

**KANSAS DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION TO THE
STANDARD SPECIFICATIONS, 1990 EDITION**

PLUGGING WATER WELLS

1.0 DESCRIPTION.

This item shall consist of plugging abandoned water wells in accordance with this specification and the details, procedure and provisions as shown on the Plans, or as directed by the Engineer.

Proper notification of the water well plugging work shall be made to the Kansas Department of Health and Environment by the Engineer in accordance with State Statutes (K.S.A. Supp. 82a-1203(c)(1), 82a-1212(g) and 82a-1213 and K.A.R. 28-30-4(a)).

Bid Items:

Plugging Water Wells (Unconfined)

Plugging Water Wells (Confined)

Plugging Water Wells (Special)

2.0 CONSTRUCTION REQUIREMENTS.

The Contractor will be required to plug the water wells by the following procedure:

Wells (Unconfined): "Dug well lining shall be removed to a depth of 1.5 m, filled with an approved granular backfill material from bottom up to static water level and fill from static water level to 1.5 m below ground level with grout or compacted clays, emplace 150 mm of concrete (or bentonite) and fill over concrete slab with surface silts and clays. For cased unconfined water wells cut off the well casing one meter below ground level, fill the well from bottom up to the static water level with an approved granular backfill material, fill with grout or compacted clay from static water level up to two meters below ground level (to within one meter of the top of the cut off casing), fill from one to two meters below ground level with grout and cover over the well with surface silts or clays from one meter (Top of cut off casing) to ground level."

"The approved granular backfill material used in plugging a water well shall be chlorinated. Chlorination may be accomplished by immersion into at least a 200 mg./L solution of available chlorine prior to being placed into the well or by direct submersion of an approved granular backfill material into the well-water disinfected with calcium hypochlorite or sodium hypochlorite (commercial grade liquid bleach) to produce a concentration of at least 200 mg./L of available chlorine."

Water Wells (Confined): "Cut off the top one meter of the well casing if the well's casing was initially grouted into the well's bore hole and remove or perforate at least the top three meters of the well's casing if the well casing was not grouted into the well's bore hole and use a

grout tremie pipe placed to within 0.6 m of the bottom of the well and fill the entire well column with grout up to within one meter of ground level. Cover over the well from one meter below ground level to ground level with compacted surface silts or clays." (Please reference K.A.R. 28-30-7(c) (1) and 28-30-2(t) and 28-30-7(c)(3)).

Water Wells (Special): Fill according to details shown on Plans.

"Grout" means cement grout, neat cement grout, bentonite clay grout or other material approved by the Department of Health and Environment used to create a permanent impervious water-tight plug.

"Neat cement grout" means a mixture consisting of 42.6 kg of Portland cement to 19 to 23 L of clean water.

"Cement grout" means a mixture consisting of 42.6 kg of Portland cement to an equal volume of sand having a diameter no larger than 2mm to 19 to 23 L of clean water.

"Bentonite clay grout" means a mixture consisting of water and commercial grouting or plugging sodium bentonite clay containing high solids such as that manufactured under the trade name of "volclay grout", or an equivalent as approved by the Department.

(a) The mixture shall be as per the manufacturer's recommendations to achieve a mass of not less than 1.1 kg/L of mix. Agents to increase the mass of the mixture may be added as per the manufacturer's recommendations.

(b) Sodium bentonite pellets, tablets or granular sodium bentonite may also be used provided they meet the specifications listed in K.A.R. 28-30-2(k), (3).

(c) Sodium bentonite products that contain low solids, are designed for drilling purposes or that containing organic polymers shall not be used.

3.0 METHOD OF MEASUREMENT.

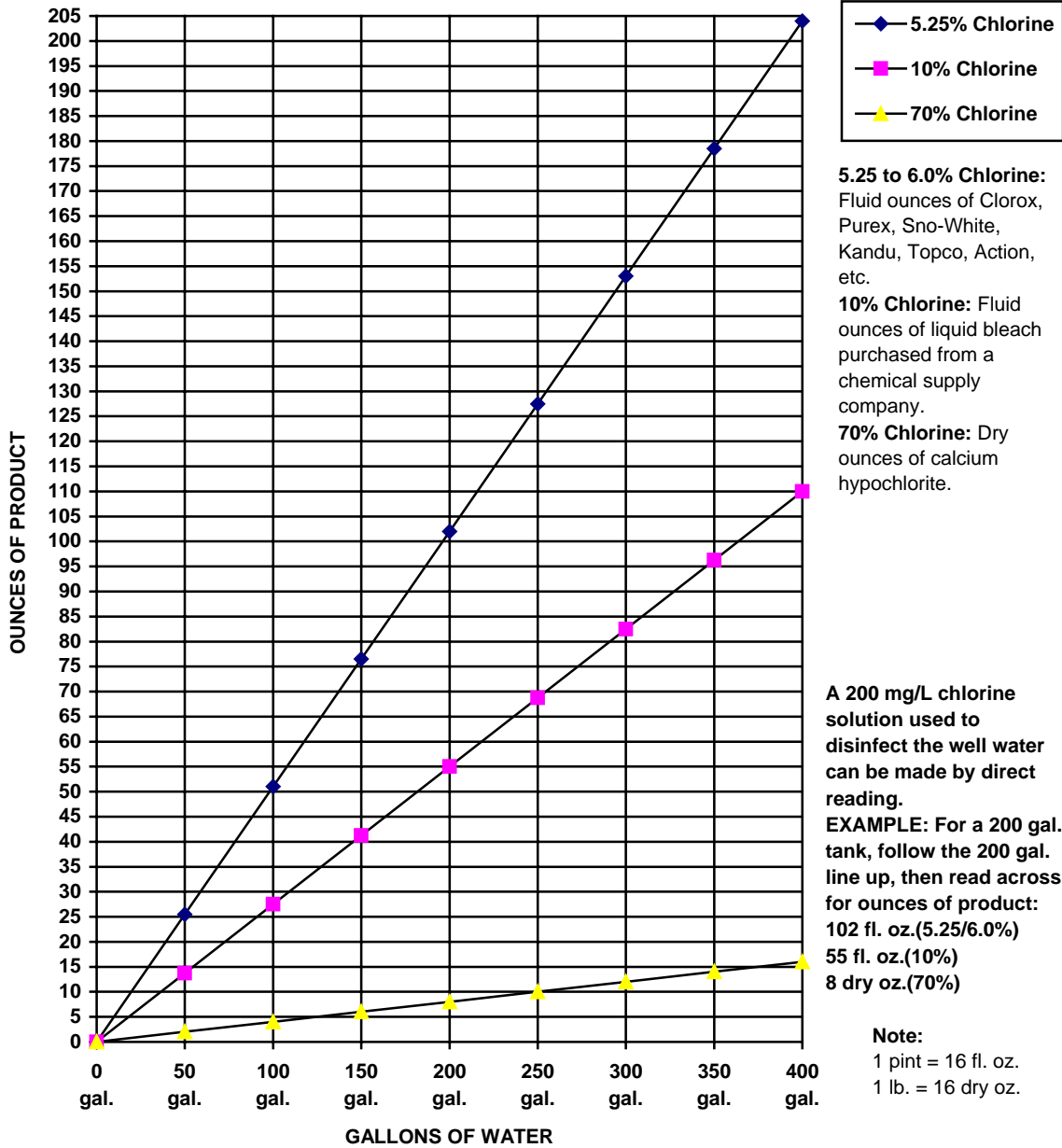
This work shall be measured per each for the above bid items.

4.0 BASIS OF PAYMENT.

The amount of completed and accepted work measured as provided above, shall be paid for at the contract unit price per each for "Plugging Water Wells" of the various types, which price shall be full compensation for furnishing and placing all materials, for all labor, equipment, tools and incidentals necessary to complete the work.

08-21-92

DISINFECTION GRAPH TO DISINFECT THE WELL WATER
 (Produces a 200 mg/L solution when mixed with the number of gallons of water.)



DISINFECTION TABLE TO DISINFECT THE WATER WELL
(Produces a 200 mg/L chlorine solution per foot of casing size)

Casing Size Nominal Diameter	Gals. of Water per One Foot of Casing Size	Ounces of Product Added to Disinfect One Foot of Water per Casing Size		
		5.25% to 6.0% Chlorine	10% Chlorine	70% Chlorine
		<u>Product:</u> Clorox, Purex, Sno-White, Kandu, Topco, Action, White Magic, Surefine, and MC ₂ or other brand names. (sodium hypochlorite)	<u>Product:</u> Liquid bleach purchased from a chemical supply company. (sodium hypochlorite)	<u>Product:</u> High test calcium hypochlorite. (calcium hypochlorite)
(inches)	(gal/ft/ca size)	(fluid ounces)	(fluid ounces)	(dry ounces)
1.25	0.06	0.030	0.016	0.0022
1.5	0.09	0.046	0.024	0.0034
2	0.16	0.082	0.042	0.0062
2.5	0.25	0.128	0.066	0.0096
3	0.37	0.188	0.098	0.0142
3.5	0.50	0.254	0.134	0.0190
4	0.65	0.330	0.174	0.0248
5	1.02	0.518	0.272	0.0388
6	1.50	0.762	0.400	0.0572
8	2.60	1.320	0.694	0.0990
10	4.08	2.072	1.088	0.1554
12	5.87	2.980	1.564	0.2236
14	8.00	4.062	2.132	0.3046
16	10.44	5.300	2.782	0.3976
18	13.21	6.708	3.522	0.5030
24	23.50	11.932	6.264	0.8948
30	36.70	18.634	9.782	1.3976

1. FORMULA TO FIND HEIGHT OF WATER COLUMN:

(total depth of water well) - (measured static water level) = (height of water column)

Example: (216 ft. depth of well) - (37 ft. static water level) = (179 ft. of water column)

2. FORMULA TO FIND NUMBER OF OUNCES USED TO DISINFECT THE WATER WELL:

(height of water column) x (ounces of Product added to disinfect one foot of water per casing size) = (ounces of Product needed to be placed and mixed with the water in the well)

Example: For a 5 in. casing using 5.25% Clorox Product, (179 ft.) x (0.518) = (92.722 fluid ounces) which is approximately six pints of Clorox placed down the well and mixed with the well water.

3. FORMULA TO FIND NUMBER OF GALLONS INSIDE THE CASING:

(gals. of water per one foot of casing size) x (height of water column) = (gals. of water inside the casing)

Example: For a 5 in. casing, (1.02) x (179) = (183 gals.)