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In the Matter of:)
Approval of the 2022-2023)
Rural Building Manual)

NOTICE OF DECISION

Appearances

Cheryl Erskine, Coordinator of Assessment Standards, appeared on behalf of the Department of Taxation.

Summary

The matter of the approval of the 2022-2023 Rural Building Costs Manual came before the Nevada Tax Commission (Commission) for hearing in Carson City, Nevada, on March 8, 2021. The Commission reviewed the Rural Building Costs Manual and the report of the Department.

DECISION

The Commission, having considered all evidence and testimony pertaining to the matter, hereby adopts the 2022-2023 Rural Building Costs Manual listing costs as reported by the Department for use by county assessors pursuant to NAC 361.128(2).

BY THE NEVADA TAX COMMISSION THIS 15th DAY OF MARCH, 2021.

Melanie Young

Melanie Young, Executive Director

cc: County Assessors

NEVADA DEPARTMENT OF TAXATION

Division of Local Government Services

2022-2023

ASSESSOR'S HANDBOOK OF RURAL BUILDING COSTS

DATE OF VALUATION JANUARY 1, 2021

Approved by NTC - 3/8/2021
Published - 3/15/2021

Division of Local Government Services

2022-2023

Rural Building Cost Manual

Department of Taxation
Division of Local Government Services
1550 E. College Parkway, Suite 144
Carson City, NV 89706
Phone 775.684.2100 ● Fax 775.684.2020

Approved by NTC - 3/8/2021
Published - 3/15/2021

INSTRUCTIONS FOR USE

The Rural Building Manual (RBM) is intended to be an assessment tool used to standardize and streamline improvement valuations for rural properties. It provides a broad listing of structures and improvements which are customarily found in rural areas; moreover, it includes photos and descriptions which may be useful to assessors when classifying improvement quality or computing segregated costs.

Based on current construction practices, all RBM sections report costs found in the Marshall and Swift Cost Manual absent of any adjustments for unskilled farm labor. As such, assessors will not adjust values upward by 33 percent as authorized by NAC 361.128 paragraph 3(b). However, to account for the use of unskilled farm labor in the construction of improvements, assessors may make downward adjustments of 25 percent when appropriate.

All photos contained in the RBM are to be used as a guide to help determine quality, class and style of buildings. Photos are not to be used as a method for determination of whether a building should be valued using the RBM.

Concrete flatwork costs contained in the RBM are specific to concrete being poured as a concrete floor during construction of farm buildings or other farm improvements and should be used only when additional concrete flatwork was constructed at the same time (i.e., around feed troughs, horse barns, etc.). For other concrete flatwork, please refer to the Marshall & Swift Commercial Manual (S66P2 – Yard Improvements) or the Marshall & Swift Residential Manual (C-5 – Yad Improvements) for more appropriate costs.

If the RBM or the Marshall Swift Cost Manual do not contain costs for a particular kind of structure or improvement, the county assessor may apply to the Executive Director for permission to use alternative recognized cost manuals, cost determinations or subscription services.

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2022-2023 RURAL BUILDING COST MANUAL

BASIC FARM BUILDINGS – SECTION 1

DAIRY BARNS – SECTION 2

BUNK HOUSES – SECTION 3

UTILITIES – SECTION 4

CORRALS AND FENCES – SECTION 5

Approved by NTC - 3/8/2021
Published - 3/15/2021

MISCELLANEOUS COSTS – SECTION 6

COMPUTATIONAL TABLES – SECTION 7

2022-2023 RURAL BUILDING COST MANUAL

Section 1

BASIC FARM BUILDINGS

Approved by NTC - 3/8/2021
Published - 3/15/2021

BASIC FARM BUILDINGS

METAL BARNS

LOW QUALITY

AVERAGE QUALITY

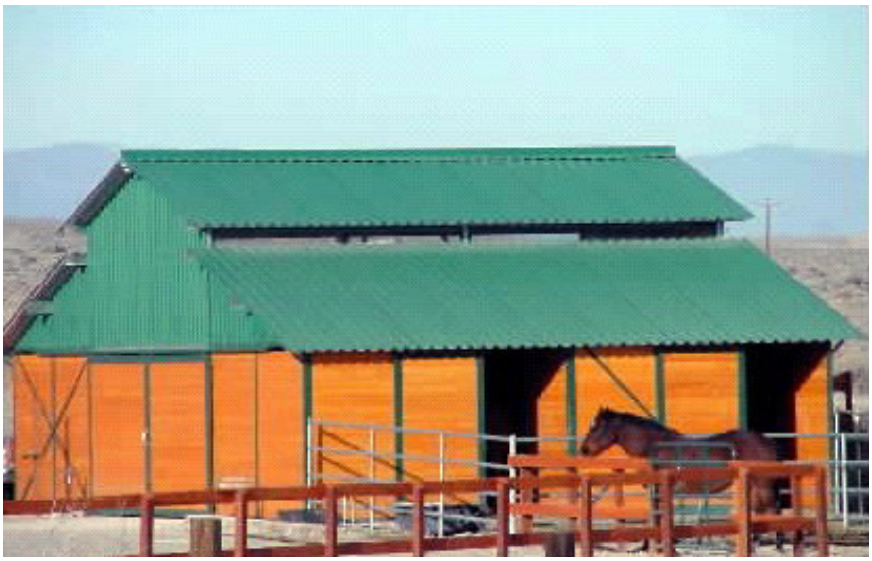
GOOD QUALITY

PHOTOS COURTESY OF CHURCHILL COUNTY ASSESSOR

BASIC FARM BUILDINGS

WOOD BARNS

LOW QUALITY



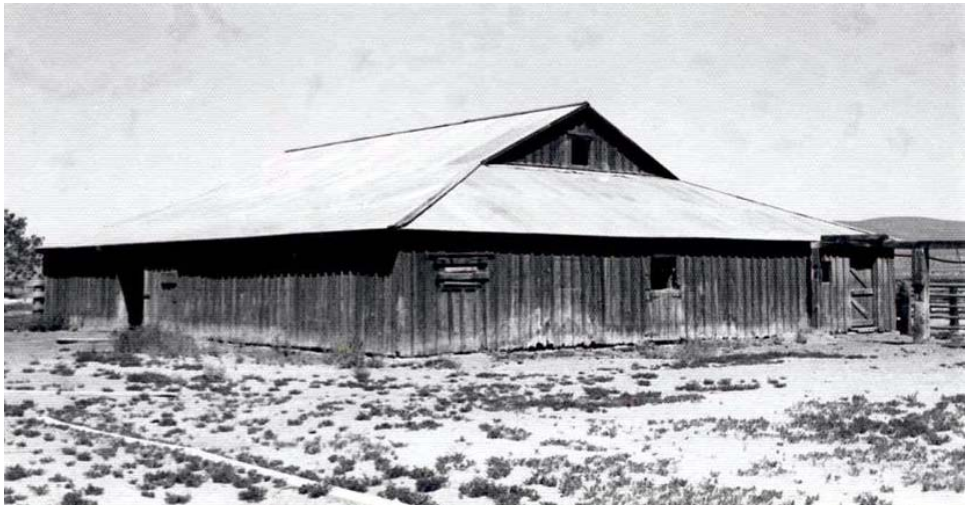
AVERAGE QUALITY

GOOD QUALITY

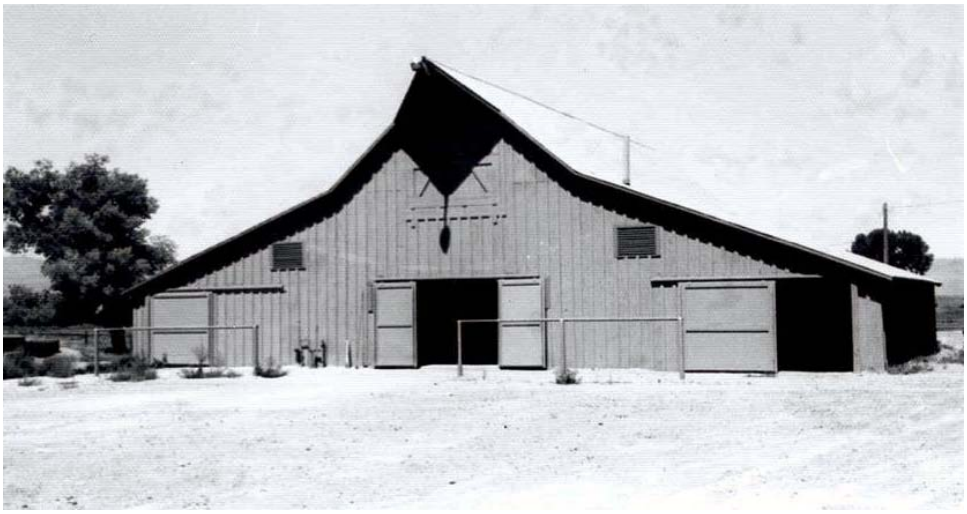
PHOTOS COURTESY OF CHURCHILL COUNTY ASSESSOR

BASIC FARM BUILDINGS

GENERAL PURPOSE BARNS



LOW QUALITY



AVERAGE QUALITY

GOOD QUALITY

BASIC FARM BUILDINGS

GENERAL PURPOSE BARNS

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY
Foundation	Perimeter concrete and column footings	Perimeter concrete and column footings	Perimeter concrete and column footings
Floor	Dirt	Dirt	Dirt
Wall Structure	Light wood boxed frame or wood posts and beams, 10' eave height	Average 2"x 4", 24" on center, 10' eave height	Concrete block or good 2"x 4", 16" on center or 2"x 6", 24" on center, 10' eave height
Exterior Wall Cover	Light wood siding board and batten or light aluminum siding	Average wood or aluminum siding	Good wood siding painted or standard gauge corrugated iron or aluminum siding
Roof Construction	Medium pitch, 2"x 4" rafters 24" to 36" on center, composition decking	Medium pitch, wood joists, wood or composition decking	Medium pitch, wood joists, wood or composition decking
Roof Cover	Composition shingle, asphalt roll paper or light wood shingles	Good wood shingles, light aluminum or corrugated iron	Standard gauge aluminum or corrugated iron or good wood shingles
Electrical	Minimal per class	Minimal per class	Minimal per class
Plumbing	Minimal per class	Minimal per class	Minimal per class

Includes normal stalls commensurate with quality class.

SQUARE FOOT COSTS

CLASS	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	11,000
1	$ 27.08	22.63	20.79	19.86	19.31	18.94	18.65	18.15	17.82	17.45	17.03
2	39.03	32.31	29.38	27.97	27.12	26.61	26.20	25.47	24.87	24.25	23.71
3	48.86	43.31	40.38	38.82	38.02	37.41	37.03	36.27	35.66	35.02	34.56

ADD Concrete or wood floors, or concrete flatwork per square foot: $ 4.79

Lofts per square foot of floor area

Low Quality: $ 5.73
Average Quality: 7.51
Good Quality: 9.86

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

HAY STORAGE BARNS

AVERAGE QUALITY

GOOD QUALITY

BASIC FARM BUILDINGS

HAY STORAGE BARNS

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt	Dirt
Wall Structure	Light wood boxed frame or wood posts and beams, 10' eave height	Average 2"x 4", 24" on center, 10' eave height	Good 2"x 4", 16" on center or 2"x 6", 24" on center, 10' eave height
Exterior Wall Cover	Light wood siding, board and batten or light aluminum siding	Average wood or aluminum siding	Good wood siding painted, standard gauge corrugated iron or aluminum siding
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	Composition shingle, asphalt roll paper or light wood shingles	Good wood shingles, light aluminum or corrugated iron	Standard gauge aluminum, corrugated iron or good wood shingles
Electrical	Minimal per class	Minimal per class	Minimal per class
Plumbing	Minimal per class	Minimal per class	Minimal per class

SQUARE FOOT COSTS

CLASS	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	11,000
1	$ 25.14	20.64	18.82	17.88	17.41	16.93	16.72	16.18	15.85	15.48	15.25
2	35.37	28.32	25.06	23.71	22.78	21.70	21.43	20.53	19.83	19.04	18.66
3	48.48	39.16	35.25	32.89	32.01	30.95	30.34	29.20	28.40	27.30	26.61

ADD Concrete or wood floors, or concrete flatwork per square foot: $ 4.79

Lofts per square foot of floor area

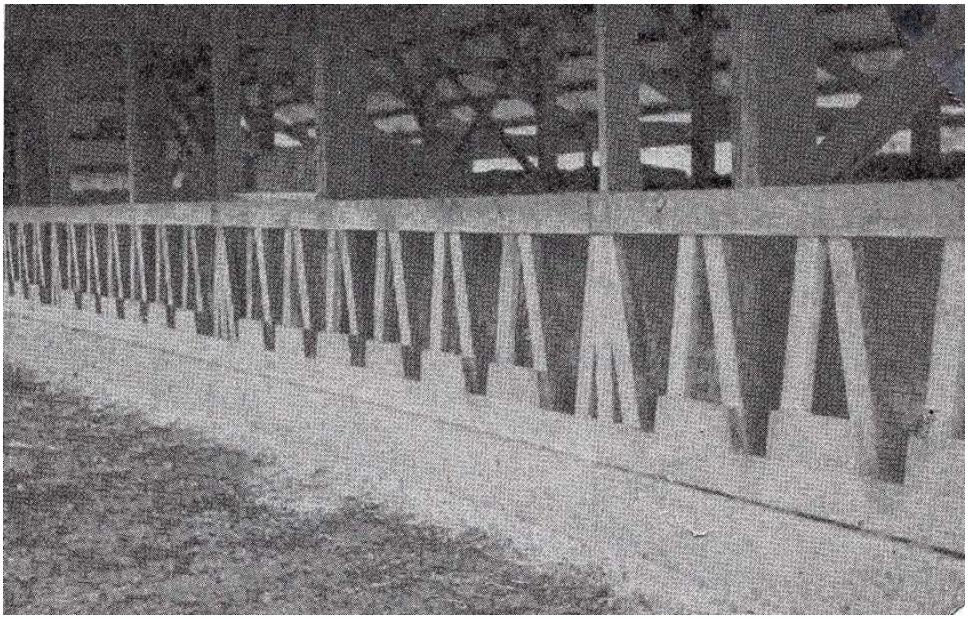
Low Quality: $ 5.73
Average Quality: 7.51
Good Quality: 9.86

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

FEED BARNS

AVERAGE QUALITY



INTERIOR DETAIL

GOOD QUALITY

BASIC FARM BUILDINGS

FEED BARNS

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt	Dirt
Wall Structure	Light wood frame, 10' eave height	Average wood frame, 10' eave height	Good wood frame, 10' eave height
Exterior Wall Cover	Closed sides and open ends	Partially open sides, standard corrugated iron or average wood siding on ends	Partially open sides, good quality siding
Roof Construction	Medium to low 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 metal or composition shingle	Standard gauge corrugated metal	Wood shingles
Electrical	Minimal per class	Minimal per class	Minimal per class
Plumbing	Minimal per class	Minimal per class	Minimal per class

Includes normal feed stalls commensurate with quality class.

SQUARE FOOT COSTS

CLASS	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	11,000
1	$ 16.97	15.73	15.06	14.61	14.44	14.34	14.25	14.17	14.09	14.00	13.98
2	20.67	19.50	18.72	18.09	17.71	17.55	17.41	17.31	17.20	17.12	17.09
3	27.53	26.42	25.51	24.79	24.14	23.76	23.57	23.46	23.38	23.15	23.04

ADD Concrete or wood floors, or concrete flatwork per square foot: $ 4.79

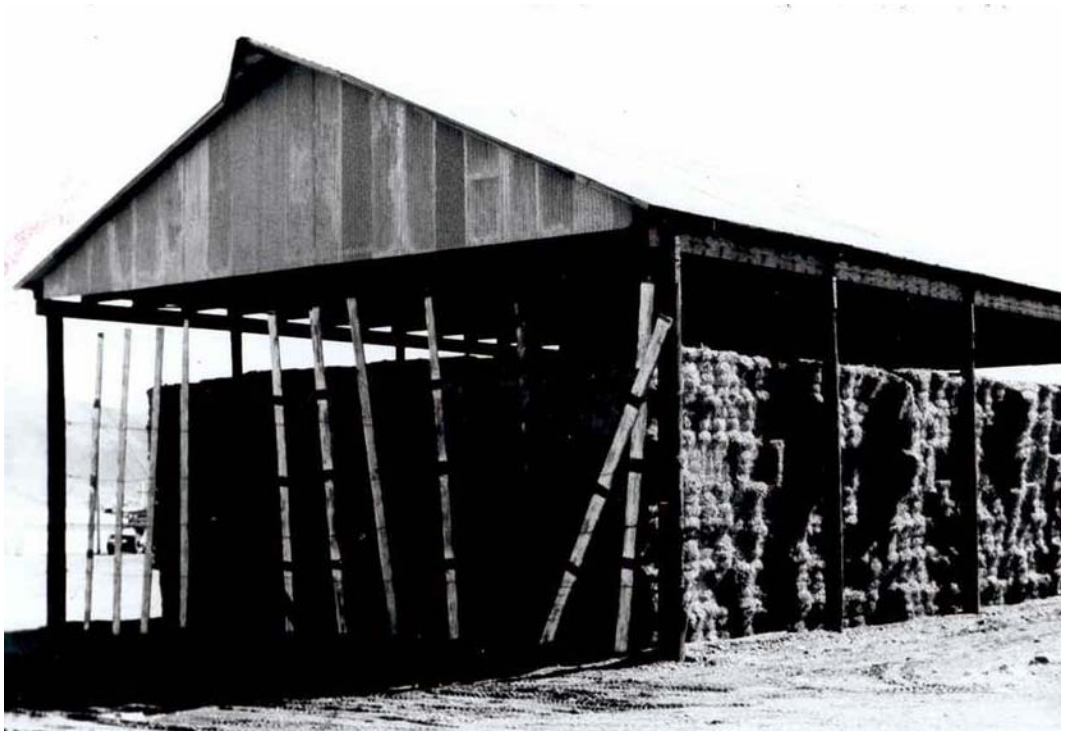
Lofts per square foot of floor area

Low Quality: $ 5.73
Average Quality: 7.51
Good Quality: 9.86

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

POLE BARNS



AVERAGE QUALITY – ALL SIDES OPEN
WOODEN POLES – WOOD FRAME

GOOD QUALITY – ALL SIDES OPEN
STEEL POLES, STEEL TRUSS & STEEL FRAME

BASIC FARM BUILDINGS

POLE BARNS - AVERAGE QUALITY

Structure	Poles 15' to 20' on center
Floor	Dirt - use square foot additive for concrete
Roof	Average wood trusses or average steel trusses, low pitch, corrugated iron or aluminum cover, gable end enclosed, 2' overhang on 2 sides
Walls	18' wall height, average wood frame or average prefabricated steel frame with corrugated iron covering where called for

All costs listed are based on average quality materials. Use multiplier for good quality materials--heavy steel frame and trusses, wide span, heavy gauge roof cover. Use multiplier for low quality materials--light wood poles and frame with light wood or steel trusses and light gauge roof cover.

SQUARE FOOT COSTS

TYPE "A" (ALL SIDES OPEN)

END WIDTH	SIDE LENGTH 34'	51'	68'	85'	102'	119'	136'	153'	170'	187'
20'	$ 14.03	13.59	13.18	12.81	12.81	12.34	12.34	12.34	12.34	12.34
25'	13.18	12.81	12.34	11.99	11.58	11.58	11.58	11.58	11.58	11.58
30'	12.56	12.30	11.99	11.52	11.17	11.17	11.17	11.17	11.17	11.17
35'	12.34	11.94	11.55	11.15	10.74	10.74	10.74	10.74	10.74	10.74
40'	12.27	11.92	11.46	11.12	10.71	10.71	10.71	10.71	10.71	10.71
45'	12.21	11.77	11.37	10.21	10.17	10.17	10.17	10.17	10.17	10.17
50'	12.18	11.74	11.27	10.10	9.95	8.51	8.51	8.51	8.51	8.51
60'	12.14	11.70	11.08	9.68	9.64	8.35	8.35	8.35	8.35	8.35
70'	11.92	11.52	10.64	9.33	9.13	8.17	8.17	8.17	8.17	8.17
80'	11.92	11.52	10.21	9.13	8.79	7.97	7.97	7.97	7.97	7.97

ADD Concrete or wood floors, or concrete flatwork per square foot : $ 4.79

QUALITY MULTIPLIERS

Good Quality: 1.27

Low Quality: 0.69

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

POLE BARNS - AVERAGE QUALITY

SQUARE FOOT COSTS

TYPE "B" (ENDS AND ONE SIDE CLOSED - ONE SIDE OPEN)

END WIDTH	SIDE LENGTH 34'	51'	68'	85'	102'	119'	136'	153'	170'	187'
20'	$ 20.34	18.55	17.61	17.14	16.76	16.41	16.23	16.20	16.16	15.94
25'	18.80	17.14	16.16	15.63	15.38	14.78	14.65	14.43	14.32	14.25
30'	17.92	16.20	15.38	14.72	14.47	14.19	14.00	13.74	13.65	13.59
35'	17.32	15.47	14.65	14.03	13.74	13.63	13.25	13.21	13.18	13.12
40'	16.92	15.03	14.21	13.65	13.56	13.18	12.81	12.77	12.72	12.61
45'	16.70	14.69	13.78	13.21	12.87	12.61	12.34	12.30	12.27	12.21
50'	16.51	14.32	13.72	12.74	12.61	12.30	12.05	11.99	11.86	11.81
60'	16.14	14.21	13.12	12.37	12.27	11.99	11.77	11.65	11.48	11.43
70'	15.91	13.90	12.74	12.30	12.05	11.81	11.48	11.43	11.33	11.30
80'	15.47	13.68	12.30	12.12	11.81	11.43	11.27	11.23	11.17	11.08

ADD Concrete or wood floors, or concrete flatwork per square foot : $ 4.79

QUALITY MULTIPLIERS Good Quality: 1.27

Low Quality: 0.69

SQUARE FOOT COSTS

TYPE "C" (ALL SIDES CLOSED)

END WIDTH	SIDE LENGTH 34'	51'	68'	85'	102'	119'	136'	153'	170'	187'
20'	$ 23.07	21.44	20.53	20.00	19.80	19.49	19.33	19.27	19.24	19.09
25'	20.75	19.24	18.33	17.83	17.51	17.27	17.16	16.89	16.45	16.23
30'	19.49	17.42	16.63	16.01	15.79	15.41	15.25	15.12	15.10	15.00
35'	18.40	16.48	16.01	15.32	15.19	14.76	14.63	14.59	14.34	14.32
40'	17.83	16.10	15.29	14.78	14.65	14.28	14.19	13.90	13.78	13.72
45'	17.27	15.47	14.65	14.28	13.78	13.63	13.43	13.28	13.25	13.21
50'	16.76	15.10	14.06	13.90	13.74	13.25	13.21	13.18	13.03	12.94
60'	16.16	14.59	13.59	12.96	12.83	12.43	12.34	12.18	12.08	11.99
70'	15.79	14.19	13.28	12.77	12.39	12.14	11.92	11.90	11.77	11.74
80'	15.23	13.65	12.77	12.27	11.92	11.58	11.52	11.39	11.30	11.14

ADD Concrete or wood floors, or concrete flatwork per square foot: $ 4.79

QUALITY MULTIPLIERS Good Quality: 1.27

Low Quality: 0.69

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

SIDE SHEDS - AVERAGE QUALITY

Structure	1 row of poles 15' to 20' on center, 1 side ties into adjoining building
Floor	Dirt - Use square foot additive for concrete
Roof	Light wood trusses, low pitch, corrugated iron or aluminum cover, ends enclosed, 2' overhang on 1 side
Walls	14' to 16' wall height, light wood frame with corrugated iron covering

SQUARE FOOT COSTS

	WITH OPEN SIDES:	$ 8.25	TO	$	10.85
	WITH ENCLOSED SIDES:	11.61	TO		15.27
ADD	Concrete or wood floors, or concrete flatwork per square foot:	$ 4.79			

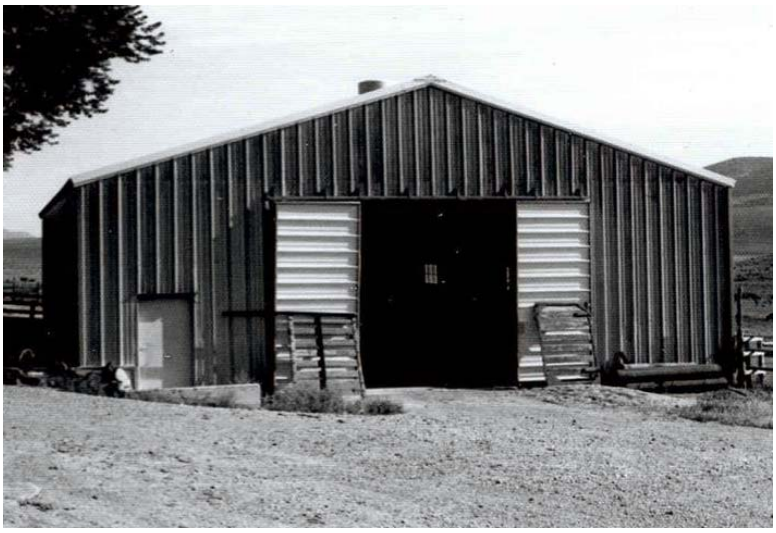
NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

SHOPS

AVERAGE QUALITY

GOOD QUALITY



GOOD QUALITY – CLASS S

BASIC FARM BUILDINGS

SHOPS

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY
Foundation	Light concrete	Standard concrete	Standard concrete
Floor	Concrete	Concrete	Concrete
Wall Structure	Light wood frame, 15' eave height	Average wood frame, 15' eave height	Good wood frame 15' eave height
Exterior Wall Cover	Light metal or low cost boards	Standard gauge corrugated metal or average wood siding	Good wood siding painted or C-block
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	Low to medium pitch, good wood trusses
Roof Cover	Light metal	Standard gauge metal	Wood shingles
Electrical	2 outlets per 1,000 square foot	4 outlets per 1,000 square foot	4 outlets per 1,000 square foot
Plumbing	1 cold water outlet	2 cold water outlets	1 rough fixture plus 2 cold water outlets
Doors	1 light sliding or swinging door per 2,000 square foot	1 average sliding or swinging door per 2,000 square foot	1 drive through door per 1,000 square foot plus 1 walk-through door
Windows	None	None or few low cost	5 percent of wall area
Shape	Square or rectangular length between 1 and 2 times width	Square or rectangular length between 1 or 2 times width	Square or rectangular length between 1 and 2 times width

SQUARE FOOT COSTS

CLASS	500	1,000	1,500	2,000	2,500	3,000	4,000	5,000	6,000	8,000
1	$ 28.79	26.91	25.20	24.16	23.34	22.76	21.91	21.21	20.80	20.27
2	42.09	37.26	32.75	31.77	29.83	28.88	27.64	26.81	25.99	25.22
3	53.71	44.18	43.48	40.91	39.15	37.68	35.71	34.77	33.54	32.40

ADD For interior finish - Class 1: $ 1.96 per square foot of floor area
Class 2: 2.41 per square foot of floor area
Class 3: 2.96 per square foot of floor area

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

MACHINERY & EQUIPMENT SHEDS

AVERAGE QUALITY

AVE. QUALITY – 1 SIDE OPEN

GOOD QUALITY

GOOD QUALITY – 1 SIDE OPEN

BASIC FARM BUILDINGS

MACHINERY AND EQUIPMENT SHEDS

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY
Foundation	Light perimeter concrete	Concrete perimeter	Concrete perimeter
Floor	Dirt	Dirt or concrete*	Dirt or concrete*
Wall Structure	Light wood boxed frame or post and beam, 10' eave height	Post and beam construction, 10' eave height	Average 2"x 4", 24" on center, 10' eave height
Exterior Wall Cover	Light wood or metal siding on a wood frame	Average wood or metal siding on wood frame	Good wood or metal siding on wood frame
Roof Construction	Shed type, or low pitch open wood system for metals	Low pitch, open wood system for metals or wood shingles	Medium pitch, open wood system for metals or wood shingles
Roof Cover	Corrugated metal	Corrugated metal or wood shingle	Standard gauge metal or good wood shingles
Electrical	None	2 outlets per 1,000 square foot	4 outlets per 1,000 square feet
Plumbing	None	None	None
Shape	Usually elongated, width between 15 and 30 feet, any length	Usually elongated, width between 15 and 30 feet, any length	Usually elongated, width between 15 and 30 feet, any length

SQUARE FOOT COSTS

TYPE I (ALL SIDES CLOSED)

CLASS	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	$ 19.97	16.08	14.79	14.15	13.87	12.87	12.82	12.51	12.39	12.28	12.14
2	27.88	22.87	21.40	20.58	20.15	18.83	18.70	18.40	18.21	18.14	17.95
3	38.52	32.55	30.74	29.79	29.36	27.70	27.42	27.17	26.93	26.84	26.50

TYPE II (ONE SIDE OPEN)

CLASS	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	$ 16.42	13.14	12.06	11.46	11.09	10.45	10.36	10.13	9.98	9.95	9.82
2	23.13	19.14	17.66	16.90	16.47	15.78	15.52	15.33	15.06	15.03	14.83
3	33.39	27.85	26.01	25.75	25.20	24.24	23.93	23.69	23.28	23.15	22.91

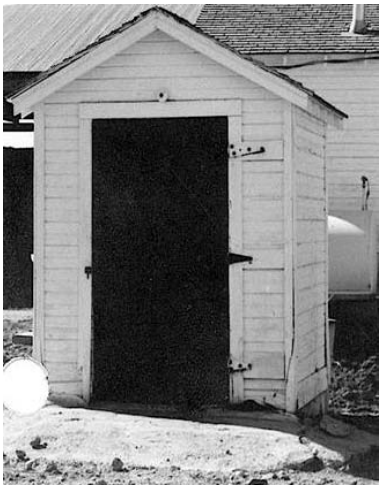
ADD Concrete or wood floors, or concrete flatwork per square foot: $ 4.79

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

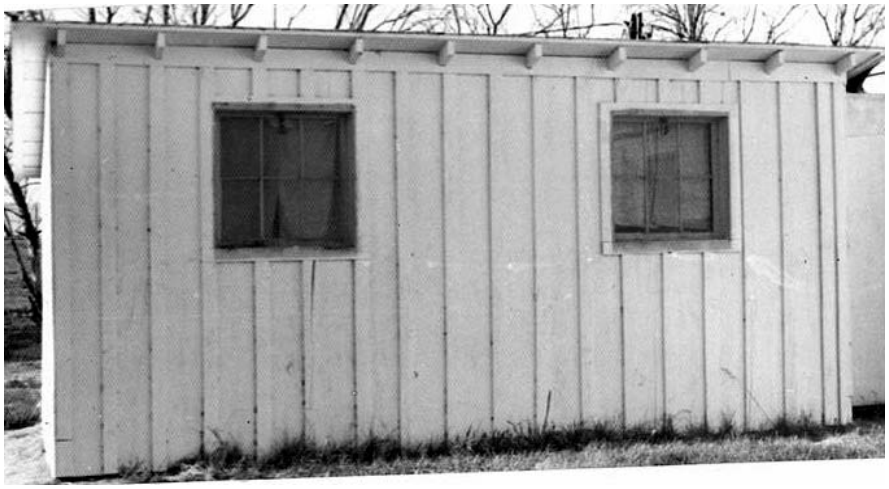
BASIC FARM BUILDINGS

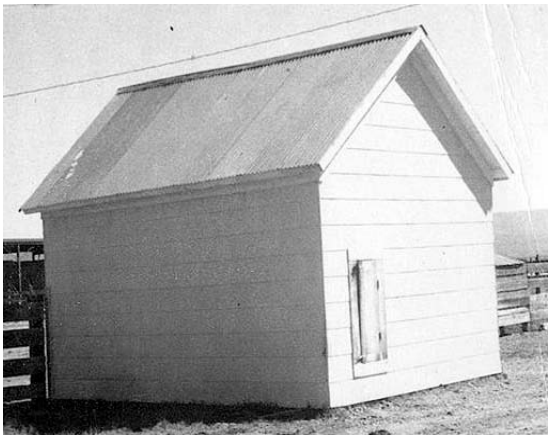
SMALL SHEDS AND PUMP HOUSES

LOW QUALITY



AVERAGE QUALITY





GOOD QUALITY

BASIC FARM BUILDINGS

SMALL SHEDS AND PUMP HOUSES

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY
Foundation	Redwood or cedar mudsills	Concrete or masonry piers	Continuous concrete
Floor	Dirt	Dirt*	Dirt*
Wall Structure	Light wood boxed frame or wood posts and beams 8' eave height	Average 2"x 4" on center, 8' eave height	Good 2"x 6", 24" on center, or 2"x 4", 16" on center, 8' eave height
Exterior Wall Cover	Light wood siding, board and batten or light aluminum siding	Average wood or aluminum siding	Good wood siding painted, standard gauge corrugated or aluminum siding
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	Composition shingle asphalt roll paper, light wood shingles or sod	Good shingles light aluminum corrugated iron	Standard gauge, aluminum corrugated iron or good wood shakes
Electrical	None	Minimal	Minimal
Plumbing	None	None	None

NOTE: Type II with 2 sides open; reduce cost by an additional 12 percent.
Type II with 3 sides open; reduce cost by an additional 25 percent.
Type II with 4 sides open; reduce cost by an additional 30 percent.

SQUARE FOOT COSTS

TYPE I (ALL SIDES CLOSED)

CLASS	30	50	60	80	100	120	150	200	250	300	400	500
1	$ 25.58	21.26	20.65	18.53	17.27	16.46	15.60	14.24	13.69	13.12	12.28	11.79
2	33.67	30.04	28.10	25.74	24.32	23.41	22.40	20.95	20.29	19.62	18.70	18.18
3	51.81	42.23	40.70	36.90	33.36	31.57	29.69	27.47	25.48	24.21	22.40	21.25

TYPE II (ONE SIDE OPEN)

CLASS	30	50	60	80	100	120	150	200	250	300	400	500
1	$ 21.29	17.35	16.05	15.02	14.38	13.61	12.77	12.20	11.79	11.28	10.76	10.30
2	30.37	25.97	25.01	22.11	20.29	18.64	18.01	16.98	16.74	15.44	14.65	13.92
3	40.01	36.06	33.10	29.43	27.19	25.20	24.41	23.24	22.09	20.92	19.98	19.11

ADD	Concrete or wood floors, or concrete flatwork per square foot:	$ 4.79
	Fiberglass Roll or Batt Insulation:	0.86
	Gypsum Board Interior:	1.85

BASIC FARM BUILDINGS

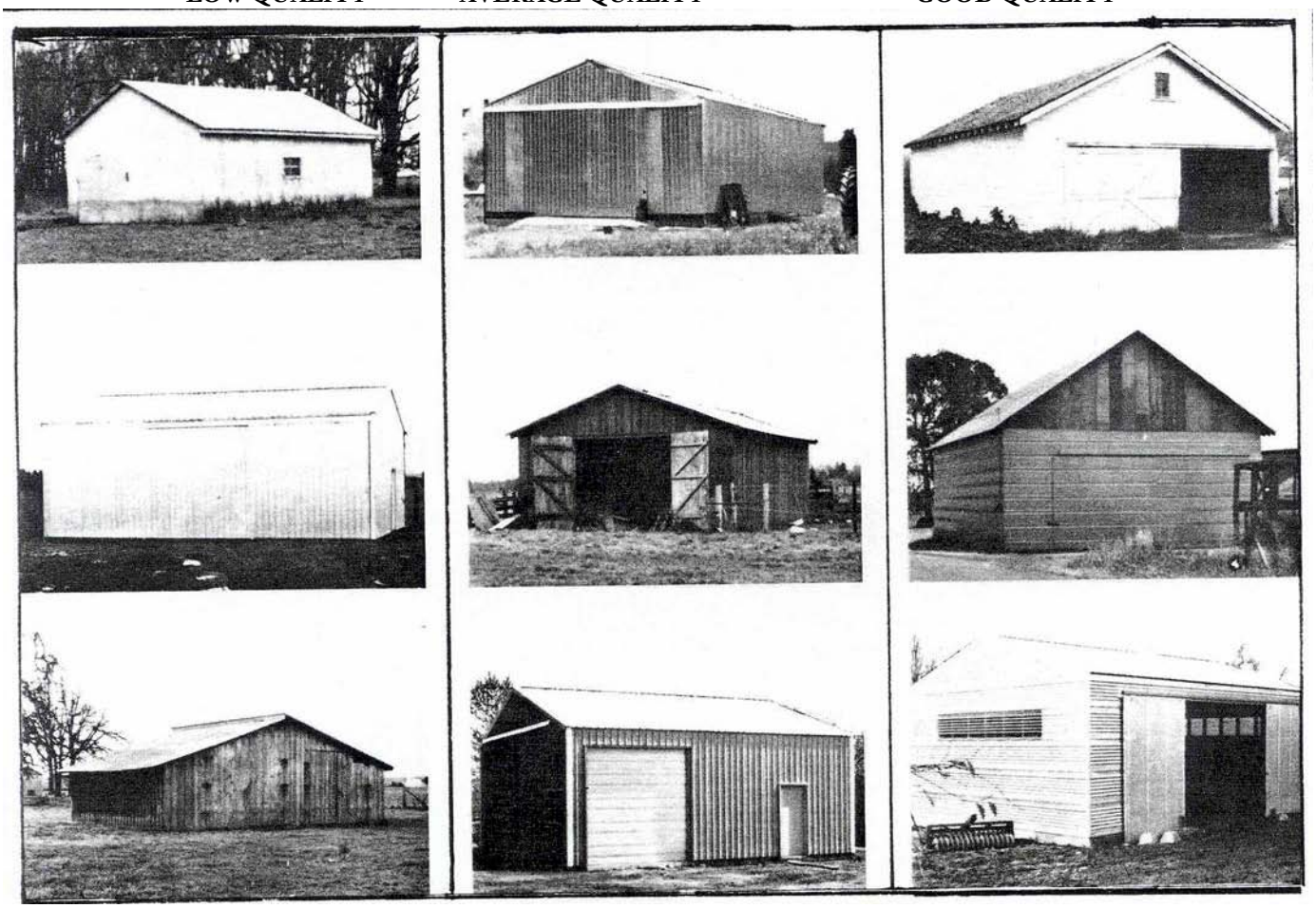
Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

GENERAL PURPOSE BUILDINGS

General purpose buildings adapt easily to many different uses, especially as garages, machine repair shops, or storage areas. General purpose buildings may also function as feed storage sheds or livestock shelters.

General purpose buildings typically employ simple designs that emphasize maximum utility at minimum cost.

CLASS ILLUSTRATIONS



BASIC FARM BUILDINGS

GENERAL PURPOSE BUILDINGS

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY
Foundation	Wood girder on masonry piers; or holes and backfill for pole frame	Holes and backfill for pole frame; or light perimeter foundation	Continuous concrete poured with floor
Floor	Dirt	Concrete	Concrete
Frame and Exterior Walls	Eave height 8'. Pole or box frame with metal exterior or low grade sidings	Eave height 8'. Pole or box frame with metal exterior or average grade sidings	Eave height 8'. Conventional wood stud frame with good wood or metal sidings
Interior Walls	Normally unfinished see options	Normally unfinished see options	Normally unfinished see options
Roof Structure	Low pitch wood system for metal or low cost composition roof	Low to medium pitch wood system for average cost metal or composition roof	Medium pitch wood system with composition or wood sheathing
Roof Cover	Aluminum or steel corrugated or crimped, low quality	Aluminum or steel corrugated or crimped, average quality	Composition shingle, good quality or average quality metal or wood shingles
Electrical	None	Minimal	Minimal
Plumbing	None	None	None

SQUARE FOOT COSTS

CLASS	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	$ 16.01	13.68	13.06	12.35	12.06	11.62	11.32	11.18	11.06
2	22.67	19.95	19.15	18.27	17.94	17.41	17.04	16.87	16.70
3	30.05	26.66	25.71	25.37	24.24	23.57	23.11	22.88	22.75

ADD For interior finish - Class 1: $ 1.89 per square foot of floor area
Class 2: 2.08 per square foot of floor area
Class 3: 2.27 per square foot of floor area

Height adjustment:

Add 2 percent for each foot of average story height over 8' base height.
Subtract 2 percent for each foot of average story height under 8' base height.

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

ROOT CELLARS

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY
Foundation	Cedar or redwood mudsills or rubble	Concrete or masonry footings	Continuous concrete
Floor	Dirt	Dirt	Concrete
Wall Structure	Post and beams with wood siding	Post and beams with wood siding	Concrete block or poured concrete
Roof Construction	Flat or low to medium pitch gable, poles or light wood	Flat or low to medium pitch gable, lodge pole or heavier wood	Flat reinforced poured concrete
Roof Cover	Sod	Sod, or if above ground corrugated metal with inside insulation	Sod, or if above ground corrugated metal with inside insulation
Electrical	Minimal	Minimal	Minimal
Plumbing	None	None	None

SQUARE FOOT COSTS

CLASS	100	200	300	400	500	600	1,000	1,500	2,000	2,500
1	$ 22.05	20.07	19.09	18.62	18.27	18.03	17.78	17.53	17.34	17.28
2	30.48	26.65	25.52	24.55	24.04	23.87	22.77	22.18	21.82	21.54
3	75.14	61.25	52.62	47.88	45.20	43.83	38.89	35.89	33.83	32.41

NOTE: Above costs include sod roof covering.

ADD For corrugated metals, light composition or wood shingles;

Class 1: $ 3.59 per square foot of floor area
Class 2: 4.31 per square foot of floor area
Class 3: 5.17 per square foot of floor area

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

COLD STORAGE WALK-IN BOXES

TOTAL COST

TYPE	50 sq ft	100'	150'	200'	300'	400'	500'
COOL BOX	17,297	24,797	30,361	35,199	43,425	50,198	56,246
FREEZE BOX	19,753	27,912	33,869	44,695	52,920	59,694	65,742

Wall deduction per linear foot of wall: $ 136

NOTE: Above costs represent prefabricated metal clad units, including refrigeration equipment. Deduct 10 percent for wood exterior and interior. Add 6 percent for each foot of height over 7.5 foot base height. Where building walls form exterior wall of box, use above wall deduction. For homemade boxes using farm labor for construction, deduct 30 percent.

POTATO STORAGE

TYPE I

Costs represent low quality construction, partly below grade, performed by unskilled farm labor with minimal quality materials. These are designed for relatively short storage periods. They are commonly called "potato cellars."

COMPONENT	LOW QUALITY
Foundation	None
Floor	Dirt
Frame	Wood post and beams
Walls	Minimal walls and supports used in this type of potato storage usually earthen side walls
Roof Frame	Open wood system for the use of corrugated metals, or, wood rafters, joists, and sheathing
Roof Cover	Corrugated metals or composition, roll type
Interior Components	None
Insulation	Minimal, usually vapor barrier, wire netting with straw on nailing strips or equivalent
Electrical	Minimal, service entrance and two light fixtures

LOW QUALITY
SQUARE FOOT COSTS

4,000	5,000	7,000	10,000	15,000	20,000
$ 15.12	14.65	13.89	13.39	12.35	11.37

BASIC FARM BUILDINGS

POTATO STORAGE WAREHOUSE

TYPE II

QUONSET BUILDING: low quality prefabricated galvanized steel building with doors in end walls only, erected on concrete footings without floors, lights or plumbing. TYPE II buildings may have other uses.

SQUARE FOOT COSTS

	WIDTH			
LENGTH	30'	40'	60'	70'
30'	21.28	-	-	-
36'	20.30	-	-	-
48'	18.89	17.35	-	-
60'	17.90	16.32	15.51	-
72'	17.13	15.55	14.91	14.27
84'	16.54	15.04	14.23	13.80

	WIDTH			
LENGTH	30'	40'	60'	70'
96'	15.89	14.53	13.80	13.29
108'	15.47	14.14	13.33	12.99
120'	15.04	13.76	13.03	12.56
160'	14.10	12.82	12.05	11.66
200'	-	12.05	11.41	11.11
240'	-	11.49	10.94	10.68

OPTIONS:

Electrical		
	Minimal Service, add per square foot of floor area:	$ 0.25
Plumbing		
	Minimal Service, add per square foot of floor area:	0.18
Insulation		
	If 2" thick foamglass is sprayed on walls and ceiling (or equivalent), add per square foot of insulated area:	4.95
Interior Construction		
	If potato storage area has bins and interior partitions, add per square foot of floor area:	2.01
Concrete (or concrete flatwork)		
	Add per square foot of concreted area:	4.79

BASIC FARM BUILDINGS

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

POTATO STORAGE WAREHOUSE

TYPE III

Costs represent construction at grade level using average or good quality materials with proper supervision and skilled labor. Base wall height ordinarily equals 14 feet. Most common building size equals 50 feet by 100 feet (5,000 square feet). The maximum potato storage period depends on the magnitude of temperature and humidity control equipment; however, costs do not include environmental control. Refer to Page 24 for additional environmental control costs. TYPE III buildings may have other uses.

COMPONENT	AVERAGE QUALITY	GOOD QUALITY
Foundation	Continuous concrete	Continuous concrete
Floor	Dirt	Dirt
Frame	Heavy timber post and beam. Basic height 14 feet.	Steel frame. Basic height 14 feet.
Exterior Wall	Wood siding painted, 1 or 2 large end doors, one walk-in door.	Aluminum or steel, corrugated metal cover, unpainted. 2 large end doors. 1 or 2 walk-in doors.
Interior Construction	See options	See options
Ceiling	Open	Open
Plumbing	Entry service, 2 hose bibs	Entry service, 2 hose bibs
Electrical	Entry service, 3 outlets	Entry service, 3 outlets
Insulation	2 inch thick cellulose sprayed walls and ceiling or equivalent	2 inch thick cellulose sprayed walls and ceiling or equivalent
Roof Frame	Wood rafters, joists, sheathing	Open steel and frame for corrugated metals
Roof Cover	Asphalt or wood shingle	Galvanized metal

BASIC FARM BUILDINGS

SQUARE FOOT COSTS

	5,000	7,000	10,000	15,000	20,000	25,000	30,000	40,000
AVG	$ 27.87	26.56	25.25	23.27	21.69	20.93	20.18	19.23
GOOD	37.39	35.37	32.79	29.61	27.37	25.95	24.90	23.78

OPTIONS:

Interior Construction

If potato storage area has bins and interior partitions,

add for average quality per square foot:	$ 5.45
add for good quality per square foot:	10.64

Exterior Construction

Painted metal exterior walls, add per square foot:	$ 0.78
Concrete or concrete flatwork per square foot:	4.79

NOTE: Above costs for potato storage warehouse assume skilled labor and include contractor fees. For construction performed by ranch or farm labor without contractor supervision, deduct 15 percent to 25 percent depending on the quality of the finished building. See the following page for other additional features.

POTATO STORAGE WAREHOUSE OPTIONS

TEMPERATURE AND HUMIDITY CONTROL

Air humidity control only, including fan room, louver system, humidifiers, perforated air pipe, and control panel.

SQUARE FOOT COSTS

5,000	7,000	10,000	15,000	20,000	25,000	30,000	40,000
$ 4.19	4.06	3.89	3.73	3.59	3.49	3.43	3.29

AIR CONDITIONING

Includes complete refrigeration unit and controls in addition to the air and humidity system listed above.

SQUARE FOOT COSTS

5,000	7,000	10,000	15,000	20,000	25,000	30,000	40,000
$ 9.11	8.82	8.46	8.10	7.81	7.60	7.45	7.16

BASIC FARM BUILDINGS

STEEL BUILDINGS – FARM & RANCH

METAL HORSE BARN

METAL SHOP– SLANT WALL

QUONSET BUILDING

BASIC FARM BUILDINGS

QUONSET BUILDINGS

Costs per square foot of floor area represent Average Quality prefabricated galvanized steel buildings with doors in end walls only and minimum additional features, erected on concrete footings without floors, lights, or heat. Adjust low quality buildings down 30 percent and good quality buildings up 25 percent based on the quality of the finished building and extra additives. Base height equals 20 feet at the center of the arch. Add or deduct 5 percent for each foot of deviation from base.

SQUARE FOOT COSTS

	WIDTH			
LENGTH	30'	40'	60'	70'
30'	30.40	-	-	-
36'	28.99	-	-	-
48'	26.98	24.78	-	-
60'	25.58	23.32	22.16	-
72'	24.48	22.22	21.30	20.39
84'	23.62	21.49	20.33	19.72

	WIDTH			
LENGTH	30'	40'	60'	70'
96'	22.71	20.75	19.72	18.98
108'	22.10	20.20	19.04	18.56
120'	21.49	19.65	18.62	17.95
160'	20.14	18.31	17.21	16.66
200'	-	17.21	16.30	15.87
240'	-	16.42	15.63	15.26

PRE-ENGINEERED STEEL BUILDINGS

Costs per square foot of floor area represent Average Quality prefabricated galvanized steel buildings, with minimum doors, windows, and additional features erected on concrete footings without floors, lights, or heat. Multipliers appear below for other types of skin coverings. Adjust low quality buildings down 25 percent and good quality buildings upwards 25 percent based on the quality of the finished building and extra additives.

AVERAGE QUALITY

	EAVE	LENGTH TO WIDTH RATIO					
WIDTH	HEIGHT	1.0	1.5	2.0	3.0	4.0	5.0
20'	10'	$ 27.14	25.69	24.71	23.39	22.45	21.78
30'	12'	23.29	22.23	21.68	20.48	19.86	19.38
40'	14'	23.65	22.15	21.21	19.90	18.97	18.32
50'	14'	20.96	20.17	19.64	18.91	18.40	18.03
60'	14'	19.11	18.48	18.07	17.52	17.15	16.97
80'	16'	19.54	18.85	18.38	17.75	17.13	16.83
100'	16'	19.11	18.32	17.75	17.03	16.58	16.14
140'	16'	16.97	16.46	16.01	15.54	15.12	14.89
160'	18'	16.79	16.30	15.95	15.44	15.10	14.85
200'	18'	15.79	15.38	15.10	14.73	14.44	14.24

See following pages for additional features.

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

BASIC FARM BUILDINGS

PRE-ENGINEERED STEEL BUILDINGS

ADDITIONAL FEATURES

HEIGHT: add or deduct 2 percent for each foot of deviation from base.

ALUMINUM: multiply base costs by 1.05.

ENAMELED STEEL: multiply base costs by 1.05.

SLANT WALL BUILDINGS: deduct 5 percent to 15 percent.

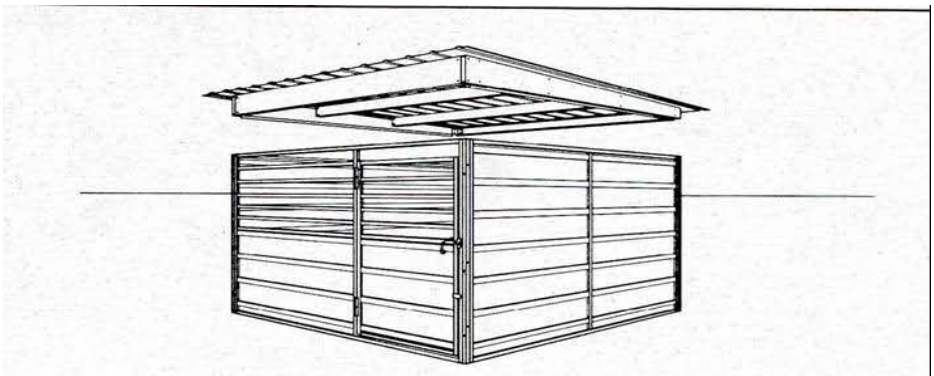
Costs based on square foot of floor area, unless otherwise noted.

COSTS PER SQUARE FOOT	LOW	AVG	GOOD
FLOOR:			
Asphalt:	$ 2.40	$ 3.04	$ 3.85
Concrete:	3.94	4.79	5.83
LIGHTING:	0.29	0.78	1.53
INSULATION: (per square foot of insulated wall area)			
Wall:	$ 0.83	$ 1.03	$ 1.24
Roof:	1.08	1.68	2.53
PLUMBING:	0.25	0.69	1.40
HEATING: (suspended space heaters):	1.16	1.57	2.17

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

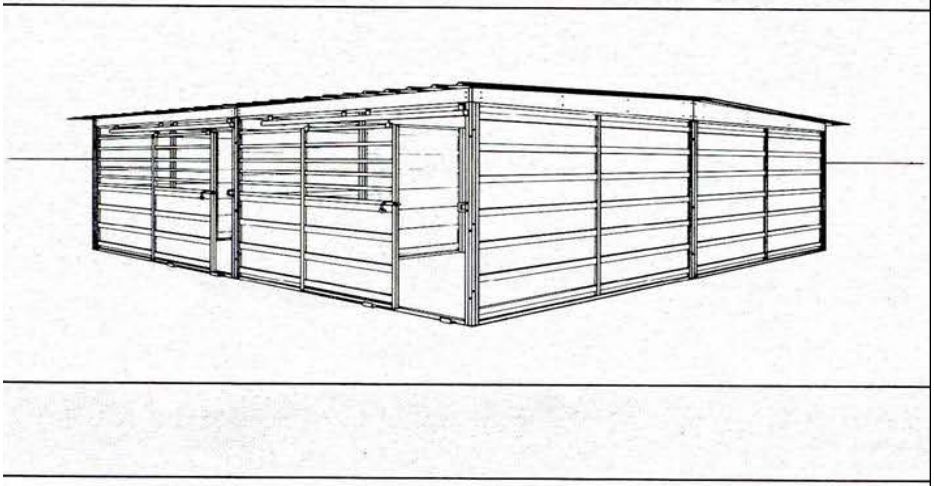
BASIC FARM BUILDINGS

PREFABRICATED METAL HORSE STABLES



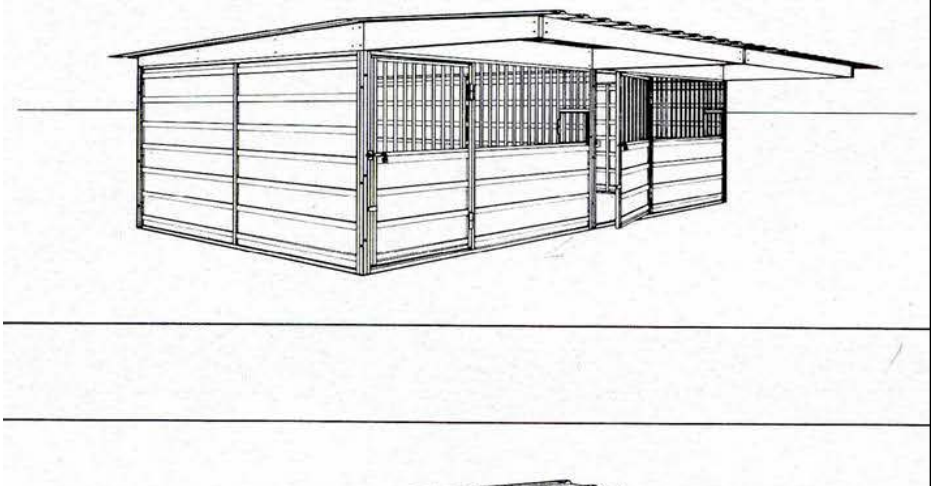
AVERAGE QUALITY

SINGLE STALL



AVERAGE QUALITY

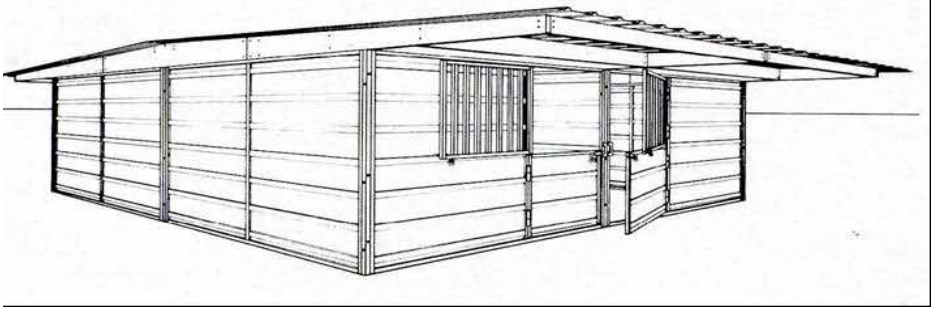
QUADRUPLE STALL



AVERAGE QUALITY

DOUBLE STALL

WITH PATIO ROOF OR OVERHANG



AVERAGE QUALITY

QUADRUPLE STALL

WITH PATIO ROOF OR OVERHANG

PREFABRICATED METAL HORSE STABLES

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY
Foundation	Light perimeter concrete foundation	Average perimeter concrete foundation	Good perimeter concrete foundation
Floor	Dirt	Dirt	Dirt
Wall Structure	Prefabricated light metal frame	Prefabricated average weight metal frame	Prefabricated heavy duty metal frame
Exterior Wall Cover	Metal cover light weight	Metal cover average weight	Metal cover heavy duty
Roof Construction	Light open steel system for metal	Average open steel system for metal	Heavy duty open steel system for metal
Roof Cover	Low pitch light metal cover	Low pitch average metal cover	Low pitch heavy duty metal cover

SQUARE FOOT COSTS

CLASS	ONE STABLE 144 SF	TWO STABLES 288 SF	FOUR STABLES 576 SF
1	$ 22.33	$ 20.48	$ 18.76
2	29.75	27.34	25.13
3	39.67	36.56	33.71

ADD per square foot of patio roof or overhang:

LOW	AVG	GOOD
$ 5.12	$ 7.17	$ 10.08

ADD Concrete or concrete flatwork per square foot: $ 4.79

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

Section 2

DAIRY BARNS

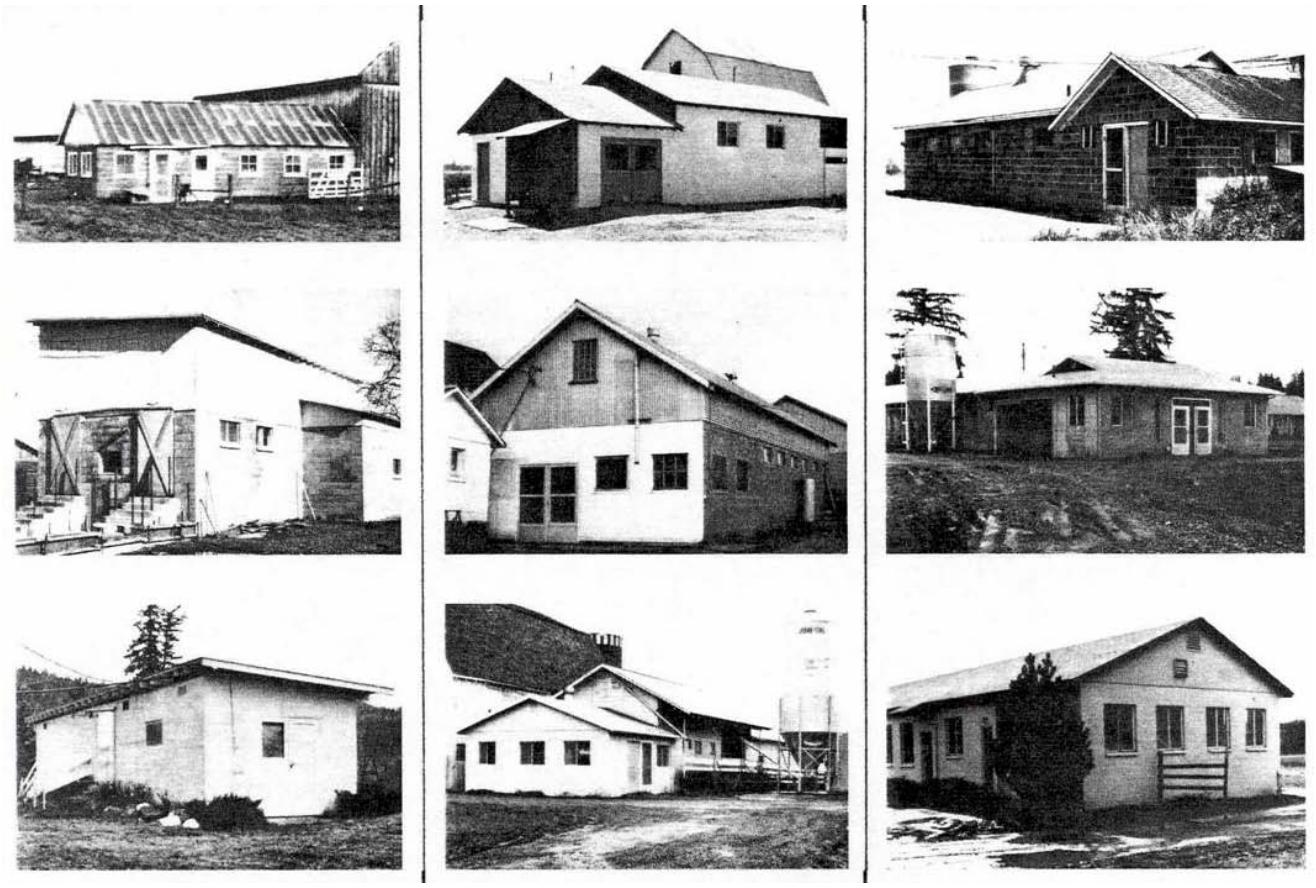
Approved by NTC - 3/8/2021
Published - 3/15/2021

DAIRY BARNS

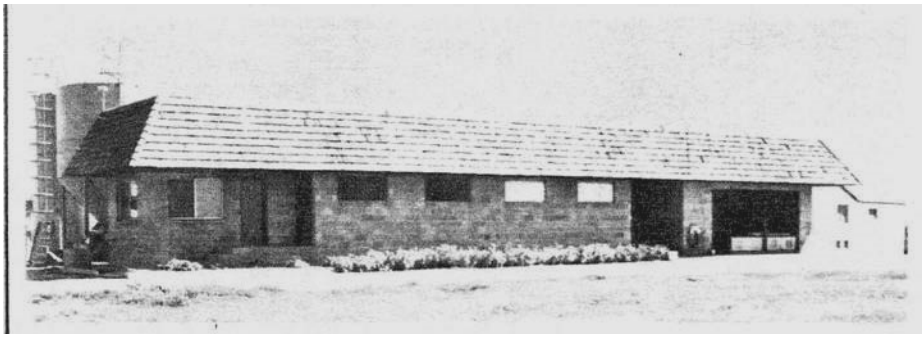
PHOTOS COURTESY OF CHURCHILL COUNTY ASSESSOR

DAIRY BARNS

LOW QUALITY **AVERAGE QUALITY** **GOOD QUALITY**

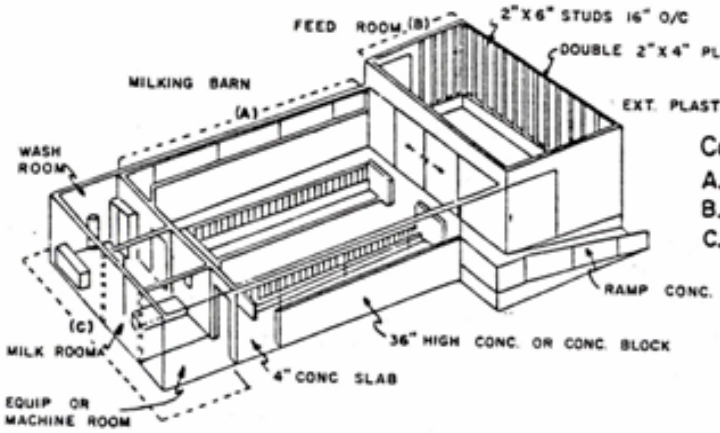


VERY GOOD QUALITY



DAIRY BARNS

Stanchion Barn

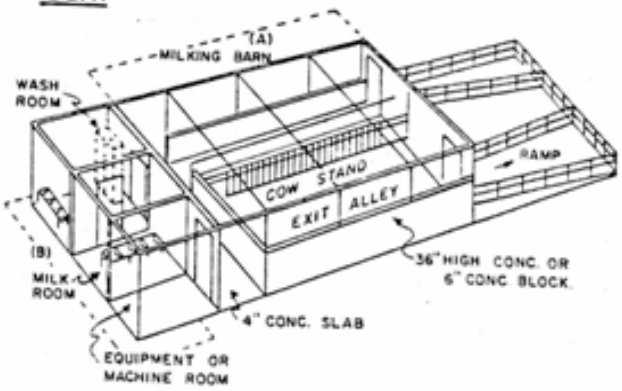


Component Parts of This Dairy
A. Milking Barn
B. Feed Room
C. Milk, Wash, and Equipment Rooms

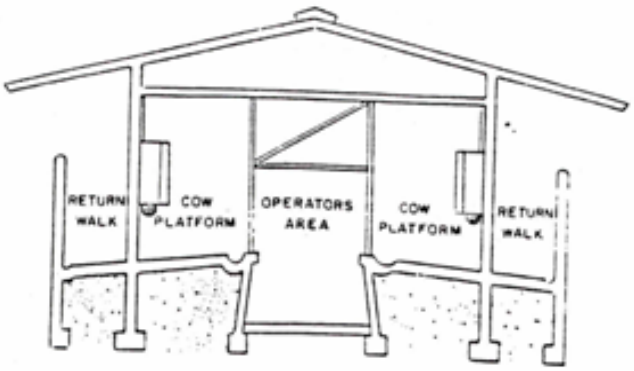
Typical Walk-Through Barn

Component Parts of This Dairy

A. Milking Barn
B. Milk, Wash,and Equipment Rooms



Cross Section Modern Herrington-Type Dairy Barn



Section 2

DAIRY BARNS

MILKING PARLORS

SITE PREPARATION	Basically level terrain, no excavation, minimum fill.
FOUNDATION	Reinforced concrete for one story height. Foundation and footings formed and poured monolithically with floor slab.
FLOORS	Concrete well-formed gutters, elevated slab.
CEILING	Open unfinished, paint only, bottom of roof.
INTERIOR	Type found in dairies and milking parlors, smooth plaster or epoxy paints. Minimum cow stanchions and stalls conforming to the quality of the building. Neither equipment nor machinery is included.
PLUMBING	Basic plumbing required for building, usual floor drains and hose bibs. Does not include milk piping, pumps or storage.
HEATING - COOLING	Minimum, space heaters and evaporative coolers.
ELECTRICAL LIGHTING	Basic electrical service required for dairies. Does not include machinery or equipment.
EXTERIOR WALLS	8" concrete block, bearing walls or reinforced concrete 36 inch high with 2" x 6" stud framing – 16" on center above.
ROOF STRUCTURE AND COVER	Wood joists, wood or composition deck. Asphalt shingles to 290 pounds.
COST RANGE RATING	Based on cost per square foot of floor area.

SQUARE FOOT COST

QUALITY

LOW	AVERAGE	GOOD	VERY GOOD
$ 62.79	$ 78.21	$ 98.67	$ 125.74

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

DAIRY BARNS

MILKING PARLORS

ADDITIONAL FEATURES

COST RANGE RATING Based on cost per square foot of floor area unless otherwise noted.*

FEATURE		QUALITY LOW	AVERAGE	GOOD	VERY GOOD
CEILING					
(Gypsum board - taped and painted):		$ 2.40	2.65	2.93	3.24
INSULATION					
	Walls:	$ 0.82	1.01	1.21	1.48
	Roof:	1.06	1.64	2.48	3.74

WALL ORNAMENTATION (*apply only to ornamented area):	LOW	AVERAGE	GOOD	VERY GOOD
CERAMIC TILE (*cost based on square foot of area covered):	14.97	18.41	21.86	25.30
ROOF COVER (Wood shingle):	5.89	7.32	9.11	11.36
AUTOMATIC GATES (*based on cost per stall):	$ 1,415	$ 1,508	$ 1,600	$ 1,693
AUTOMATIC FEED EQUIPMENT (*based on cost per stall):	$ 1,022	1,116	1,212	FOR AUGER ADD: $ 1,022 1,306

FEED STORAGE BINS (see pages 3 & 4, section 6)

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

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DAIRY BARNS

MILK STORAGE, WASH, AND EQUIPMENT ROOMS

SITE PREPARATION	Basically level terrain, no excavation, minimum fill.
FOUNDATION	Reinforced concrete for one story height. Foundation and footings formed and poured monolithically with floor slab.
FLOORS	Concrete at grade level, may include some gutters and drains.
CEILING	Gypsum board, taped and painted.
INTERIOR	Type found in dairies and milking parlors, smooth plaster or epoxy paints. No equipment or machinery is included.
PLUMBING	Basic plumbing required for building, washbasins, water closet, and lavatory. Does not include milk piping, pumps or storage.
HEATING - COOLING	Minimum, space heaters and evaporative coolers.
ELECTRICAL LIGHTING	Basic electrical lighting service required for building.
EXTERIOR WALLS	8" concrete block, bearing walls for good and very good quality, plywood, boards, or wood siding on wood frame, interior sheathing finished for low and average quality.
ROOF STRUCTURE AND COVER	Wood joists and sheathing, asphalt shingle cover.
COST RANGE RATING	Based on cost per square foot of floor area.

SQUARE FOOT COSTS

QUALITY

LOW	AVERAGE	GOOD	VERY GOOD
$ 31.04	$ 42.90	$ 73.50	$ 96.91

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

DAIRY BARNS

MILKING STORAGE, WASH AND EQUIPMENT ROOMS

ADDITIONAL FEATURES

COST RANGE RATING Based on cost per square foot of floor area.

	QUALITY			
FEATURE	**LOW**	**AVERAGE**	**GOOD**	**VERY GOOD**
INSULATION				
Walls:	0.82	1.01	1.21	1.48
Roof:	1.06	1.64	2.48	3.74
WALL ORNAMENTATION (*apply only to ornamented area):				
CERAMIC TILE (*cost based on square foot of area covered):				
	14.97	18.41	21.86	25.30
ROOF COVER				
(Wood shingle):	5.89	7.32	9.11	11.36

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

FEEDER FENCE w HEADLOCK

DAIRY BARNS

WASH PEN AND HOLDING AREA

FLOOR OR RAMP	Sloping concrete slab rough finish 6" thick.
WALLS	Concrete block 8" - height 5'.
FENCING	Welded iron pipe, post 10' on center set in concrete, pipe top rail with 3 cable strands, or, no pipe top rail with 5 cable strands, or, iron rods. Cable size 5/8" or ¾".
GATES	Metal gates (2 usually) 12 linear feet each, 5 rail.
SPRINKLER	Hooded rainbird type or equivalent including piping and pump.
COST RANGE RATING	Based on cost per square foot of floor area.

QUALITY

LOW	AVERAGE	GOOD	VERY GOOD
$ 19.69	$ 22.67	$ 25.43	$ 28.36

ROOF COVERING: Wood or pipe post and beam, steel trusses, light metal roof cover;

QUALITY

LOW	AVERAGE	GOOD	VERY GOOD
$ 8.27	$ 10.60	$ 13.65	$ 17.60

METAL RAIL FENCE
WELDED IRON RAILS

Iron pipe post 2-1/2" to 4" in diameter - 7' to 10' on center in concrete:
$ 18.95 per linear foot.

CABLE FENCE

Iron pipe post 2-1/2" to 4" in diameter - 7' to 10' on center in concrete - iron pipe top rail;
3-Cable: $ 15.00 per linear foot.
4-Cable: $ 16.97 per linear foot.

METAL GATES

54" to 64" high - welded iron rails or pipe with bracing:
22.53 per linear foot of gate width.

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

DAIRY BARNS

DAIRY EQUIPMENT

STAINLESS STEEL REFRIGERATED HOLDING TANKS

SIZE GALLONS	TANK ONLY	COMPLETE SYSTEM
500	$ 9,798	$ 18,414
1,000	18,416	26,309
1,250	21,546	30,206
1,500	24,086	32,821
2,000	29,756	40,029
2,500	34,247	48,642
3,000	37,558	57,258
4,000	45,360	71,032
5,000	50,803	84,186

VACUUM PUMP SYSTEMS

8-20 STALLS WITH 3 PHASE ELECTRIC MOTORS
PER COW STALL: $ 644

REFRIGERATION COMPRESSORS

HORSE POWER	COST
3.0	$ 7,675
4.0	11,202
5.0	14,729
7.5	18,256
10.0	21,784
15.0	25,311

FEED FENCING w HEADLOCKS

TYPE	COST
STEEL	$ 31.32 per LF
LOCKABLE STEEL	46.99 per LF
SELF-LOCKING STEEL	91.73 EACH

NOTE: See following page for listing of additional equipment.

DAIRY BARNS

DAIRY EQUIPMENT

PLATE COOLERS

NUMBER OF STALLS

6	8	12	20	24
$ 5,111	7,553	9,995	12,436	14,878

HERRINGBONE STALLS

SIZE	STALLS	COST
DOUBLE 3	6	$ 12,701
DOUBLE 4	8	15,120
DOUBLE 6	12	22,680
DOUBLE 10	20	37,800
DOUBLE 12	24	39,917

NOTE: Above costs include manually operated gates.
Larger or other sizes, use a combination of above.

MILK TRANSFER LINES

TYPE	SIZE	COST PER LF
STAINLESS STEEL	18 GAUGE - 1.5"	$ 8.75
STAINLESS STEEL	18 GAUGE - 2.0"	11.10
STAINLESS STEEL	16 GAUGE - 2.0"	14.46
STAINLESS STEEL	16 GAUGE - 2.5"	20.08
STAINLESS STEEL	16 GAUGE - 3.0"	24.26
GLASS PIPE	1.5"	67.61
GLASS PIPE	2.0"	83.75

NOTE: Flushing systems require twice the amount of pipe.

Electric pulsator or hydropulsator;

Manual on & off:	$ 592	to	$ 948	EACH
Automatic off, add:	$ 989	to	$ 2,960	

Section 3

BUNK HOUSES

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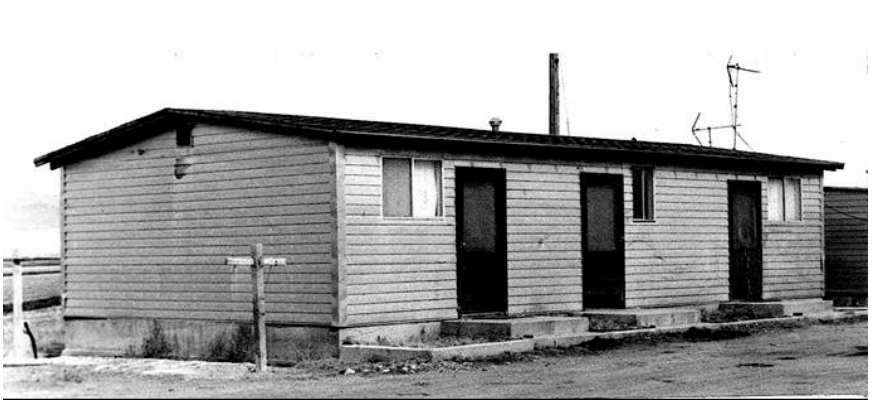
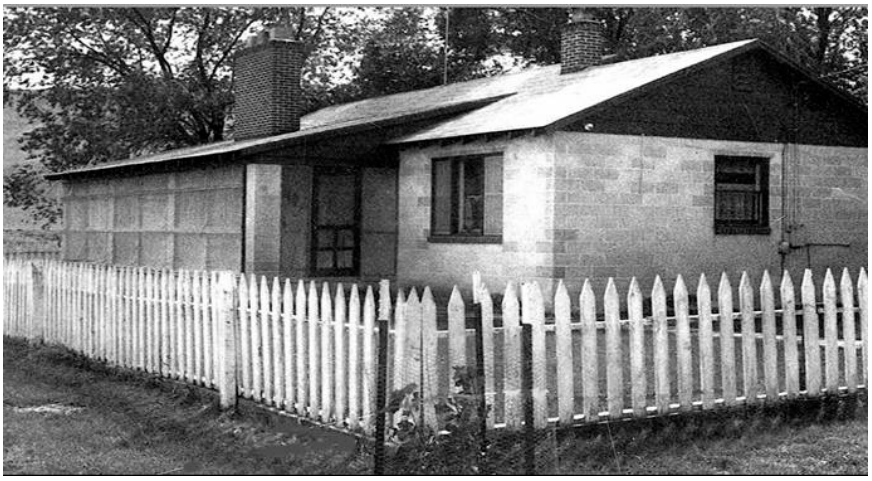
BUNK HOUSES

CLASS I
LOW QUALITY



CLASS 2
AVERAGE QUALITY

CLASS 3
GOOD QUALITY



CLASS 4
VERY GOOD QUALITY

BUNK HOUSES

COMPONENT	CLASS 1 LOW QUALITY	CLASS 2 AVERAGE QUALITY	CLASS 3 GOOD QUALITY	CLASS 4 VERY GOOD QUALITY
Foundation	Thickened slab around perimeter	Thickened slab around perimeter	Thickened slab around perimeter	Spread footing around perimeter and thickened slab at partitions
Floor	4" concrete slab	4" concrete slab	4" concrete slab	4" concrete slab
Walls	Box construction 2"x4" at 48" on center	Box construction 4"x4" at 48" on center	2"x4" studs at 24" on center, 2"x4" stud partitions at 24" on center	Masonry exterior walls wood frame interior partitions and ceiling
Exterior Cover	Cheap grade redwood or Douglas fir vertical or horizontal	Average grade of redwood, Douglas fir, B and B or horizontal board	Average or better grade of redwood B and B or horizontal siding or stucco finish	Natural blocks
Interior Finish	None	Gypsum board or plywood partitions painted	Gypsum board or plywood partitions painted	Sheet rock finished
Roof Framing	Rafters and tie at plate line	Very simple truss	Rafters, collar beams and ceiling joists or good trusses	Rafters, collar beams and ceiling joists or good trusses
Roofing	Composition or used metal sheeting	Composition or metal sheeting	Aluminum or corrugated iron or light wood shingles	Good grade composition shingles or wood shingles
Doors	Two or three cheap doors	Three or four average doors	One average door each room	One good door each room
Windows	Few and small	One window each room	One steel or aluminum window in each room	One steel sash or aluminum window in each room
Electrical	Minimum outlets	Minimum outlets	Average or better outlets	Average or better outlets adequate amount
Heating & Cooling	None	None	None	None

BUNK HOUSES

	SQUARE FEET								
CLASS	**400**	**600**	**800**	**1,000**	**1,200**	**1,500**	**2,000**	**2,500**	**3,000**
1	$ 27.52	26.00	25.25	24.41	24.11	23.38	22.85	22.39	22.19
2	36.82	34.85	33.97	32.88	32.47	31.56	30.84	30.30	30.06
3	49.87	47.37	46.17	44.83	44.32	43.12	42.25	41.55	41.19
4	89.17	82.64	79.62	75.80	74.60	71.34	69.03	67.04	66.16

1. Utility hook-up costs included.

2. Interior plumbing not included

Add for Class 1:	$ 958	per fixture
Class 2:	1,465	per fixture
Class 3:	2,234	per fixture
Class 4:	3,479	per fixture

3. Domestic well or septic system not included. Refer to Section 4 for costs

4. Floor covering not included.

Add asphalt title or linoleum:	$ 6.07	per sq ft
Add installed carpet:	6.17	per sq ft

5. Cooling systems not included.

Add window units:	$ -	per sq ft
Add for evaporative coolers, roof or wall units only:	3.23	per sq ft

6. Heating systems not included.

Add floor or wall furnace:	1.86	per sq ft

7. Insulation not included.

Add for Roof:	1.68	per sq ft
Walls:	1.03	per sq ft

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

Section 4

UTILITIES

Approved by NTC - 3/8/2021
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UTILITIES

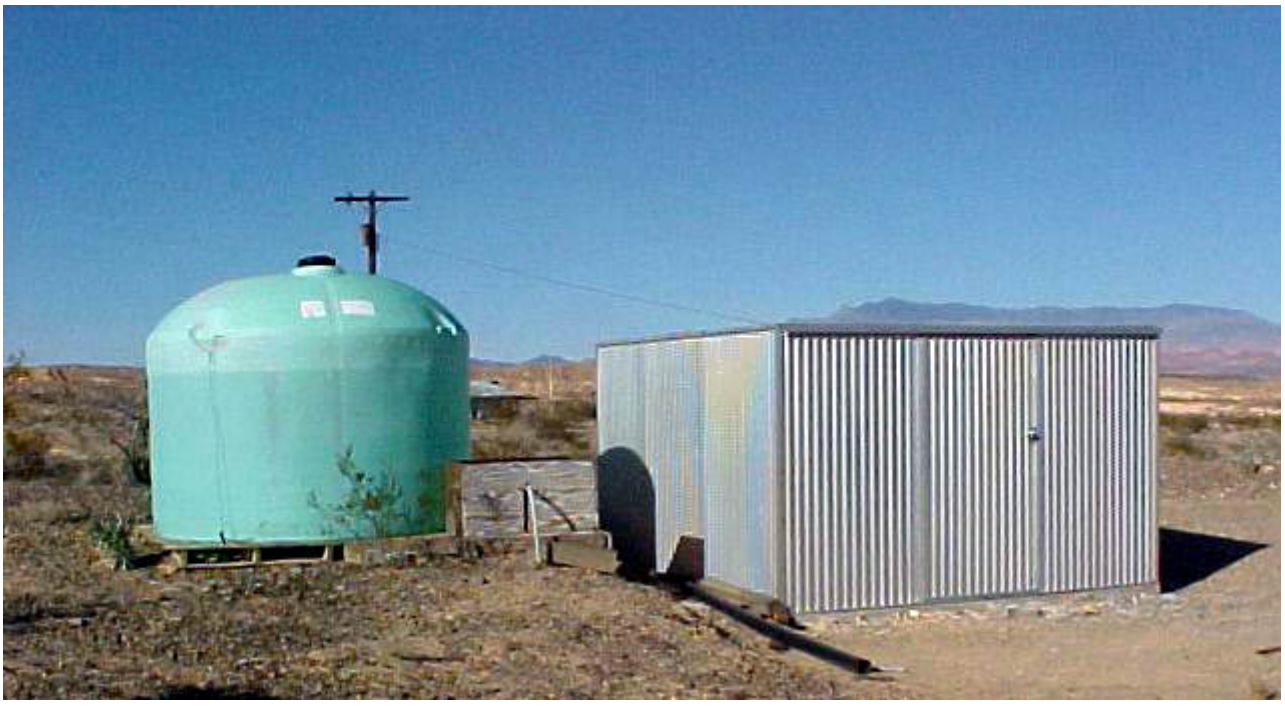
DOMESTIC WATER SYSTEMS - SEPTIC SYSTEMS - MOBILE HOME HOOKUPS

NOTE: The costs offered in this section represent general or average costs. Actual costs in specific geographic areas may vary substantially thereby requiring each assessor to substitute locally relevant cost data.

Residence and bunkhouse costs already include utility hookups. Mobile home hookup costs appear on Page 3 of this section.

PRESSURE TANK SIZES

42 gallons	16 inch diameter	x	48 height	50 inch circumference
82 gallons	20 inch diameter	x	60 height	63 inch circumference
120 gallons	24 inch diameter	x	60 height	75 inch circumference
220 gallons	30 inch diameter	x	72 height	94 inch circumference
315 gallons	36 inch diameter	x	72 height	113 inch circumference
525 gallons	36 inch diameter	x	120 height	113 inch circumference



UTILITIES
DOMESTIC WATER SYSTEMS

JET PUMPS

Includes a completely installed shallow well system package. Does not include well drilling. **Bold** cells show typical configurations.

PUMP MOTOR (HP)

TANK (GAL)	1/3	1/2	3/4	1	1 1/2	2
40	1,449	1,691	1,993	2,090	2,404	2,852
80	1,525	1,767	2,069	2,166	2,481	2,928
120	1,674	1,916	2,218	2,315	2,629	3,077
220	2,196	2,438	2,741	2,837	3,152	3,599
315	2,511	2,753	3,055	3,152	3,466	3,914
525	2,973	3,215	3,517	3,614	3,928	4,376

EXAMPLE: 3/4 HP & 80 GAL TANK $ 2,069
6" WELL AT 60' DEPTH 2,700
TOTAL COST $ 4,769

SUBMERSIBLE PUMPS

Includes pump, piping at well, pressure tank, and pad. Does not include well drilling. **Bold** cells show typical configurations.

PUMP MOTOR (HP)

TANK (GAL)	1/3	1/2	3/4	1	1 1/2	2	3	5
40	1,396	1,698	2,016	2,333	2,877	3,543	3,819	6,129
80	1,472	1,774	2,092	2,409	2,954	3,619	3,894	6,204
120	1,621	1,923	2,241	2,558	3,102	3,768	4,017	6,327
220	2,143	2,446	2,764	3,081	3,625	4,290	4,510	6,821
315	2,458	2,760	3,078	3,395	3,940	4,605	4,746	7,057
525	2,920	3,222	3,540	3,857	4,402	5,067	5,260	7,571

EXAMPLE: 1 HP PUMP & 120 GAL TANK $ 2,558
8" WELL AT 100' DEPTH. 6,800
TOTAL COST $ 9,358

WELL DRILLING

Drilling & casing costs per foot of well depth	4" - 6" WELL:	$ 45	per foot
(includes gravel and concrete packing)	8" - 10" WELL:	68	per foot

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

UTILITIES

SEPTIC TANKS

This table contains costs derived from the current Marshall Swift Commercial Manual without any adjustment for farm labor. Assessors should apply their knowledge of local market conditions to select an appropriate value.

Segregated by common sizes, these costs represent septic tanks installed and connected in normal soil with leach fields and lines, but do not include hookup costs, which are included with residences or bunkhouses. For mobile homes, add the sewer hookup costs listed below.

SEPTIC SYSTEMS	LOW	AVG	GOOD
1000 GAL	1742	2141	2540
1250 GAL	2347	2731	3115
1500 GAL	2770	3260	3750
LEACH LINES (per ft)	12.58	16.33	20.08
DRAINFIELD MULTIPLIER	1.25	1.25	1.25
PLASTIC PIPE 4"-6" (per ft)	7.58	10.08	12.58

MOBILE HOME HOOKUPS

TYPE	LOW	AVG	GOOD
Water	$ 865	1161	1,633
Electric	1,294	1863	2,697
Sewer	974	1427	1,814
Gas	410	623	992

WATER hookups include trenching, pipe, and labor from unit to city main or domestic well system.

ELECTRIC hookups include pole, box, overhead wiring, and conduit for a 100-ampere system.

SEWER hookups include trenching, pipe, and labor to a city sewer main or septic system.

GAS hookups include trenching, pipe, and labor from unit to a gas main or a tank and regulator.

NOTE: Mobile home hookup costs do not include connector, service, or user fees.

Hookup costs do include combined piping for 40 linear feet of water and sewer lines.

For either water or sewer piping costs exceeding base, ADD per linear foot: $7.72 to $12.81

Section 5

CORRALS AND FENCES

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CORRALS AND FENCES

RAILROAD TIE POSTS
10' OC

POLE RAIL FENCE

AVERAGE QUALITY
LESS 15 %

RAILROAD TIE POSTS

POLE RAIL FENCE
WITH FEED TROUGH

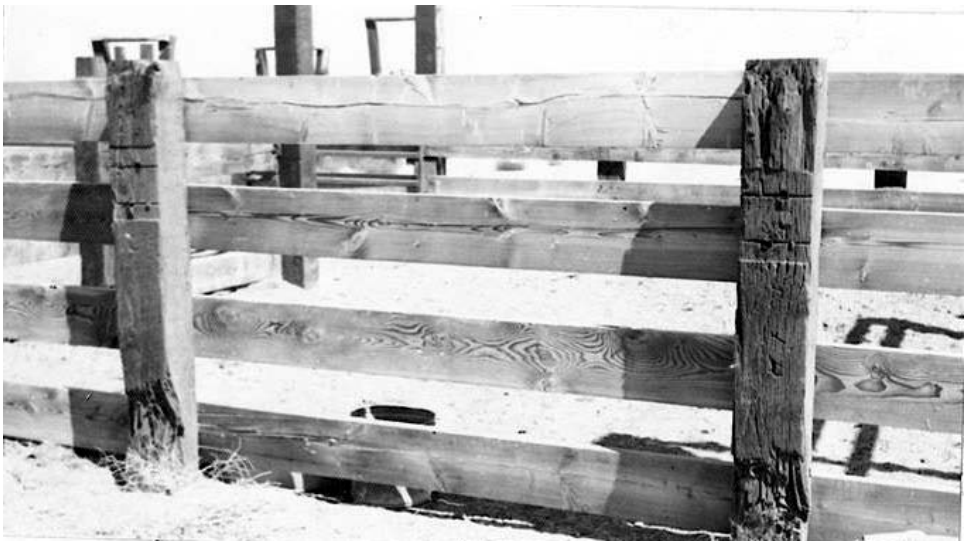
AVERAGE QUALITY

RAILROAD TIE POSTS

CABLE FENCE
WITH FEED TROUGH

AVERAGE QUALITY

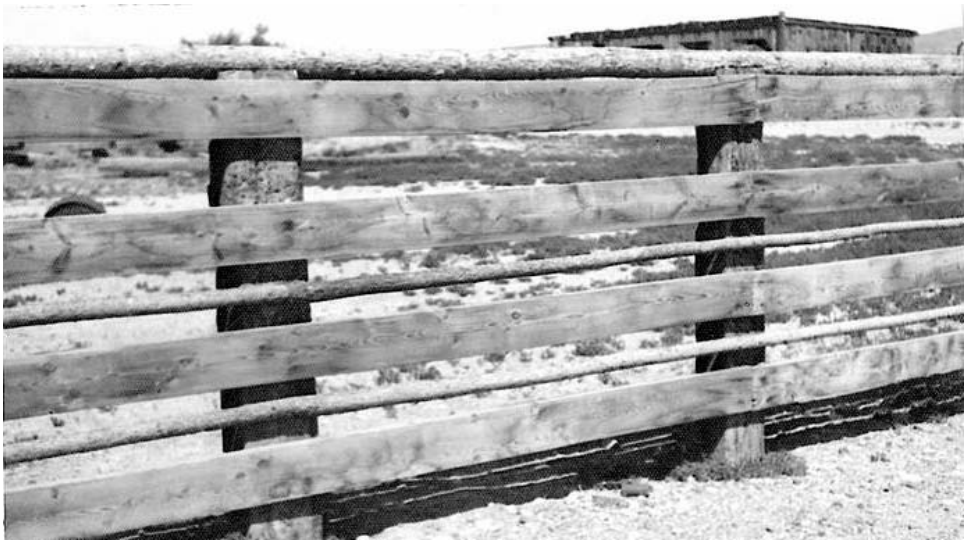
CORRALS AND FENCES



RAILROAD TIE POSTS
6' OC

2" X 8" FENCE RAILS

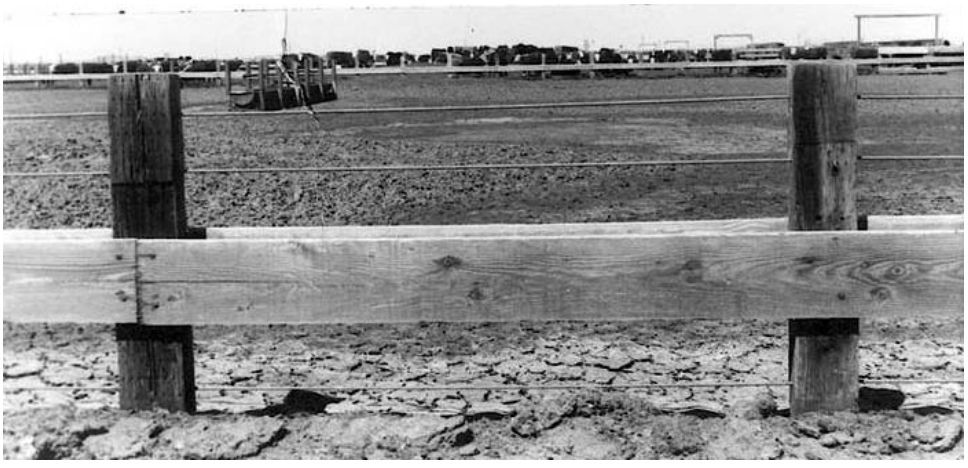
AVERAGE QUALITY
PLUS 15%



RAILROAD TIE POSTS
8' OC

2" X 8" FENCE RAILS
WITH POLES

GOOD QUALITY



RAILROAD TIE POSTS

CABLE FENCE
WITH FEED TROUGH

AVERAGE QUALITY

CORRALS AND FENCES

CORRAL FENCING

COST PER LINEAR FOOT

TYPE	LOW	FAIR	AVG	GOOD
WOOD	$ 10.39	$ 12.50	$ 15.10	$ 18.16

Examples of Rails	4-4”	4-6”	5-6”	7-6”
	3-6”	3-8”	4-10”	6-8”
	2-10”	2-12”	3-12”	4-12”
	2 or 3 poles	4 or 5 poles	6 or 7 poles	7 or 8 poles

Base costs include railroad tie posts eight feet on center with two-inch thick rails. Reduce fair – good quality by one class for lighter wood posts or one-inch thick rails; reduce low quality by 20 percent. Adjust base cost plus or minus 7.5 percent for each foot of deviation from base of eight feet on center. Less than eight feet, increase costs, more than eight feet, reduce costs. For solid wood fence of two-inch thick rails, add 35 percent to good quality. Do not adjust base cost overall more or less than 50 percent.

TYPE	LOW	FAIR	AVG	GOOD
WIRE	$ 3.78	$ 4.29	$ 4.79	$ 5.29

Examples:	2 or 3 strands barbed or hog/cattle fence	3 or 4 strands barbed or light grade woven or welded wire	5 or 6 strands barbed or horse fence (medium welded wire)	7 or 8 strands barbed or bull panels (heavy welded wire)

Base costs include railroad tie posts eight feet on center. Adjusted cost plus or minus 7.5 percent for each foot of deviation from base. Reduce one class for lighter wood posts; reduce two classes for metal “T” posts. Reduce low quality by 30 percent for light wood posts or 50 percent for metal “T” posts. Do not adjust base cost overall more or less than 50 percent.

PIPE AND CABLE FENCES

TYPE	LOW	FAIR	AVG
4" PIPE, CABLE RAILS	$ 15.00	15.48	15.97
4" PIPE, 2" PIPE RAILS	19.11	19.72	20.32

WOODEN FEED TROUGHS

TYPE	LOW		FAIR		AVG		GOOD
W/O FENCE	$ 8.10		$ 10.70		13.71		19.35
WITH FENCE	$ 11.39		14.78		18.07		23.54

For metal troughs, add 200 percent. For concrete troughs, add 250 percent.

CONCRETE

In-place cost for flatwork per square foot: $ 4.79 to $ 5.83

Cost per square foot of wall area: $ 23.17

CORRALS AND FENCES

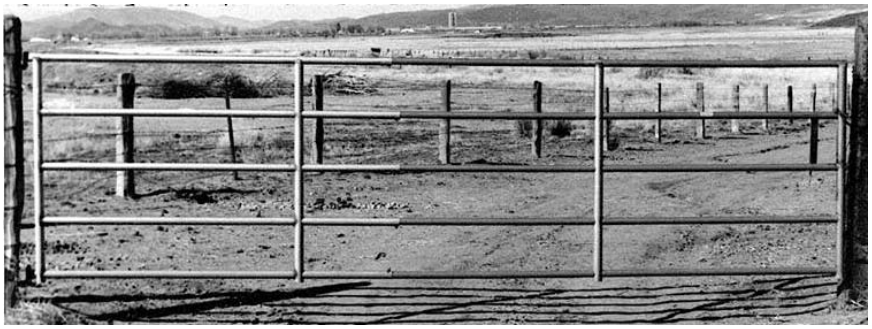
METAL FENCING AND GATES

5’ CHAIN LINK FENCE

NO TOP RAIL

COMMERCIALLY MANUFACTURED GATE

GOOD QUALITY



EXPANDED TUBE STEEL GATE

IRON PIPE CORRAL AND HOLDING PEN

CORRALS AND FENCES

CHAIN LINK FENCING

Average cost per linear foot, including complete installation on two inch round or "H" posts set in concrete, 8 to 12 feet on center.

	HEIGHT				
TYPE	4'	6'	8'	10'	12'
2" INCH MESH AVERAGE QUALITY	$ 10.35	14.93	19.61	24.20	28.83
ADD FOR RAILS	2.30	2.30	2.49	2.49	2.49
ADD FOR PRIVACY SLATS	6.98	10.64	14.34	18.33	21.98
ADD FOR 3 STRAND BARBED WIRE	2.99	2.99	3.35	3.35	3.35

Add 5 percent to 15 percent for aluminum or vinyl covered wire.

PORTABLE HORSE CORRALS & GATES

TYPE	LOW	FAIR	AVG	GOOD
METAL PIPE OR PORTABLE PANELS	$ 8.95	$ 14.26	$ 19.04	$ 27.62

Gates may be included in linear footage of fencing, commensurate to quality class, height, etc.

PLASTIC FENCING

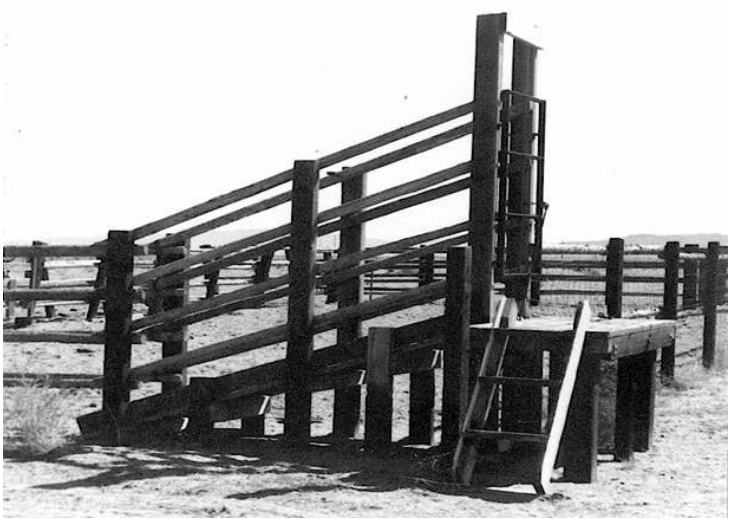
TYPE	COST
POLYMER GRID , 5', 2" * 6" TOP RAIL	$ 16.39
VINYL FENCE, 5" * 5" POSTS, 3 - 2" * 6" RAILS	20.67

For other types of plastic fence, see the Marshall & Swift Commercial Manual, Section 66 Page 5

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

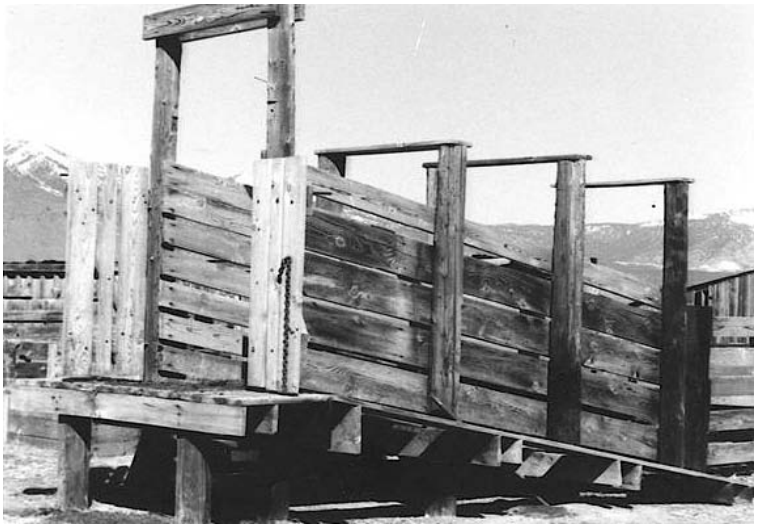
CORRALS AND FENCES

CORRAL LOADING CHUTES



LIGHT SPACED CHUTE

HEAVY SPACED CHUTE



HEAVY SOLID CHUTE

CORRALS AND FENCES

CORRAL LOADING CHUTE

COST PER LINEAR FOOT INCLUDING BOTH SIDES

SPACED	LIGHT CHUTE	$ 77.22 per lf
	HEAVY CHUTE (INCLUDES PLATFORM)	82.37
SOLID	LIGHT CHUTE	87.52
	HEAVY CHUTE (INCLUDES PLATFORM)	92.66

CONCRETE DIPPING VAT

USUALLY COMPOSED OF:

Six-inch electric welded fabric, reinforced concrete wade in dipping vat.

Three foot six inches wide by 30 feet long and four feet deep with two inch supply and drain lines included.

Pump and valve not included.

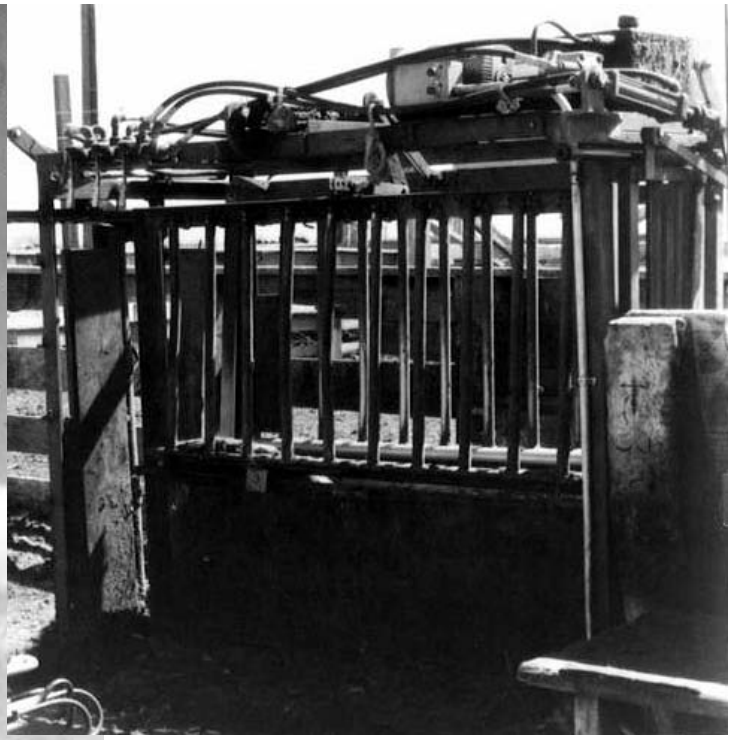
COMPLETE IN PLACE COST $ 5,540

CALF TABLE

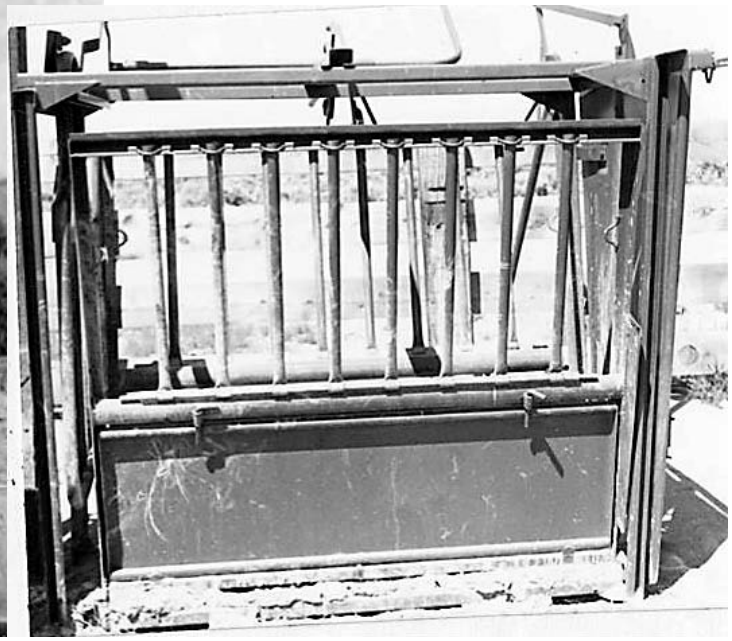
CORRALS AND FENCES

WINDMILLS & CATTLE SQUEEZES

SMALL WINDMILL



HYDRAULIC SQUEEZE



LIGHT STATIONARY SQUEEZE

CORRALS AND FENCES

COMMERCIALLY MANUFACTURED HEAVY DUTY CATTLEGUARDS

7.5' x 8'	7.5' x 10'	7.5' x 12'	7.5' x 15'
$ 2,643	$ 3,582	$ 4,521	$ 5,460

CATTLE SQUEEZE

STATIONARY MODEL, LIGHT	$ 2,187
STATIONARY MODEL, HEAVY	3,771
HEAVY DUTY, HYDRAULIC	18,008
CALF TABLE	1,549

HEAVY STATIONARY SQUEEZE

WINDMILLS AND STEEL TOWERS

FAN		TOWER		INSTALLATION	TOTAL COST
6'	$ 2,361	21'	$ 2,499	$ 2,518	$ 7,379
6'	2,361	27'	3,244	2,439	8,044
6'	2,361	33'	4,011	2,700	9,072
8'	3,039	21'	2,499	2,324	7,862
8'	3,039	27'	3,244	1,942	8,225
8'	3,039	33'	4,011	2,264	9,314
10'	5,281	27'	3,244	2,785	11,310
10'	5,281	33'	4,011	2,805	12,096
12'	8,345	27'	3,244	3,894	15,483
12'	8,345	33'	4,011	4,095	16,451
14'	13,261	27'	3,244	5,389	21,894
14'	13,261	33'	4,011	6,920	24,192
16'	17,897	33'	4,011	7,728	29,635

Includes complete steel wheel, tower and installation excluding well.

CORRALS AND FENCES

CATTLE AND HORSE WATERING TANKS

ROUND BOTTOMLESS STOCK TANKS

25.5 INCH DEEP, GALVANIZED CORRUGATED

PER FOOT OF DIAMETER - 22 GAUGE METAL	$ 37.46
12 GAUGE METAL	$ 62.44
ADD: 10 GAUGE METAL	25%
PER SQUARE FOOT OF CONCRETE SLAB	$ 4.79

COMMERCIALLY MANUFACTURED METAL WATER TANKS

25.5" TO 27" DEEP, GALVANIZED WITH BOTTOM

PER FOOT OF DIAMETER - 22 GAUGE METAL	$ 46.83
12 GAUGE METAL	$ 80.67
ADD: 10 GAUGE METAL	25%
PER SQUARE FOOT OF CONCRETE BASE	$ 4.79

COMMERCIALLY MANUFACTURED AUTOMATIC WATERERS WITH HEATERS
(no change from 2018-19)

LEN	WDTH	HGHT	GAL	HEAD	COST
20	18	25	3	30 50	$ 845
30	24	25	9	80 120	845
32	28	25	13	100 200	845
42	28	25	20	200 300	924
66	28	25	35	300 400	992
84	24	16	40	350 450	1,030
90	28	25	50	400 550	1,108
90	36	25	120	500 700	1,234
120	28	25	120	500 700	1,276

COMMERCIALLY MANUFACTURED METAL WATER TROUGHS

(GALVANIZED TANK)

GALLONS			
175	300	500	900
$ 203	$ 278	$ 368	$ 555

ALL OTHER WATER TROUGHS

1 cubic foot = 7.5 gallons

VOLUME	COST / GAL	Cu Ft
LESS THAN 100 GALLONS	$ 3.54	$ 26.54
100 TO 175 GALLONS	3.24	24.24
176 TO 300 GALLONS	2.93	21.94
301 TO 500 GALLONS	2.62	19.64
OVER 500 GALLONS	2.31	17.35

CORRALS AND FENCES

COMMERCIALLY MANUFACTURED METAL FENCE PANELS

Portable or stationary, not including posts. For wooden posts (RR Ties)

Add $ 10.41 to $ 20.85 EACH

64" HEIGHT, 5 RAIL MEDIUM DUTY	6'	$ 195
	8'	258
	10'	283
	12'	319
	14'	366
	16'	396

64" HEIGHT, 5 RAIL EXTRA HEAVY DUTY	6'	$ 215
	8'	255
	10'	279
	12'	315
	14'	357
	16'	404

For extra heavy-duty panels with solid steel sections, increase cost 100%.

COMMERCIALLY MANUFACTURED METAL GATES w LEVER LATCH

WIDTH			
6 FOOT	8 FOOT	12 FOOT	16 FOOT
$ 255	$ 297	$ 368	$ 458

COMMERCIALLY MANUFACTURED PROFESSIONAL ROPING AND DOGGING CHUTE

FIRST SECTION WITH RELEASE GATE	$ 2,853
SECOND SECTION	1,702
STRIPPING CHUTE	1,799

COMMERCIALLY MANUFACTURED BUCKING CHUTE

(No Change from 2018-19)

FIRST SECTION	$ 6,523
ADDITIONAL SECTIONS, EACH	4,617

CORRALS AND FENCES

COMMERCIALLY MANUFACTURED CROWDING ALLEYS

24' x 60" INCLUDES FRAMES & HEADGATE w STAND	$ 4,904
24' x 60" ADD-ON SECTION	1,447
ALLEY STOPS ADD	264
10' CUTOUT GATE INCLUDING FRAME AND 10' PANEL	1,954

CURVED CROWDING ALLEYS

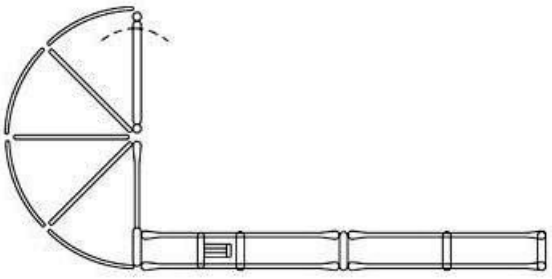
180 DEGREE SWEEP, 10' GATE & 24' ADJUSTABLE ALLEY WITH A1 CAGE & 10' X 20' LEAD-UP	$ 14,020
180 DEGREE SWEEP, 10' GATE & 24' ADJUSTABLE ALLEY	10,624
BLOCKING DOOR ADD	807
ADJUSTABLE ALLEY BOW	196

COMMERCIALLY MANUFACTURED FEEDER PANEL

SIZE	EACH
6' x 64"	$ 518
8' x 64"	617
10' x 64"	686
12' x 64"	795
16' x 64"	954

HEADGATES

SELF CATCH HEAVY DUTY	$ 1,391
SELF CATCH LIGHT DUTY	966



180' SWEEP w CROWDING ALLEY

Section 6

MISCELLANEOUS COSTS

Most of the costs in this section are based on professional construction labor supervised by a contractor or his job foreman. Few of these costs should be adjusted downward for farm labor with no professional supervision, as most of these items are professionally installed with contractor supervisor.

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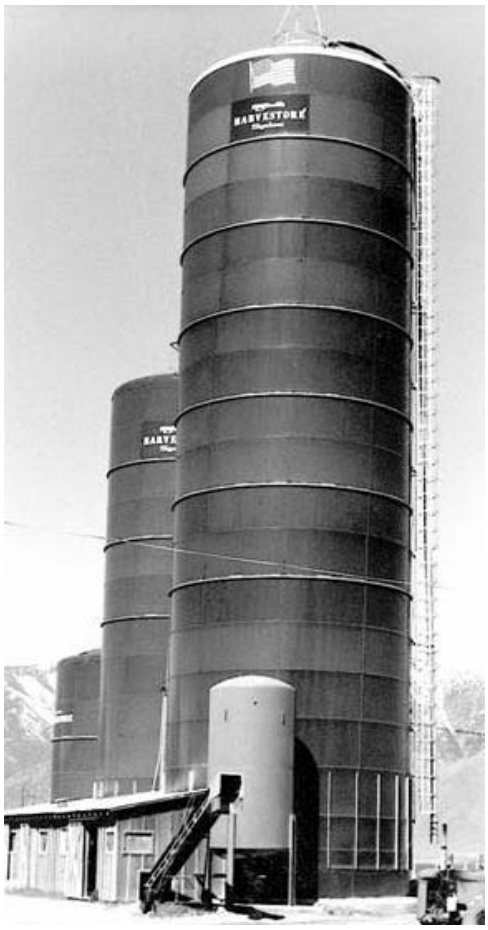
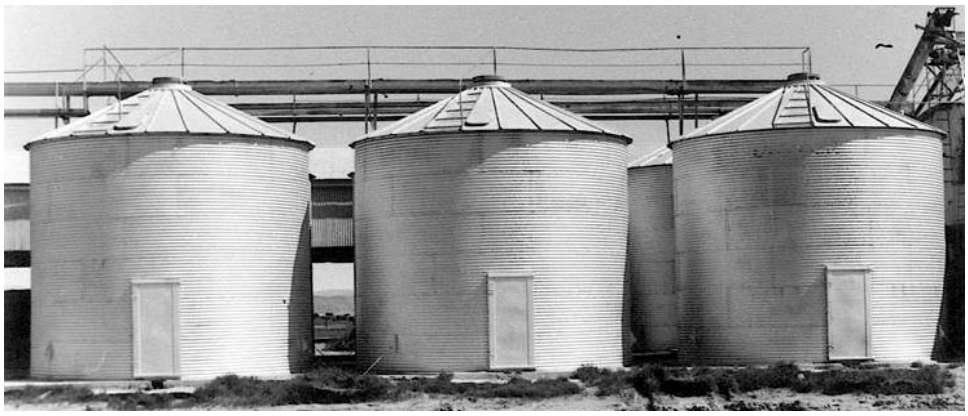


SILO: GLASS-LINED STEEL



GRAIN STORAGE BINS with CONVEYOR

FARM SILOS

Costs of concrete stave silo, complete. For other construction material, see factors listed below.

TOTAL COST

DIAMETER \ HEIGHT	30'	35'	40'	45'	50'	60'	70'	80'	90'
12'	$ 14,477	17,125	19,774	22,186	24,599	29,307	-	-	-
14'	16,949	19,832	22,716	25,364	28,013	33,662	39,076	-	-
16'	17,537	20,421	23,305	26,247	29,190	34,839	40,607	46,374	-
18'	18,832	21,951	25,070	28,248	31,426	37,664	44,020	50,023	56,378
20'	21,186	24,599	28,013	31,661	35,310	42,254	49,199	56,143	63,264
22'	24,717	28,719	32,721	36,722	40,724	49,081	56,967	65,029	73,268
24'	-	-	-	-	46,962	56,378	65,618	74,445	84,156
30'	-	-	-	-	-	76,505	89,158	101,516	114,169

No chute, deduct per vertical foot of height	$	-
Flat roof, deduct per square foot of floor area	$	6.99
No roof, deduct per square foot of floor area	$	13.18

NOTE: For silos constructed from other materials, multiply the costs above by these factors:

Brick masonry	1.75	Glass lined steel	2.15
Reinforced concrete	1.60	Steel	1.80
Concrete block	1.20	Wood	1.10

SILO UNLOADER

EACH

12'	14'	16'	18'	20'	22'	24'	26'	28'	30'
$11,593	12,123	12,829	13,536	14,359	15,066	15,772	N/A	N/A	16,713

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

STEEL GRAIN BINS

Costs are averages for utility type storage bins usually found on farms and ranches. Costs of standard bins are for tank with door and manhole, erected on buyer's slab. Height is to top of shell. Cost of ventilated floor includes floor, auger tube, and steel columns and beam supports for plenum assembly.

NOTE: To calculate capacity in bushels, multiply diameter squared x height x .63.

SIZE		CAPACITY	COST W/O	COST WITH	
DIAM	HGHT	(BUSHELS)	DRY BIN	DRY BIN	SLAB FLOOR
15	7	1,257	$ 6,169	$ 9,012	$ 853
15	11	1,792	8,044	11,915	931
15	15	2,329	9,616	14,152	1,064
15	18	2,864	10,947	15,846	1,234
18	11	2,647	9,012	13,064	1,143
18	15	3,422	11,189	16,088	1,191
18	18	4,189	12,701	18,386	1,234
21	11	3,693	9,919	14,394	1,572
21	15	4,753	12,701	18,386	1,621
21	18	5,813	15,362	22,378	1,693
24	11	4,949	12,217	17,660	1,996
24	15	6,344	14,757	21,773	2,081
24	18	7,739	18,507	26,853	2,177
27	11	6,409	14,394	21,168	2,552
27	15	8,182	17,781	25,764	2,673
30	15	10,278	21,652	31,208	2,951
30	18	12,473	25,523	37,014	3,115
30	22	14,668	29,393	-	3,266
30	26	16,863	32,659	-	3,568
36	15	15,297	30,361	44,150	4,355
36	18	18,473	34,474	50,198	4,627
36	22	21,648	40,159	-	4,808

ADD: PER SQUARE FOOT OF CONCRETE SLAB $ 4.79

LADDERS	$ 86	PLUS	$ 12.34	PER LINEAR FOOT
SAFETY CAGES	24.07	TO	29.88	PER FOOT INSTALLED
AUGER AND DRIVE	514	PLUS	55.64	PER FOOT OF TANK DIAMETER
SPREADERS	1,004	TO	1,512	EACH
STIRRATORS	233.45	TO	356.83	PER FOOT OF TANK DIAMETER

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

FEED TANKS

Costs are averages of typical farm hoppers with roof, manhole, and ladder including necessary steel structural supports and concrete footings. Height is overall from ground level to top of tank. Capacity in tons is figured at 50 pounds per bushel.

DIAMETER (FEET)	HEIGHT (FEET)	CAPACITY (BUSHELS)	CAPACITY (TONS)	COST
6	10'	120	3.0	$ 2,298
6'	16'	240	6.0	3,266
6'	21'	360	9.0	3,689
6'	25'	480	12.0	4,173
6'	28'	600	15.0	4,596
7'	11'	157	4.0	3,145
7'	14'	239	6.0	3,417
7'	16'	321	8.0	3,659
7'	19'	403	10.0	3,931
9'	14'	300	7.8	4,717
9'	17'	450	11.3	5,685
9'	20'	590	14.8	6,169
9'	25'	855	21.4	7,137
9'	28'	1,000	25.0	7,560
9'	31'	1,130	28.5	7,802
12'	20'	870	21.8	10,644
12'	25'	1,345	33.6	12,036
12'	31'	1,825	45.6	13,789
12'	36'	2,300	57.5	14,757
12'	42'	2,780	69.5	16,088

ADD: PER SQUARE FOOT OF HEAVY DUTY CONCRETE SLAB $ 5.83

NOTE: Above costs are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product.

GRAIN HANDLING SYSTEMS

Cost of handling equipment only does not include grain storage bins. Most grain handling systems are professionally installed with contractor supervision. In cases where unsupervised nonprofessional help such as farm labor is used, adjust the costs listed downward by 25 percent, depending on the quality of workmanship.

GRAIN LOADING AND UNLOADING SYSTEMS

CONVEYOR

AUGER-TYPE

DIAM	COST/LIN FT
6"	$ 89
8"	121
10"	160
12"	217
14"	252
16"	313

BELT-TYPE

WIDTH	COST/LIN FT
12"	$ 154
18"	237
24"	278
30"	319
36"	340
48"	438

FEED MILL and COMPONENTS

ELECTRIC POWER PLANTS

HOME GENERATOR SETS

RATING - KW	GASOLINE	DIESEL
3.0	$ 3,608	$ 4,329
4.0	4,384	5,260
5.0	5,220	6,264
7.0	7,008	8,410

COMMERCIAL INDUSTRIAL GENERATORS

RATING - KW	GASOLINE	DIESEL
10.0	$ 16,629	$ 20,655
12.5	19,585	24,203
15.0	21,820	26,885
20.0	25,031	31,203
25.0	26,339	31,438
30.0	27,647	31,673
40.0	33,107	38,114
50.0	36,290	42,133
60.0	47,735	55,669
100.0	59,180	69,205
150.0	79,944	94,872

For Air Cooling, Deduct: 15%

For natural or LP gas fuel systems, Add per KW: $ 29.85

For remote control starting, gasoline fuel, Add: $ 114.43

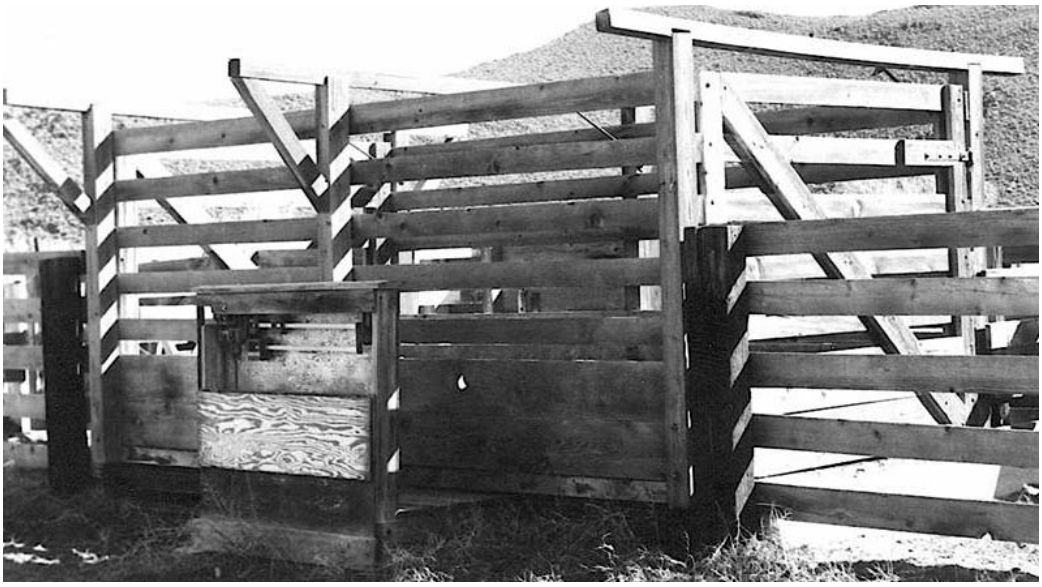
NOTE: Above costs include minimal current load control switchboard facilities. Above costs do not include mounting pads

ALTERNATING CURRENT LOAD CONTROL SWITCHBOARD				AUTOMATIC EMERGENCY SWITCHBOARD FOR GASOLINE PLANT			
RATING			COST	RATING			COST
KW	AMPS	VOLTAGE	EACH	KW	AMPS	VOLTAGE	EACH
15	130	240; 230/400	$ 1,730	15	130	120/240	$ 675
20	170	120/240; 240	2,456	20	170	120/240	2,276
25	210	240; 120/240	3,181	25	210	120/240	3,877
30	250	240; 120/240	3,906	30	250	120/240	5,478
40	330	120/240; 240	4,631	40	330	120/240	7,079
50	420	480;240	5,356	50	420	120/240	8,680
60	500	480;240	6,081	60	500	120/240	10,281
100	830	480;240	6,806	100	830	120/240	11,882

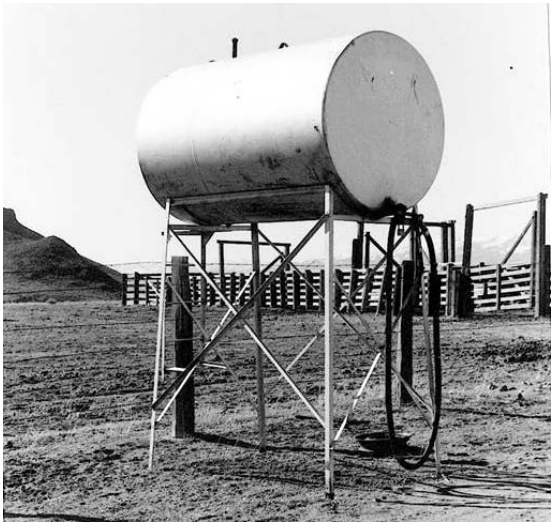
ADD FOR DIESEL POWERED PLANTS: $ 219

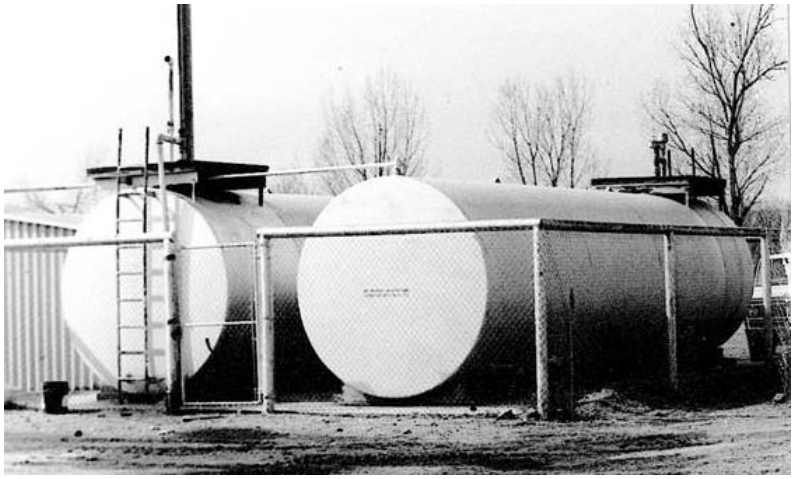
FOR CIRCUIT BREAKERS: $ 738 TO $ 4,211

SCALES AND FUEL TANKS



LIVESTOCK SCALE with WOOD CAGE





BULK FUEL TANKS

LIVESTOCK SCALES

BEAM TYPE	SIZE	CAPACITY	COST
FULL CAPACITY	14' X 8'	5 TON	$ 17,781
FULL CAPACITY	16' X 8'	10 TON	23,466
FULL CAPACITY	22' X 10'	15 TON	33,264

SCALE CAGES

METAL		WOOD	
SIZE	COST	SIZE	COST
14'	$ 1,992	14' X 8'	$ 1,050
16'	2,238	16' X 8'	1,080
22'	3,090	22' X 10'	1,341
24'	3,367	24' X 10'	1,392

FOR TYPE REGISTERING BEAM, ADD.	$ 888
FOR PRINTER, ADD	1,851
FOR ELECTRONIC DIGITAL SCALE, ADD.	5,715

Scale pit 4-inch concrete walls and slab poured in place. May be poured in or on top of ground. If on top, compacted ramps and steps to scale beam included.

MOTOR TRUCK SCALES

SPECIFICATIONS

Reinforced concrete pit and platform. All steel structure and scale mechanism.

Motor truck scales are of two general types: the beam type (either manual or type registering) and the full automatic dial type. The construction of both, insofar as the weight carrying mechanism is concerned, is very similar. The method of recording the weights makes the difference.

CAPACITY	TOTAL COST
20 TONS	$ 44,150
30 TONS	51,408
40 TONS	59,028
50 TONS	66,830
60 TONS	75,298
70 TONS	86,789

FOR WOOD PLATFORM, DEDUCT:	6%
FOR STEEL PLATE, ADD:	5%
FOR AUTOMATIC DIAL MODEL, ADD:	$ 3,084
FOR REMOTE READER-PRINTER, ADD:	11,007
FOR CARD PRINTER, ADD:	2,540

UNDERGROUND FUEL STORAGE

Costs are for complete installation and are based on professional construction labor supervised by a contractor or his job foreman. For farm labor with no professional supervision, costs should be adjusted downward by 25 percent relative to the quality of the finished product. For multiple installation, two or more tanks in one hole, deduct 7 percent for each extra tank, consider the largest tank as the base. Costs do not include electric pumps. See following page 8 in this section for pump costs.

GALLONS	COST	GALLONS	COST
300	$ 7,526	**4,000**	$ 19,404
550	8,644	**5,000**	22,226
1,000	11,407	**6,000**	26,225
2,000	14,818	**8,000**	29,518
3,000	16,699	**10,000**	35,633

ABOVE GROUND HORIZONTAL BULK (FUEL) STORAGE

Costs are for complete installation. Includes holding stand, discharge hose and valve. Does not include any electric pumps. See following Page 8 in this section for pump costs.

GALLONS	COST	GALLONS	COST
200	$ 4,151	**3,000**	$ 8,644
350	4,386	**4,000**	10,114
550	4,716	**5,000**	11,760
1,000	5,557	**7,500**	15,876
2,000	6,997	**10,000**	19,874

ELECTRONIC FUEL DISPENSERS

TYPE I			
WITHOUT METER	$ 368	TO	$ 1,043
WITH METER	744	TO	1,185
TYPE II			
WITHOUT METER	$ 506	TO	$ 976
WITH METER	870	TO	1,526
TYPE III	$ 991	TO	$ 1,484
TYPE IV	$ 1,448	TO	$ 2,885
TYPE V	$ 3,651	TO	$ 4,719

NOTE: To calculate tank volume use the following formula: Volume in gallons = Pi x radius squared x length x 7.5.

EXAMPLE: A tank five feet in diameter and 14 feet in length; Pi equals 3.1416;

Radius (one-half of diameter) equals 2.5 feet: 3.1416 x 2.5 squared x 14 feet x 7.5 = 2,062 gallons.

FUEL DISPENSERS

TYPE I—NO METER

TYPE I METER

TYPE II—WITH METER

TYPE III

TYPE IV

TYPE V

PREFABRICATED TELECOM / COMMUNICATION EQUIPMENT SHELTERS

Costs are for complete installation of small prefabricated modular buildings used for weather- and vandal-resistant equipment storage. Costs include a foundation and all wall, roof, and floor panels. Steel wall vents and entry door, and minimum electrical. Air conditioning and equipment power panel and wiring are not included.

SQUARE FOOT COSTS

CLASS	100	150	200	300	500	750
1	$ 137.21	$ 117.79	$ 107.78	$ 92.48	$ 77.18	$ 67.76
2	$ 161.28	$ 134.55	$ 122.43	$ 103.59	$ 84.17	$ 71.22
3	$ 196.69	$ 162.56	$ 148.43	$ 126.06	$ 102.52	$ 86.04

NOTE: For very low quality metal or fiberglass structures, reduce Class 3 costs by 55%.

PREFABRICATED EQUIPMENT SHELTER

TELECOM / COMMUNICATION EQUIPMENT SHELTERS

LOW QUALITY

AVERAGE QUALITY

GOOD QUALITY

ELECTRIC CAR CHARGERS

Costs are for complete installation of electric car chargers. Costs include car charger, electrical work and installation costs.

ELECTRIC CAR CHARGERS		
30-AMP ELECTRIC CAR CHARGER	SINGLE UNIT	3,771.54
30-AMP ELECTRIC CAR CHARGER	DOUBLE UNIT	4,898.70

HOME BATTERY BACKUP SYSTEM

Costs are for complete installation of a home battery backup system. Costs include home battery backup system (power wall) and supporting hardware.

SINGLE POWERWALL	SUPPORTING HARDWARE	TOTAL
$ 6,500.00	$ 1,100.00	$ 7,600.00

COMPRESSED NATURAL GAS FILLING STATION

Costs are for complete installation of a compressed natural gas fuel station. Costs include compressor, gas inlet, dispenser, installation and other costs identified below.

COMPRESSED NATURAL GAS FUEL STATIONS

SMALL FAST-FILL STATION 1-4 vehicles/day fueling cycle: 70% of fuel dispensed 2 hrs 2 times a day	Includes: 8 scfm compressor, 2-5 psi inlet gas pressure, 3,780 scf storage, 1 single-hose dispenser, installation at 65% of equipment costs, priority panel, credit card reader and gas dryer	$60,000
MEDIUM TIME-FILL STATION 75-80 light/medium-duty vehicles/day fueling cycle: 1 time/day for 10 hrs	Includes: 100-175 scfm compressor, 30 psi inlet gas pressure, 10-40 dual-hose posts, 1 time-fill panel; 10hr fueling window, installation at 65% of equipment costs	$700,000

Section 7

COMPUTATIONAL TABLES

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MEASUREMENT PRINCIPLES

PLANE FIGURE	A plane surface bounded by either straight or curved lines having no thickness.
SOLID	A body, such as a barrel, building, etc.
SQUARE MEASURE	Area calculation requiring only two dimensions, length and width.
CUBIC MEASURE	Cubic or cubage means volume and gives size in terms of its bulk. Calculation requires three dimensions: length times width times depth or height or thickness.

WEIGHTS AND MEASURES

Tables of weights, measures and other information helpful to the assessor-appraiser.

METRIC MEASURE

Millimeter	0.001 meters
Centimeter	0.01 meters
Decimeter	0.1 meters
Meter	39.3685 inches
Kilometer	1,000 meters
Kilometer	0.62137 miles
Meter	1.0935 yards
Meter	3.2807 feet
1 foot	0.30480 meter
1 foot	30.48 centimeters
1 inch	2.54 centimeters

LINEAR MEASURE

1 foot	12 inches
1 yard	3 feet or 36 inches
1 rod	5 1/2 yards or 16 1/2 feet or 25 links
1 furlong	40 rods or 220 yards or 660 feet
1 mile	8 furlongs or 320 rods or 1,760 yards or 5,280 feet

SURVEYOR'S LINEAR MEASURE

1 link	7.92 inches
1 rod	25 links
1 chain	4 rods or 100 links or 66 feet
1 furlong	10 chains
1 mile	8 furlongs or 80 chains

WEIGHTS AND MEASURES

SQUARE MEASURE

1 square foot	144 square inches
1 square yard	9 square feet or 1,296 square inches
1 square rod	1 pole or perch or 30 1/4 square yards or 272 1/4 square feet
1 rood	40 square rods or 1,210 square yards or 1/4 acre
1 acre	160 square rods or 4,840 square yards or 43,560 square feet
1 square mile	640 acres

SURVEYOR'S SQUARE MEASURE

1 square rod	625 square links
1 square chain	16 square rods
1 acre	10 square chains
1 square mile	640 acres

CUBIC MEASURE

1 cubic foot	1,728 cubic inches or 7.481 gallons
1 cubic yard	27 cubic feet
1 cord foot	16 cubic feet
1 cord of wood	8 cord feet or 128 cubic feet
1 perch of masonry	24 3/4 cubic feet
1 bushel	1.2445 cubic feet

ANGLES AND ARCS

1 minute	60 seconds
1 degree	60 minutes
1 right angle	90 degrees or 1 quadrant
1 circumference	360 degrees or 4 quadrants

BOARD MEASURE

1 board foot	length in feet times width in feet times thickness in inches

AREAS

Square feet of surface area equals square of one side multiplied by the given factor.

REGULAR SHAPED	NUMBER OF SIDES	FACTOR
Equilateral triangle	3	0.433
Pentagon	5	1.721
Hexagon	6	2.598
Heptagon	7	3.634
Octagon	8	4.828
Nonagon	9	6.182
Decagon	10	7.694
hendecagon	11	9.366
Dodecagon	12	11.196

MEASURES AND THEIR EQUIVALENTS

A gallon of water (U. S. Standard) weighs 8 1/3 pounds and contains 231 cubic inches.

A cubic foot of water contains 7 1/2 gallons, 1,728 cubic inches and weighs 62 1/2 pounds.

Doubling the diameter of a pipe increases its capacity four times.

To find the capacity of any size tank: given the dimensions of a cylinder in inches, to find its capacity in U. S. gallons; square the diameter, multiply by the length and by 0.0034. (Note: See table on tank capacities.)

Rectangular tanks: multiply the length by the width by the depth (all in inches) and divide the result by 231. The answer is the capacity in gallons.

Thirty one and one half (31 1/2) gallons water equals one barrel by weight.

British Thermal Unit (BTU) is the amount of the heat required to raise one pound of water one degree Fahrenheit.

A ton of refrigeration is measured by the displacement of the amount of heat required to melt a ton of ice in 24 hours. One motor horsepower of an electrically powered unit is normally required to produce one ton of refrigeration. Twelve thousand British Thermal Units (12,000 BTU) equals one ton.

Watts = Volts multiplied by Amps

Horsepower equals Kilowatts multiplied by 1.3405.

Kilowatts equal horsepower multiplied by 0.746.

WEIGHTS

BRICK: Common brick of the national size weigh from 4 1/2 to five pounds; pressed and paving brick, from six to seven pounds, depending upon clay, burning and size.

LIME: On the basis of 53 pounds to the cubic foot, lime weighs about 66 pounds to the bushel, but in bulk it often sells on the basis of 80 pounds to the bushel or 200 pounds to the barrel of 2 1/4 bushels.

MISCELLANEOUS

WEIGHT AND MEASURE EQUIVALENTS

1 cubic inch of cast iron weighs 0.26 pounds
1 cubic inch of wrought iron weighs 0.28 pounds
1 cubic inch of water weighs 0.036 pounds
1 cubic foot of water weighs 62.321 pounds
1 United States gallon weighs 8.34 pounds
1 Imperial gallon weighs 10.00 pounds
1 United States gallon equals 231.01 cubic inches
1 Imperial gallon equals 277.274 cubic inches
1 cubic foot of water equals 7.48 U. S. gallons

1 gallon (water) weighs 8.34 pounds
1 gallon equals 0.1337 cubic feet
1 gallon equals 0.1074 bushels
1 cubic foot equals 0.8032 bushels
1 barrel (oil) equals 42 gallons
1 barrel (water) equals 31.5 gallons

A span is 9 inches
A hand, horse measurement, equals 4 inches
A knot, nautical, equals 6,080.27 feet
A fathom, nautical, equals 6 feet
A stone equals 14 pounds

Pressure in pounds per square inch of column of water equals 0.434 times the height of the column in feet.

A square acre measures approximately 208.7 feet on each side.

1 acre measures about 8 rods by 20 rods, or any two combinations of rods whose product equals 160.

MISCELLANEOUS

WEIGHT AND MEASURE EQUIVALENTS

To convert bushels to tons, multiply number of bushels by 60 and divide the product by 2,000 (average maximum weight of commodities 60 pounds per bushel).

To convert gallons to bushels, divide gallons by 9.35. Answer in bushels.

To convert cubic measure into bushels, multiply by 0.8035.

AREAS AND MEASUREMENTS

To find the circumference of a circle, multiply the diameter by 3.1416.

To find the diameter, multiply circumference by 0.3183 or divide circumference by 3.1416.

To find the radius, multiply circumference by 0.15915.

To find the side of an inscribed square, multiply the diameter by 0.07071 or multiply the circumference by 0.2251.

To find the side of an equal square, multiply the diameter by 0.8863 or multiply the circumference by 0.2821.

SQUARE: A side multiplied by 1.4142 equals the diameter of its circumscribing circle.

A side multiplied by 4.443 equals the circumference of its circumscribing circle.

A side multiplied by 1.126 equals the diameter of an equal circle.

A side multiplied by 3.547 equals the circumference of an equal circle.

To find the area of a circle, multiply the circumference by one-quarter of the diameter or multiply the square of the diameter by 0.7854 or multiply the square of the circumference by 0.07958 or multiply the square of one-half of the diameter by 3.1416.

To find the surface of a sphere or globe, multiply the diameter by the circumference or multiply the square of the diameter by 3.1416 or multiply four times the square of the radius by 3.1416.

To find tank capacities, diameter square times .0034 equals gallons per inch of height - Base 42 gallons per barrel.

To find area of a triangle, multiply base by 1/2 perpendicular height.

To find area of an ellipse, product of both diameters times 0.7854.

To find area of a parallelogram, base times altitude.

To find cubic inches in a ball, multiply cube of diameter by 0.5236.

To find cubic contents of a cone, multiply area of base by one third the altitude.

Area of rectangle equals length multiplied by width.

Surface of frustum of cone or pyramid equals sum of circumference of both ends times 1/2 slant height plus area both ends.

Contents of frustum of cone or pyramid: multiply area of two ends and get square root, add the two areas and times 1/3 altitude.

CONVERSION TABLES

TABLE FOR AREA AND CAPACITY OF CIRCULAR TANKS / FOOT

DIAMETER	CIRCUMFRENCE	AREA	GALLONS		BARRELS (OIL)
3	9.42	7.07	53	6	1.26
4	12.57	12.57	94	10	2.24
5	15.71	19.63	147	16	3.50
6	18.85	28.27	212	23	5.00
7	21.99	38.48	288	31	6.80
8	25.13	50.27	376	42	9.00
9	28.27	63.62	477	51	11.30
10	31.42	78.54	587	63	14.00
11	34.56	95.03	711	76	16.90
12	37.69	113.10	846	91	20.20
13	40.84	132.73	993	107	23.70
14	43.98	153.94	1,151	124	27.40
15	47.12	176.72	1,322	142	31.50
16	50.26	201.06	1,054	162	35.80
17	53.41	226.98	1,698	182	40.40
18	56.55	254.47	1,903	204	45.30
19	59.69	283.53	2,121	228	50.50
20	62.83	314.16	2,350	252	56.00
21	65.97	346.36	2,591	278	61.70
22	69.12	380.13	2,843	305	67.70
23	72.26	415.48	3,108	334	74.00
24	75.40	452.39	3,384	364	80.60
25	78.54	490.87	3,672	394	87.40
26	81.68	530.93	3,971	427	94.60
27	84.82	572.56	4,283	460	102.00
28	87.97	615.75	4,606	495	109.70
29	91.11	660.52	4,941	531	117.60
30	94.25	706.86	5,287	568	125.80
31	97.39	754.77	5,646	606	134.40
32	100.53	804.25	6,016	646	143.20
33	103.67	855.30	6,398	687	152.30
34	106.81	907.92	6,791	730	161.60
35	109.96	962.11	7,197	773	171.30
36	113.10	1,017.88	7,614	818	181.30
37	116.24	1,075.21	8,043	864	191.50
38	119.38	1,134.11	8,483	911	202.00
39	122.52	1,194.59	8,936	960	212.70
40	125.66	1,256.64	9,400	1,010	223.80

NOTE: Capacity of cylindrical tanks standing on end.

CONVERSION TABLES

NOTES on cylindrical tanks: To find the capacity in cubic feet of a round tank or cistern, multiply the square of the average diameter by the depth and multiply the product by 0.785.

*To find the capacity in barrels (oil) equals diameter squared times 0.1399 times height.

** To find the capacity in gallons equals diameter squared times 5.8748 times height.

TABLE FOR CONVERSION OF LINEAR FEET INTO BOARD FEET

2 by 4	0.667 board feet
3 by 4	1.000 board feet
2 by 6	1.000 board feet
2 by 8	1.333 board feet
2 by 10	1.667 board feet
2 by 12	2.000 board feet
2 by 14	2.333 board feet
2 by 16	2.667 board feet
3 by 6	1.500 board feet
4 by 6	2.000 board feet
4 by 10	3.333 board feet
4 by 12	4.000 board feet
6 by 6	3.000 board feet
6 by 8	4.000 board feet
10 by 12	10.000 board feet
12 by 12	12.000 board feet

BOARD MEASURE

Multiply thickness in inches by width in inches, divide product by 12 and multiply result by the length in feet. The result is board measure content.

EXAMPLE

Two inches times 10 inches equal 20 square inches divided by 12 equals 1.667 board feet times 1,000 linear feet equals 1,667 board feet.

CENTER PIVOT IRRIGATION SYSTEM DATA

----------AREA COVERED IN ACRES

TOTAL SYSTEM LENGTH (IN FEET) 2/	PERCENT OF WATER APPLIED IN LAST 100 FEET 1/	TOTAL ACRES OF SQUARE FIELD TWICE LENGTH OF SYSTEM	WITH GUN 3/ SPRINKLER CORNERS USED ONLY	WITH GUN SPRINKLER USED ON ENTIRE CIRCLE 3/	WITHOUT END GUN
600	30.6	33.1	30.8	35.3	26.0
650	28.4	38.8	36.0	40.6	30.5
700	26.5	45.0	41.5	46.2	35.3
750	24.9	51.7	47.3	52.1	40.6
800	23.4	58.8	53.4	58.4	46.2
850	22.1	66.3	59.8	65.1	52.1
900	21.0	74.4	66.5	72.1	58.4
960	19.9	82.9	73.6	79.5	65.1
1,000	19.0	91.8	81.1	87.3	72.1
1,050	18.1	101.2	89.0	95.4	79.5
1,100	17.4	111.1	97.3	103.8	87.3
1,150	16.6	121.4	106.0	112.7	95.4
1,200	16.0	132.2	115.1	121.9	103.9
1,250	15.4	143.5	124.6	131.4	112.7
1,300	14.8	155.2	134.5	141.4	121.9
1,320	14.6	16.0	138.5	145.4	125.7
1,350	14.3	167.4	144.7	151.6	131.4
1,400	13.8	180.0	155.4	162.3	141.4
1,450	13.3	193.1	166.5	173.3	151.6
1,500	12.9	206.6	178.0	184.6	162.3

1/ Less volume of end gun when used.

2/ Generally outside drive wheel is approximately 50 feet from end.

3/ Based on 100 feet gun coverage.

EXAMPLE: System is 900 feet long. Then 21 percent of water is applied in last 100 feet; 66.5 acres are covered with gun used in corners only.