to 12' gauge wires on metal open Lyre crossarms with a typical width of 42" at the top; 6 to 10 wires.



# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### LYRE SYSTEM

#### 11 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		792	660	566	495
		Cost Per Acre			
		5' x 11'	6' x 11'	7' x 11'	8' x 11'
13 end posts per acre with anchor	\$36	\$468	\$468	\$468	\$468
13 end posts per acre without anchor	\$27	\$351	\$351	\$351	\$351
Heavy steel stake with open lyre crossarm					
Every vine	\$15.00				
Every other vine	\$7.50	\$5,940	\$4,950	\$4,245	\$3,712
Every third vine	\$5.00	\$3,960	\$3,300	\$2,830	\$2,475
Every fourth vine	\$3.75	\$2,970	\$2,475	\$2,122	\$1,856
4' Rebar or pencil rod at each vine (between lyre crossarm)	\$.60				
One rebar between lyres	\$.30	\$238	\$198	\$170	\$148
Two rebars between lyres	\$.40	\$317	\$264	\$226	\$198
Three rebars between lyres	\$.45	\$356	\$297	\$254	\$222
Six wires		\$560	\$560	\$560	\$560
Seven wires		\$653	\$653	\$653	\$653
Eight wires		\$745	\$745	\$745	\$745
Nine wires		\$837	\$837	\$837	\$837
Ten wires		\$930	\$930	\$930	\$930

# VINEYARD STAKES AND TRELLISES

## WINE GRAPES

### LYRE SYSTEM

#### 12 FOOT ROWS

	Cost Per Unit	Vines Per Acre			
		726	605	518	454
		Cost Per Acre			
		5' x 12'	6' x 12'	7' x 12'	8' x 12'
12 end posts per acre with anchor	\$36	\$432	\$432	\$432	\$432
12 end posts per acre without anchor	\$27	\$324	\$324	\$324	\$324
Heavy steel stake with open lyre crossarm					
Every vine	\$15.00				
Every other vine	\$7.50	\$5,445	\$4,538	\$3,885	\$3,405
Every third vine	\$5.00	\$3,630	\$3,025	\$2,590	\$2,270
Every fourth vine	\$3.75	\$2,723	\$2,269	\$1,943	\$1,702
4' Rebar or pencil rod at each vine (between lyre crossarm)	\$.60				
One rebar between lyres	\$.30	\$218	\$182	\$155	\$136
Two rebars between lyres	\$.40	\$290	\$242	\$207	\$181
Three rebars between lyres	\$.45	\$327	\$272	\$233	\$204
Six wires		\$512	\$512	\$512	\$512
Seven wires		\$600	\$600	\$600	\$600
Eight wires		\$685	\$685	\$685	\$685
Nine wires		\$770	\$770	\$770	\$770
Ten wires		\$850	\$850	\$850	\$850

# VINEYARD STAKES AND TRELLISES

## MISCELLANEOUS

### COMPONENT COSTS TO CALCULATE COSTS PER ACRE

#### WIRE PRICE PER ACRE

Based on 10' spacing between rows of vines and 13 gauge wire	
2 wire	\$205
3 wire	\$308
4 wire	\$411
5 wire	\$514
6 wire	\$616

#### METAL STAKES AND CROSSARMS

T-Post Stakes and Training Stakes		Metal Crossarms With U Bolts (Medium Grade)	
7' .95 lbs/ft	\$3.30	6"	\$.70
7' 1.25 lbs/ft	\$4.10	12"	\$.80
6' .95 lbs/ft	\$2.82	18"	\$1.10
6' 1.25 lbs/ft	\$3.50	24"	\$1.40
5' .95 lbs/ft	\$2.35	30" to 34"	\$2.00
4' Rebar Training Stake	\$.60	36"	\$2.10
4' ¼" Steel Training Stake	\$.50	48"	\$2.80

Heavy duty elaborate galvanized crossarms can run 40 to 50 percent more.

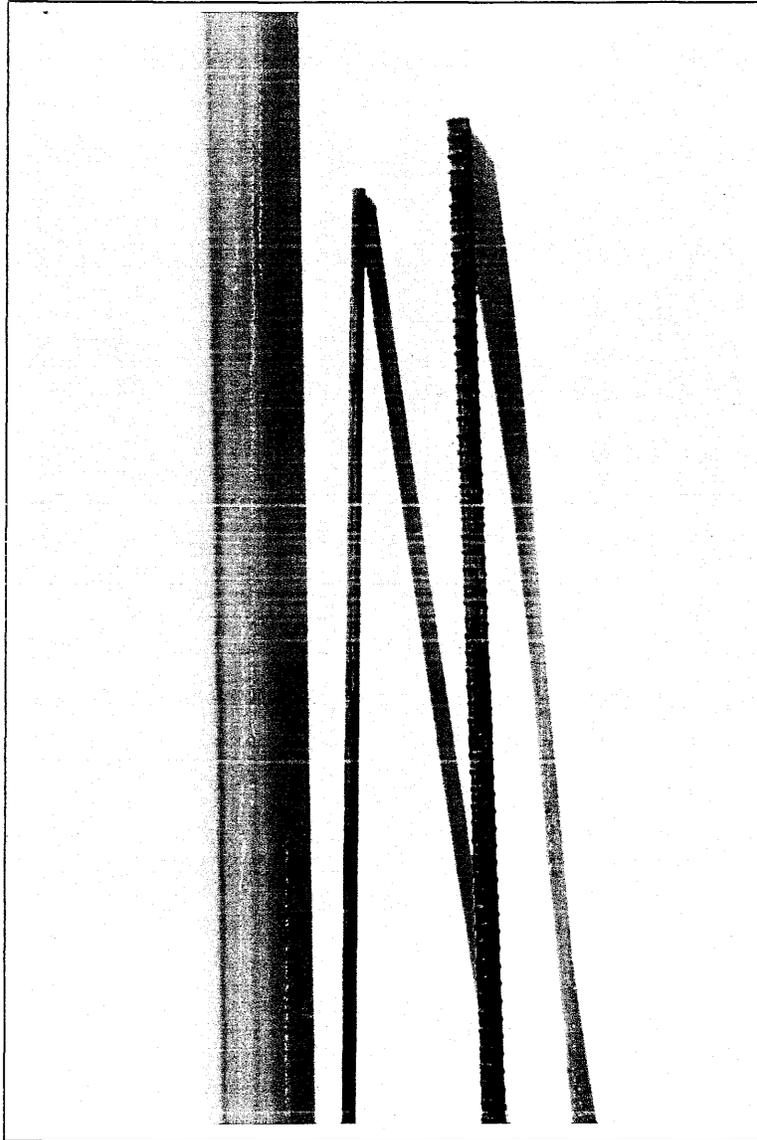
#### WOOD STAKES AND CROSSARMS

Stakes		Crossarms With Clips		Crossarms With U-Bolts	
5'	1 ¾" sq \$1.30	12"	\$.45	12"	\$.45 - \$.55
6'	1 ¾" sq \$1.60	24"	\$.60	24"	\$.75 - \$.90
7'	1 ¾" sq \$1.90	30"	\$.70	30"	\$.85 - \$.95
8'	3" to 4" \$3.50 - \$4.50	36"	\$.85	36"	\$.95 - \$1.05

Price varies with quality

# VINEYARD STAKES AND TRELLISES

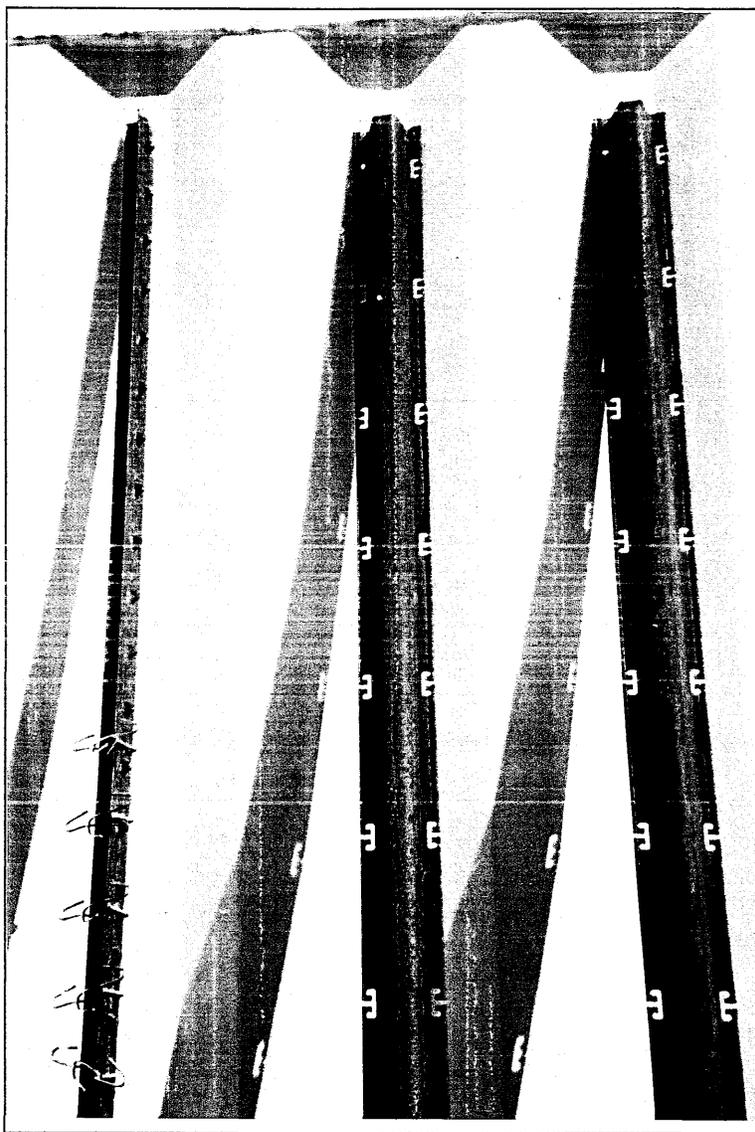
## MISCELLANEOUS



4' Pencil rod and rebar  
\$.50 to \$.65 each

# VINEYARD STAKES AND TRELLISES

## MISCELLANEOUS



T-post with J.R. wire clips

7' heavy T-post: **\$4.10** installed

7' light T-post: **\$3.30** installed

J.R. clips: \$.17 each

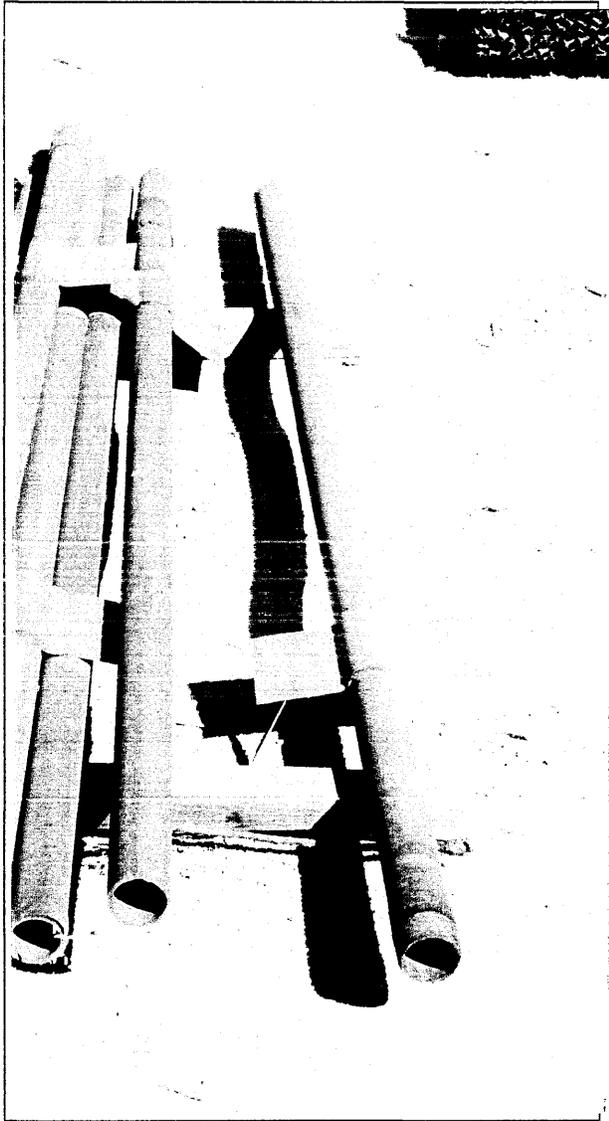


Vertical line post with wire slots

8' Vertical line post (13 ga): **\$8.00** installed

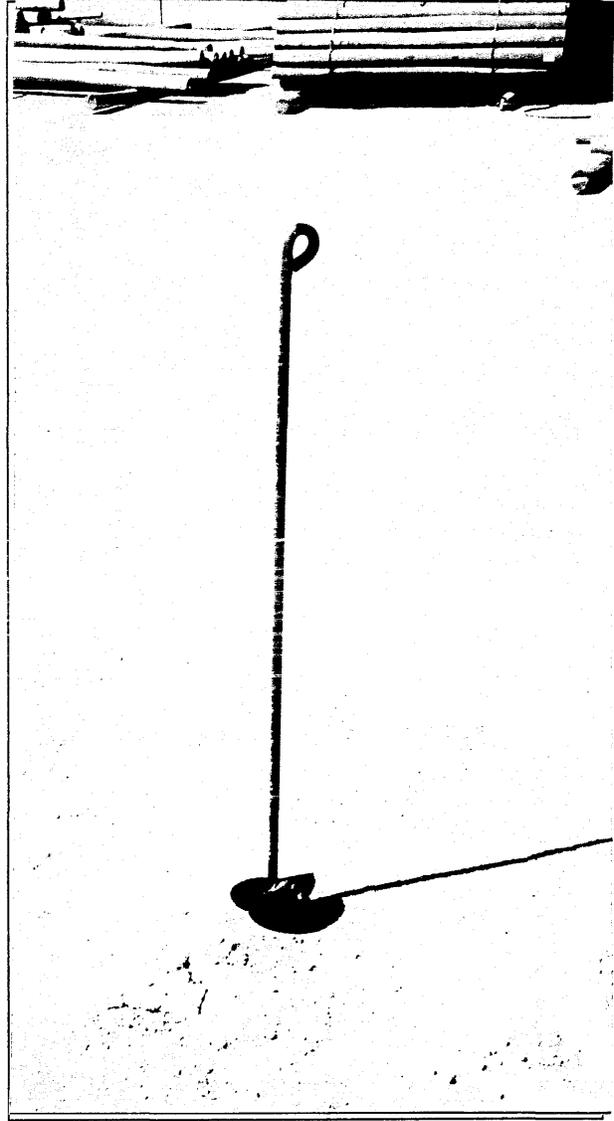
# VINEYARD STAKES AND TRELLISES

## MISCELLANEOUS



Steel end post with spade

\$20.00 to \$22.00 each  
\$3.60 install

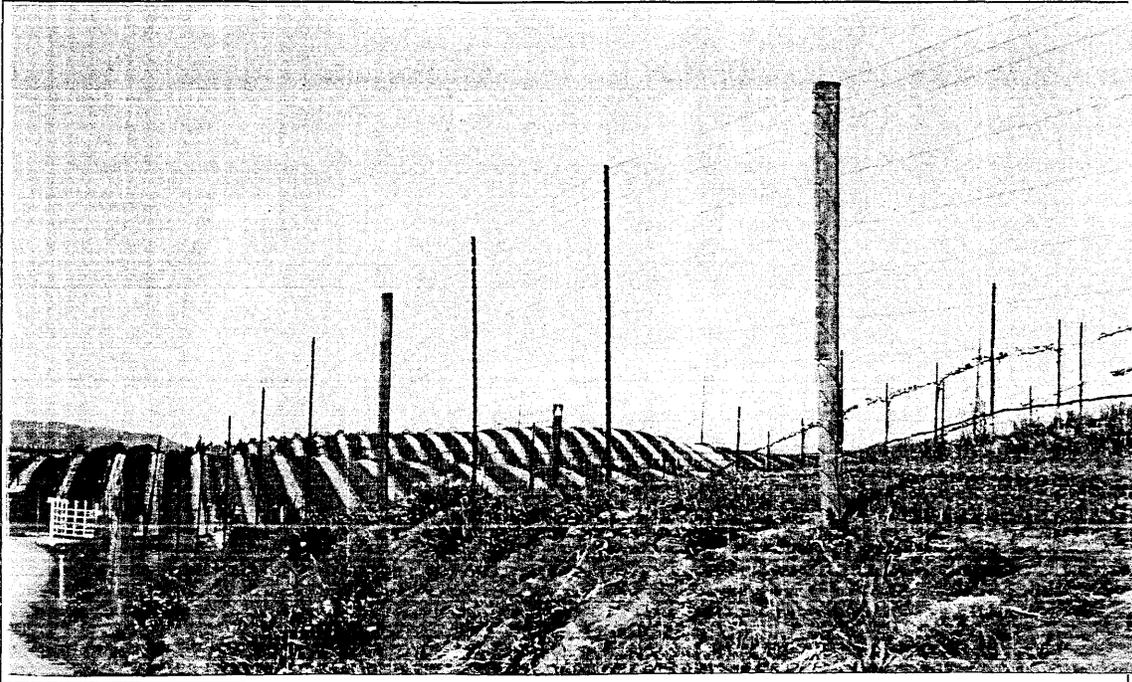


Screw-in earth anchor

6" x 48" : \$6.80  
6" x 36" : \$6.00  
\$3.00 install

# VINEYARD STAKES AND TRELLISES

## MISCELLANEOUS DEER FENCE



7' Deer fence made with 9' T-post and 9' wood stakes  
6 1/2' woven wire with 2 barbed wires on top and steel gates at drives  
Cost: \$4.25 to \$5.50 per linear foot



# VINEYARD STAKES AND TRELLISES

## USEFUL INFORMATION

### WIRE

10 Gauge	2,060 ft. Per 100 lbs. roll
11 Gauge	2,580 ft. Per 100 lbs. roll
12 Gauge	3,370 ft. Per 100 lbs. roll
13 Gauge	4,470 ft. Per 100 lbs. roll
14 Gauge	5,860 ft. Per 100 lbs. roll

### PLANTING SPACING AND WIRE CHART

Planting Pattern Between Plants—Between Rows	One-Wire System No. of Wire Feet Required Per Acre	No. of Plants Required Per Acre
3' x 6'	7,260'	2,420
4' x 6'	7,260'	1,815
5' x 6'	7,260'	1,452
6' x 6'	7,260'	1,210
3' x 7'	6,222'	2,074
4' x 7'	6,222'	1,555
5' x 7'	6,222'	1,245
6' x 7'	6,222'	1,037
7' x 7'	6,222'	889
3' x 8'	5,445'	1,815
4' x 8'	5,445'	1,361
5' x 8'	5,445'	1,089
6' x 8'	5,445'	907
7' x 8'	5,445'	778
8' x 8'	5,445'	681
3' x 9'	4,850'	1,613
4' x 9'	4,850'	1,210
5' x 9'	4,850'	968
6' x 9'	4,850'	807
7' x 9'	4,850'	691
8' x 9'	4,850'	605
5' x 10'	4,355'	871
6' x 10'	4,356'	726
7' x 10'	4,354'	622
8' x 10'	4,352'	544
5' x 11'	3,960'	792
6' x 11'	3,960'	660
7' x 11'	3,962'	566
8' x 11'	3,960'	495
5' x 12'	3,630'	726
5½' x 12'	3,630'	660
6' x 12'	3,630'	605
7' x 12'	3,626'	518
8' x 12'	3,632'	454

## **AH 534.78: STEEL BUILDINGS**

The *all steel* building serves a variety of functions for the farmer/rancher with its most common use being either storage space for farm machinery or storage of feeds and grains. The typical building as described in this section reflects the cost of a basic building.

In addition, there are instances where the building cost is modified for wall height, partitions, and extra electrical circuits within the structure.

### **BASIC BUILDING COST**

Square-foot costs of basic buildings include the following components:

1. Foundation as required for normal soil conditions.
2. Concrete slab floor, 4 inches to 6 inches thick with wire mesh.
3. A steel building made up of these components:
  - Steel frame or bents, 20, 25, or 30 feet on center.
  - Steel roof purlin, 4 1/2 to 5 1/2 feet on center.
  - Steel wall grits 6 to 7 feet on center.
  - Twenty-six gauge galvanized steel on walls and roof.
  - Window area equal to 2 percent of floor area.
  - Minimal light fixtures—including wiring.
  - One rotary vent per bay.
  - Two walk-in doors.
  - Two overhead or sliding doors.
  - Fourteen-foot eave height.

Basic steel buildings are of two types: the low profile roof pitch (1" in 12") and the more conventional barn-like roof pitch (4" in 12"). The cost differential between the two is considered immaterial for appraisal purposes.

### **ADDITIVE COSTS**

Additive costs are the in-place cost components not included in the basic square-foot cost but are those costs found as part of steel buildings. They are added to the basic building cost to arrive at a total building cost.

## STEEL BUILDINGS

### COST PER SQUARE FOOT

Length	Width												
	20'	25'	30'	35'	40'	45'	50'	55'	60'	65'	70'	80'	
20'	31.56												
25'	31.17	30.56											
30'	30.56	29.59	28.40										
35'	29.58	28.40	26.89	26.03									
40'	28.73	26.89	26.68	25.27	24.62								
50'	26.68	25.70	24.84	24.51	23.44	22.36	21.92						
60'	25.70	25.60	24.52	23.44	22.46	21.92	21.60	20.84					
75'	25.06	24.52	23.11	22.46	22.14	21.60	20.84	20.20					
80'	24.52	23.54	22.47	21.92	21.60	20.84	20.23	19.44	19.22	18.68	18.25	17.93	
90'	23.54	22.46	21.92	21.60	20.84	20.20	19.76	19.22	18.68	18.36	17.93	17.17	
100'	22.46	22.03	21.60	20.84	20.20	19.76	19.22	18.68	18.36	17.93	17.17	16.96	
135'		21.60	20.84	20.20	19.76	19.22	18.68	18.36	18.04	17.17	16.96	16.63	
150'				19.44	19.22	18.68	18.36	18.04	17.17	16.96	16.63	16.20	
175'				19.22	18.68	18.36	17.93	17.17	16.96	16.63	16.20	15.98	
200'					18.36	18.04	17.17	16.96	16.63	16.20	15.98	15.77	
225'						17.17	16.96	16.63	16.20	16.00	15.77	15.66	
250'							16.63	16.20	16.00	15.77	15.66	15.66	

### ALTERNATE COSTS

- Dirt Floor: Due to increased size of footings/foundation, no adjustment for dirt floor.
- Wall Height: Add or subtract 3 percent per square foot from basic cost for each foot of variation above or below the basic 14-foot eave height.
- Missing Wall Cover: Deduct **\$1.90** for each square foot of missing wall area.
- Electrical Power: Deduct **\$1.50 - \$2.00** per square foot for lack of power.

The above costs are for 26 gauge steel cover.

# STEEL BUILDINGS

## ADDITIVE COSTS

The cost of additives, such as doors and windows, that replace a portion of the exterior skin of the building, reflects the net added cost of the component in-place. The cost of the skin that is replaced has been deducted from the total cost of the additive components. No further deduction is necessary.

### OVERHEAD DOORS WITH CHAIN HOIST OPENERS

Width	Height				
	8'	10'	12'	14'	16'
8'	\$940	\$1,000	\$1,090	\$1,210	
10'	970	1,050	1,110	1,300	\$1,870
12'	1,060	1,160	1,250	1,430	1,620
14'	1,300	1,370	1,490	1,620	1,980
16'	1,430	1,570	1,710	2,000	2,220
18'	1,730	1,870	2,000	2,220	

### WALK-IN DOORS

Flush 3' x 7'	\$500 to \$600
Half Glass	\$550 to \$650

### ROTARY VENTS

20"	\$250
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### RIDGE VENTS

9" x 10'	\$425
12" x 10'	\$450

### GUTTERS AND DOWNSPOUTS

Per lineal foot	\$4.50 to \$6.50
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### SKYLIGHTS

3' x 10'	\$80 to \$100
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### WINDOWS

3' x 3'	\$145
3' x 6'	170
4' x 6'	230
4' x 8'	280

# STEEL BUILDINGS

## ADDITIVE COSTS

### HEATING

Overhead Suspended Unit	Cost Per Unit
75,000 BTU	\$1,300
100,000 BTU	1,550
200,000 BTU	2,100
300,000 BTU	2,500

### RESTROOMS

	Total Cost
Cost includes 2 fixtures, electrical service, and all partitions. Add for septic tank.	\$6,000 - \$7,500

### OFFICE AREAS

	Square Foot
Cost includes partitioning, interior finish, trim, and doors	\$50 - \$65

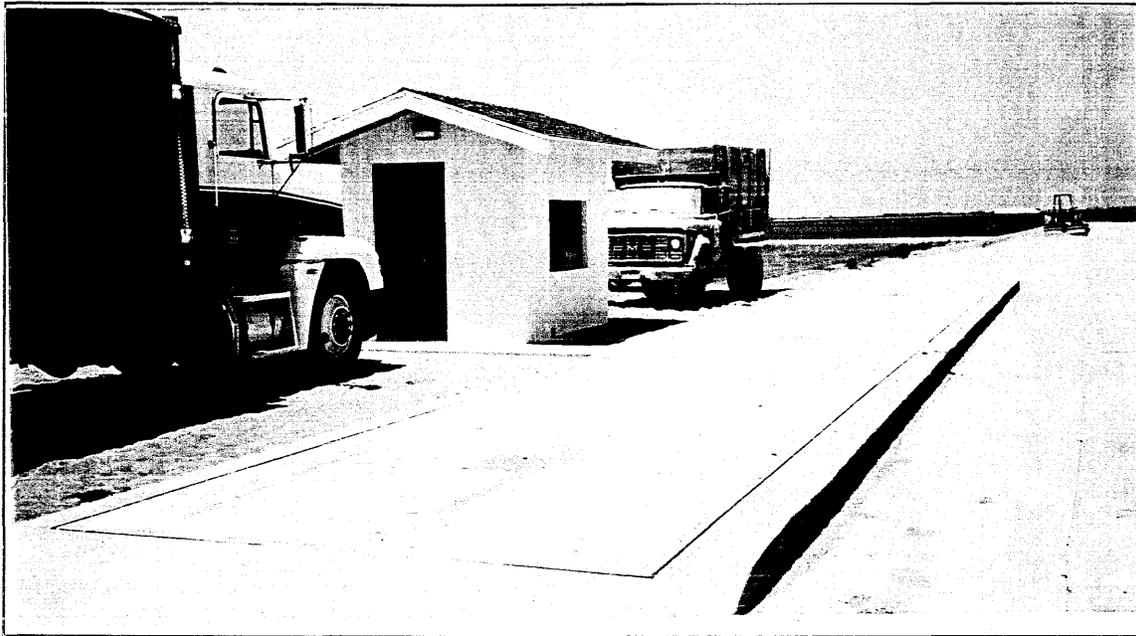
### PARTITIONS

	Per Surface Foot
Gypsum on wood frame	\$3.50
Plaster on wood frame	\$5.00
Paneling (average quality)	\$4.00 - \$5.00

### INSULATION

	Square Foot
R-13	\$.60 - \$.70
R-6	\$.45 - \$.50

# AH 534.79: MISCELLANEOUS COSTS



## PIT TYPE MOTOR TRUCK SCALES WITH CONCRETE DECK

Scales			Scale Pit		
Tons Capacity	Platform Size	Total Cost	Size	Standard Cost	Add for: 12' Width
20	25' x 10'	\$ 11,000	25' x 10'	\$ 11,000	900
30	25' x 10'	11,800	40' x 10'	14,400	1,000
50	40' x 10'	18,300	50' x 10'	16,000	1,100
50	50' x 10'	19,300	60' x 10'	17,000	1,300
60	60' x 10'	20,600	70' x 10'	17,600	1,500
60	70' x 10'	24,700	80' x 10'	19,000	2,100
60	80' x 10'	27,900	90' x 10'	20,700	
80	80' x 10'	34,000	90' x 10'	20,700	
100	90' x 10'	37,700	100' x 10'	23,000	

Pitless above-ground scales, deduct 25% from above prices

Used scales, deduct 25% to 40%

### ADD FOR WEIGHT RECORDING EQUIPMENT

Electronic indicator	\$1,000
Ticket printer	\$1,000

### EXAMPLE OF MOTOR TRUCK SCALE COST

Scales: 80 ton capacity, 80' x 10' platform	\$34,000
Scale Pit: 90' x 10' size, standard	19,000
Electric weight recording equipment and printer	<u>2,000</u>
Total	\$55,000

## MISCELLANEOUS COSTS

### ELEVATED HOPPER TANK – Steel Support Legs, Stiffened Side Walls, Ladder, Roof Access Door, includes Concrete Base

Size	Cost
80 Tons	\$11,300
100 Tons	14,300
130 Tons	16,800
160 Tons	19,300
200 Tons	23,100
235 Tons	25,600
300 Tons	32,800
350 Tons	40,500
400 Tons	45,200

### CONCRETE HORIZONTAL OR FLAT STORAGE

Cwt	Cost per Cwt
28,000	\$3.95
42,000	3.80
56,000	3.65
85,000	3.48
110,000	3.33
140,000	3.22
200,000	3.12
400,000	2.72
600,000	2.60

## MISCELLANEOUS COSTS

### ABOVE-GROUND FUEL TANKS & CONTAINMENT SYSTEMS

#### PREFABRICATED CONCRETE FUEL CONTAINMENT TUBS

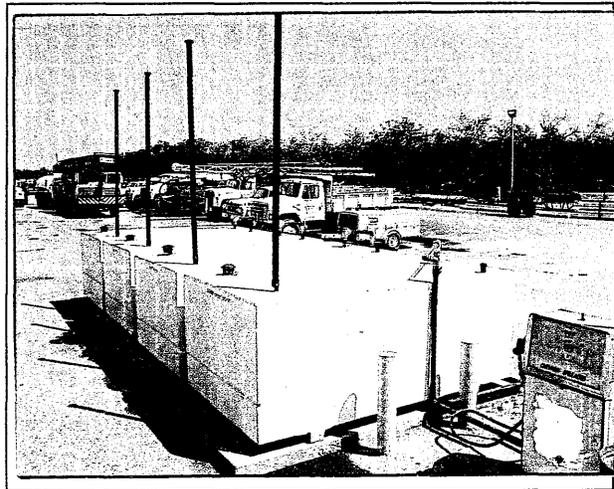
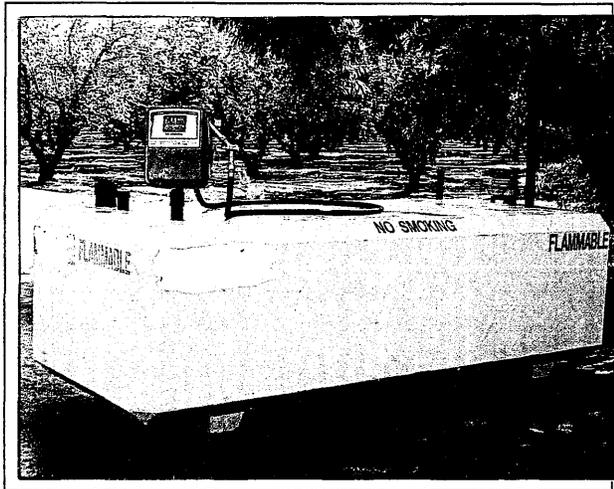
400 gallon capacity containment	\$850
500 gallon capacity containment	\$1,100
1,000 gallon capacity containment	\$1,600

#### CONTAINMENT WITH TANK AND ELECTRIC PUMPS

500 gallon – diesel	\$4,000
1,000 gallon – diesel	\$5,450
500 gallon – gasoline	\$4,800
1,000 gallon – gasoline	\$6,300

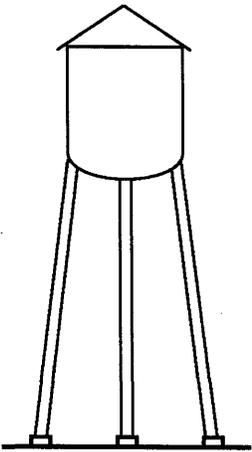
#### ABOVE-GROUND FUEL TANKS (Steel Tanks with Thick Outer Shell of Concrete)

Gallons	Cost
500, with electric pump	\$7,300 to \$8,300
1,000, with electric pump	\$10,000 to \$11,500
2,000, with electric pump	\$14,700 to \$16,700
Double unit—(1) 1,000 gallon, (1) 500 gallon with 2 electric pumps	\$11,000 to \$12,000

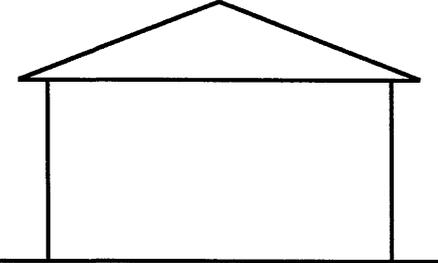


## MISCELLANEOUS COSTS

### ELEVATED STEEL WATER STORAGE TANKS

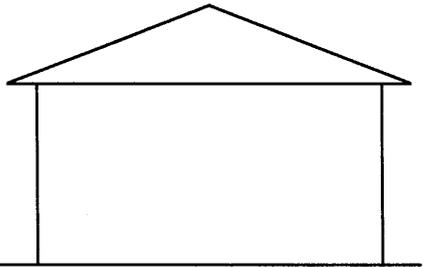
	Gallon Capacity	Total Cost of 75' Tower and Tank	Total Cost of 100' Tower and Tank
	25,000	\$237,000	\$273,000
30,000	254,000	291,000	
40,000	267,000	299,000	
50,000	276,000	314,000	
60,000	288,000	328,000	
75,000	295,000	346,000	
100,000	341,000	374,000	
150,000	433,000	462,000	
200,000	536,000	567,000	
300,000	667,000	719,000	
500,000	896,000	958,000	
1,000,000	1,487,000	1,642,000	

### WELDED STEEL WATER STORAGE TANKS ON GROUND WITH FOUNDATION

	Gallon Capacity	Total Cost of Tank on Ground
	25,000	\$46,500
30,000	52,500	
40,000	60,000	
50,000	72,000	
60,000	78,000	
75,000	93,000	
100,000	114,500	
150,000	133,000	
200,000	151,000	
300,000	189,000	
500,000	267,500	
1,000,000	415,000	

## MISCELLANEOUS COSTS

### BOLTED STEEL WATER TANKS

	Gallon Capacity	Total Cost of Tank on Ground
	10,000	\$15,500
	20,000	22,500
	30,000	28,000
	50,000	36,000
	75,000	43,000
	100,000	47,000
	125,000	55,500
	150,000	67,500
	200,000	80,000

Price varies due to gauge, height, diameter, and delivery costs.  
 Price typically includes crushed rock base or concrete on longer tanks.

### POLYETHYLENE OR FIBERGLASS TANKS (Used for Ag Chemicals or Liquid Fertilizers)

Capacity (Gallons)	Cost
1,000	\$ 980
2,000	1,800
3,000	2,750
4,000	3,500
5,000	4,400
6,000	5,100
8,000	6,600
10,000	7,900

Add \$4.00 per square foot for concrete base

**Polyethylene water only tanks, deduct 20% from above prices.**

## **MISCELLANEOUS COSTS**

### **STEEL GRAIN BINS**

Sacramento and Northern California

Steel grain bins are used for storage and drying of small grains. The typical storage bin has metal walls and roof, a concrete floor and foundation. The drying bin is of similar construction with a dryer floor, unloading auger, and leveler. Dryer fan, heater unit, and motor are also considered part of the drying bin.

## MISCELLANEOUS COSTS

### STEEL GRAIN BINS Sacramento and Northern California

#### GRAIN DRYING BINS

Diameter	Eave Heights					
	16'	18'	21'	24'	32'	40'
18'	17,580	18,500	18,600	20,830	25,800	29,800
21'	20,050	20,800	21,750	24,100	29,700	33,100
24'	22,900	23,750	25,000	27,850	34,200	37,900
27'	27,600	28,500	30,100	33,600	41,650	44,250
30'	30,750	32,050	33,850	36,950	45,500	50,500
36'	40,700	42,600	44,500	48,600	57,800	65,600
42'	50,250	50,900	53,650	63,000	72,400	84,500
48'	64,450	68,350	72,400	77,800	88,550	92,450

Includes cost of foundation, perforated floor, unloading auger, aeration unit, fan, dryer, and stirring devices.

#### GRAIN STORAGE BINS

Diameter	Eave Heights								
	16'	18'	21'	24'	32'	40'	48'	58'	64'
18'	10,350	10,500	11,650	13,800	18,000	21,350	24,650		
21'	11,750	12,200	13,400	16,100	21,000	24,400	28,700		
24'	14,250	14,900	15,550	19,100	23,950	28,450	33,200	39,600	44,000
27'	16,250	17,600	19,750	23,350	30,450	33,850	41,050	49,400	54,500
30'	18,300	19,600	22,450	25,300	33,050	37,900	45,000	56,350	63,350
36'	24,500	25,900	28,700	32,900	42,000	49,000	58,900	72,850	80,800
42'	30,700	32,000	33,450	44,000	52,950	64,200	75,300	90,700	100,600
48'	42,500	46,000	50,100	56,870	65,650	74,500	88,000	106,950	117,700

Includes cost of bin foundation, door, ladder, and unloading auger.

**ADD FOR:** Roof Augers \$800 to \$1,500 (depends on length—13' to 24')  
Fan \$1,700 (5 H.P.) to \$3,100 (25 H.P.)

#### PERFORATED FLOORS

18'	21'	24'	27'	30'	36'	42'	48'
\$2,500	\$2,700	\$3,400	\$4,100	\$5,100	\$7,100	\$9,100	\$11,100

## MISCELLANEOUS COSTS

### 2-INCH REDWOOD WATER STORAGE TANKS

Gallons	Diameter	Height	Cost
500	5'	4'	\$2,950
1,000	6'	6'	3,700
1,500	7'	6'	4,500
2,000	8'	6'	5,575
3,000	10'	6'	7,150
4,000	10'	8'	8,600
5,000	11'	8'	9,800
6,000	12'	8'	11,500
7,000	11'	10'	12,600
8,000	12'	10'	13,250
9,000	13'	10'	14,200
10,000	14'	10'	15,650
12,000	15'	10'	17,450
15,000	14'	14'	19,300

Above costs include chime joists, covers, foundation, and all labor, set up,  
and transportation charges.

**ADD FOR:** Ladders                    \$40 per lineal foot  
                   Water level registers       \$15 per lineal foot of tank height  
                   Cone covers                    \$1,000 to \$2,800 per tank

## MISCELLANEOUS COSTS

### 3-INCH REDWOOD WATER STORAGE TANKS

Gallons	Diameter	Height	Cost
10,000	14'	10'	\$22,000
12,000	14'	12'	25,300
15,000	16'	12'	27,100
20,000	18'	12'	34,900
25,000	17'	16'	37,800
30,000	20'	14'	44,000
40,000	23'	14'	55,400
50,000	24'	16'	62,200
60,000	26'	16'	69,800
70,000	28'	16'	74,200
75,000	29'	16'	84,200
80,000	30'	16'	90,800
90,000	30'	18'	95,500
100,000	32'	18'	100,800
150,000	37'	20'	135,000
200,000	43'	20'	160,000

Above costs include typical foundation, chime joists, tank cover, and all labor, set up, and transportation charges.

### CYLINDRICAL 3-INCH REDWOOD WINE TANKS

Gallons Capacity	Base Price
1,000	\$5,100
1,500	6,500
2,000	7,600
2,500	9,000
3,000	10,700
4,000	11,500
5,000	14,000
7,500	17,300
10,000	19,100
15,000	26,600
20,000	35,000
25,000	38,000
30,000	45,000

Base price includes 4" x 6" chime joists, 1/2' galvanized hoops, recessed head cover, side door with galvanized T-bolt.

## MISCELLANEOUS COSTS

### STAINLESS STEEL WINE TANKS

Gallons Capacity	Cost
1,000	\$ 9,100
2,000	13,000
3,000	14,700
4,000	16,400
5,000	16,600
10,000	23,500
20,000	38,500
50,000	60,300
100,000	93,500
200,000	166,000

Cost includes all valves, temperature controls, vents, and cooling jackets for tanks with a capacity of 20,000 gallons or less. The cost on tanks of 50,000 gallons or more excludes cooling jackets.

### CYLINDRICAL 2 INCH OAK TANKS

Gallons Capacity	Base Price
500	\$2,150
750	3,150
1,000	4,100
1,250	5,000
1,500	5,800
2,000	8,200
2,500	9,450
3,000	10,800
4,000	14,500
5,000	17,400
6,000	21,000

Base price includes 4" x 6" chime joists, galvanized hoops, head supports with stainless steel head bolts, side door with stainless T-bolt, installation in Sonoma County. Foundations not included.

## MISCELLANEOUS COSTS

### PREFABRICATED METAL SHADES

#### SPECIFICATIONS

Foundation	Metal base plate with tie downs
Floor	Dirt
Wall/Roof Frame	2 3/8" galvanized structural tubing (4' on center) 7' to 9' eaves
Roofing	29-gauge steel with baked on enamel (extends 6" to 12" below eaves)
Exterior Wall Covering	None

#### COMMON SIZES

12' x 21'	\$1,200	20' x 21'	\$2,050
12' x 26'	1,450	20' x 26'	2,450
12' x 31'	1,900	20' x 31'	3,050
12' x 36'	2,150	20' x 36'	3,600
12' x 41'	2,450	20' x 41'	4,000

#### RV SHADES

14' x 30' x 12'	\$3,600
14' x 40' x 12'	4,750

#### ADDITIVES

- Add 6 percent to above prices for 26-gauge steel roofing
- 29-gauge metal wall covering—**\$1.25** per square foot of wall (standard roofing extends 6" to 12" below eaves)
- Back enclosure kit:
  - 12-foot wide — **\$450**
  - 20-foot wide — **\$600**
  - 24-foot wide -- **\$800**
- Front enclosure kit with opening for roll-up door:
  - 12-foot wide — **\$350**
  - 20-foot wide — **\$400**
- Light duty roll-up doors
  - 8' x 6' — **\$300**
  - 9' x 7' — **\$350**
  - 10' x 8' — **\$400**
  - 10' x 10' — **\$450**
- Walk-thru door 32" x 72" — **\$200 to \$250**
- Add 3 percent for each additional foot of wall height above 8 feet
- Concrete floor—**\$4.00 to \$5.00** per square foot
- Windows 30" x 30" — **\$125**

MISCELLANEOUS COSTS  
PREFABRICATED METAL SHADES

