Tri-Basin Irrigator

Volume 22, Issue 7 **August 4, 2022**

Program Information

EQIP: Signup anytime for 2023 funds.

CSP: Sign up anytime for 2023 funds.

NSWCP: Get your irrigation applications in by August 31st in order to be reviewed for possible approval at the September TBNRD Board Meeting. Next round of irrigation approvals will be at the December Board Meeting. Applications must be signed by the owner.

ENERGY EFFICIENCY GRANT: Sign-up anytime for 2023 funds. For more information contact Jolene Jones at Rural Development at the Kearney USDA Service Center at 308-455-9840.

Calendar of Events

Aug 9: TBNRD Board Meeting

Aug 25: Water, Crops & Soil Field Day at the West Central Research Extension and Education Center in North Platte: Register at https://extension.unl.edu/statewide/westcentral/2022-water-and-crops-field-day-registration/

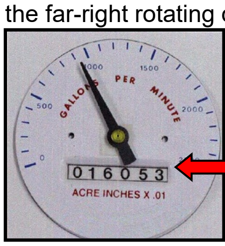
Sept 5: Labor Day – Gov't offices closed

Sept 6: CNPPID Board of Directors Meeting

Flow Meter Accuracy!

I get calls from producers wondering if their flow meters are reading accurately. An example of this is, my pivot is set up for 800 gpm, yet the needle on my flow meter says 500 gpm. The majority of the flow meters across the Tri-Basin NRD are McCrometers, so these are the ones I will be focusing on. The same concept may apply on other brands.

The needle on the readout display is a guide. Sometimes the needle bounces around, the unit display is too broad for accuracy, or it can simply be out of sync. To determine actual flow rate, one needs to time the odometer. When timing, I look straight into the odometer, and start the timer when the top of the far-right rotating digit (fastest) hits the bar across the top.



See photo. Do the same when recording the ending reading. Having the same eye angle, and reading the same location will provide a more accurate reading.

Depending upon the odometer units, the far-right digit can move faster or slower. The slower it moves, the more critical it is for consistent eye angle, and a very defined start / stop point.

Time the odometer for at least 10 minutes. For a slower rotating odometer, a longer time will help in accuracy.

Attached to this newsletter is a 2-page sheet. The first page shows different flow meter faces and units. The second page shows how to convert the varying units to gallons. Towards the bottom, it shows how to calculate the timed gallons to gallons per minute.

In closing, the needle is a guide. The odometer is the official and most accurate record.

Curtis's Column

USDA United States Department of Agriculture
Natural Resources Conservation Service

Managing Irrigation in SDI Fields

Subsurface Drip Irrigation (SDI) fields are different from pivots when it comes to irrigation water management. Mainly because irrigation water enters the soil profile at a depth of 14-18 inches rather than on the soil surface.

Our TAPS team manages an SDI system. I want to show you what we are looking at when it comes to irrigating our corn.

Our tape depth is at 14", 30" apart. Most of you are 60" apart with depths up to 18". Sensor distance from the tape can play a factor in what moisture you see on the sensors. Also, we have one zone. you may have multiple irrigation zones to get across your field. You may need to manage your system a bit differently, but the concept should remain the same.

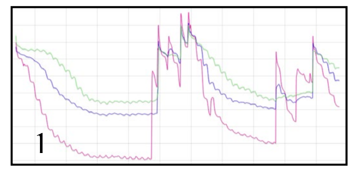


Chart 1 shows sensors at the 4", 8", & 12" depths (1st foot). We made room for rain by drying the top foot. You can see this with the level sensor lines. The increase in moisture in this 1st foot is all from rain. Currently, the moisture level is 78% in this 1st foot.

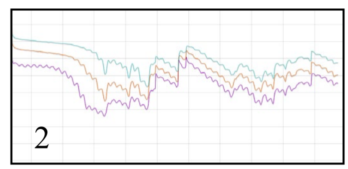


Chart 2 shows sensors at the 16", 20", & 24" depths (2nd foot). We dried this depth down some during the vegetative stages. Irrigation and rain keeps the moisture level where we want it, starting prior to the silking stage. Currently, the moisture level is 86% in this 2nd foot.

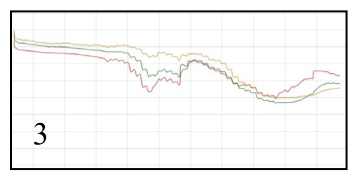


Chart 3 shows sensors at the 28", 32", & 36" depths (3rd foot). Moisture levels decrease once the roots reach these depths. Irrigation and rain have increased the moisture levels lately. Currently, the moisture level is 79% in this 3rd foot.

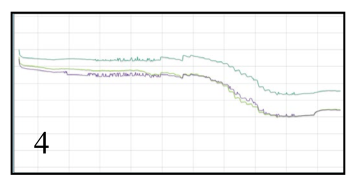


Chart 4 shows sensors at the 40", 44", & 48" depths (4th foot). Again, moisture levels decrease once the roots reach these depths. Recently, moisture levels remain even due to irrigation and rain. Currently, the moisture level is 75% in this 4th foot.

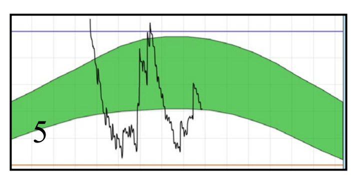


Chart 5 is the moisture level summary based on root depth. Roots are at 48", so the summary chart represents all 4 feet. This chart shows we are outside the green area at times. Remember, our 1st foot is drier for rain, and our 4th foot is being dried slowly. Irrigating in the 2nd and 3rd foot is our goal. Irrigating to push water up into the 1st foot will reduce room for rain, and it will leach nitrogen out of the root zone. Especially, when fertigating at the 14" depth.

CNPPID Notes

Chemical Trailers

Central has built their own chemical injection trailers for treatment of aquatic weeds in the irrigation canals. These chemical trailers allow Central to pump the chemicals directly into the canal at a constant flow and correct rate following the label. This allows Central to be much more effective and efficient with the chemical treatments than the gravity float boxes used in the past.

Central currently has two of these chemical trailers in operation. Each chemical trailer has its own set of chemical tanks, precision injection pumps for each chemical, generator to run the pumps and exhaust fans, & fresh water containers, all of which are contained inside the locked trailer during treatments.

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Tri-Basin NRD News

Irrigation Season Reminders

Chemigation: Our staff is busy with chemigation inspections. New permit inspections must be conducted prior to use and routine inspections due this year must be completed by the end of this irrigation season. If your system is due for a routine inspection, we have tried to contact you to schedule. Please call us to schedule your inspections.

Water Samples: If you have crop reports due each year, do not forget to take water samples from your irrigation wells for those reports. These samples are for your 2023 reports.

NRD staff are also taking samples from irrigation wells for our Water Quality testing program.

Irrigation Meters: Periodically check your irrigation flowmeters to make sure they are working correctly. If you do not think your meter is working correctly, our staff or Curtis Scheele at the NRCS office can check flow rates using an ultrasonic flowmeter.

If you have a meter repaired during the irrigation season, please contact the NRD and note the meter reading before removing. Doing so will make it easier to reconcile any movement of the propeller while the meter was being repaired. If you have questions about reinstalling your flowmeter or about your meter readings, contact our office at 1-877-995-6688.

Nebraska Extension Extras

Night-time versus Day-time Irrigation

Evaporation losses from sprinkler irrigation can range from 1.5 to 3% depending on weather, water droplet size and time of day application. However, is it wise to switch to night-time watering to reduce ET (evaporation & transpiration) losses??

Before adopting a night-time watering system, Tamara Jackson-Ziems, UNL Plant Pathologist, reminds irrigators that leaf wetness is a major driver of disease development. Therefore, this practice could contribute to potentially higher fungal disease losses as leaves remain wet through the night. For example, the new "Tar Spot" disease, which has lowered some Eastern Corn Belt corn by as much as 50% & only needs 7 hours of continuous wet leaf conditions to get established. Conversely, "Grey Leaf Spot" only needs wet leaves 11 hours.

Western Bean Cutworm & Bt Trait Comparison Table

Click on the free 2022 Handy Bt insect resistance Trait Table *https://agrilife.org/lubbock/files/2021/02/BtTraitTable_Feb_2021B.pdf* This provides Bt protein information; refuge requirement; and herbicide tolerance traits for Bt corn hybrid.

Western Bean Cutworms (WBC) are potentially our highest corn impact insect. Research indicates that one larvae per plant at dent stage can reduce yields by 3.7 bu./A. Despite efforts to slow resistance such as 5% refuge, Cry1F (Herculex, AcreMax and SmartStax) Bt traits from soil bacteria are providing less WBC control. Whereas, the VIP3A proteins (Agrisure Viptera and Leptra) are still providing near 100% WBC in Nebraska Extension research trials.

Julie Peterson, Nebraska Extension WC Entomologist, shares that bred-in resistance to WBC insects is far more effective than relying strictly on insecticide applications during the growing season. UNL UV Insect Light Trap data from Mid-May through Sep. for Concord, Clay Center, Mead & North Platte. *https://entomology.unl.edu/fldcrops/lightrap*

Other UNL free support includes the UNL App "western bean cutworm" which incorporates the predicted growing degree days (GDD) of moth first 25% flight (1391 GDD) to begin scouting and NebGuide G2013 "Western Bean Cutworm in Corn and Dry Beans." Reminder, Bt traits don't prevent adult WBC from laying eggs; non-resistant larvae are killed as they feed on the corn plant.

Estimating Corn Grain Yield Prior to Harvest

The University of Illinois 'Yield Component Method' estimates corn yields as early as "roasting ear" or milk stage of kernel development (18 to 22 days) after pollination completion.

Ears per acre, kernel rows per ear and kernels per row are easily measured; whereas, the final weight per kernel is not as easily measured until the grain is mature (kernel black layer). Grain moisture needs to be calculated to 15% used for 56-lb/bu.

Normal kernel weight is 90,000 kernels per 56-lb bushel.

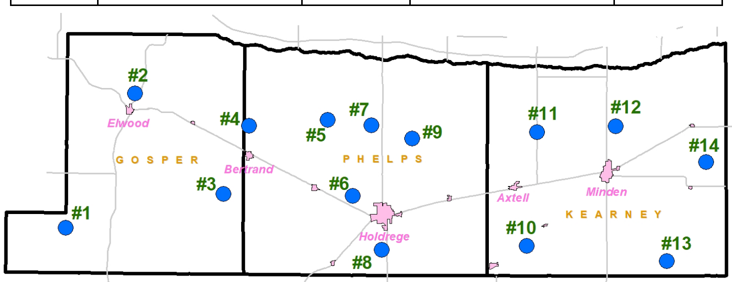
1) Estimate single row equal to 1/1,000th acre. For 30-inch (2.5 feet) rows, this equals 17.4 linear feet.
2) Count number of ears on the plants for 1/1,000th acre of row harvestable. (Do not count dropped ears).
3) For every fifth ear in the sample row, record number of kernel rows per ear and average kernels/row. Multiply ear row number x kernels/row = total kernels/ear
4) Calculate average kernels per ear by summing the values of all sampled ears and dividing ear numbers.
5) Estimate the yield for each site by multiplying the ear number (Step 2) by the average number of kernels per ear (Step 4) and then dividing that result by the estimated kernel weight.

NAWMN Crop ET Information

Additional Information and other ET resources can be found at websites listed under "Crop ET Information" below.

Inches of Crop Water Use (ET) = Evaporation x Kc

	July 18 – July 24		July 25 – July 31	
Site	**Evaporation**	**Rain**	**Evaporation**	**Rain**
1	2.80	0.59	1.30	0.33
2	2.50	0.71	0.70	0.75
3	2.00	0.72	1.00	0.68
4	2.10	0.20	1.20	0.55
5	1.90	1.25	1.10	0.48
6	1.90	0.93	1.10	0.85
7	1.90	1.40	1.10	0.60
8	2.10	0.55	1.10	1.24
9	2.00	0.81	0.90	1.45
10	1.80	0.71	1.10	2.40
11	2.10	1.10	1.30	0.78
12	2.00	0.93	1.20	0.13
13	2.00	1.05	1.20	0.10
14	2.00	0.11	1.30	1.21



2022 Map of NAWMN Sites across the Tri-Basin NRD.

Crop Coefficients (Kc)

Corn Stage	Kc	Soybeans Stage	Kc
2 leaf	0.10	Cotyledon (VC)	0.10
4 leaf	0.18	1st Node (V1)	0.20
6 leaf	0.35	2nd Node (V2)	0.40
8 leaf	0.51	3rd Node (V3)	0.60
10 leaf	0.69	Beg. Bloom (R1)	0.90
12 leaf	0.88	Full Bloom (R2)	1.00
14 leaf	1.01	Beg. Pod (R3)	1.10
16 leaf	1.10	Full Pod (R4)	1.10
Silk – Beg. Dent	1.10	Beg. Seed (R5)	1.10
¼ Milk Line	1.04	Full Seed (R6)	1.10
Full Dent (½ Milk)	0.98	Yellow Leaf (R6.5)	1.00
¾ Milk Line	0.79	Beg. Mat. (R7)	0.90
Black Layer	0.60	Full Mat. (R8)	0.20
Full Maturity	0.10	Mature	0.10

Crop Stage Information

Corn (R1-Silking to R4-Dough stage): These stages do not reflect replants. Not as severe as Silking, stress now can still have a profound effect on yield. As the kernels mature, the potential yield loss becomes less.
Avg. daily water use from July 25 – July 31 was 0.14"-0.21".

Soybeans (R2-Full Bloom to R5-Beginning Seed stage): These stages do not reflect replants. Environmental stress from R3 through R6 (Full Seed) will reduce yield more than any other time.
Avg. daily water use from July 25 – July 31 was 0.14"-0.21".

July 25-July 31 (14 of 14 NAWMN sites reporting): Average weekly rainfall was 0.83 (range 0.10 to 2.40). Average weekly ET for corn was 1.23 and for soybeans was 1.23.

Crop ET Information

NAWMN: https://nawmn.unl.edu/ETdata/DataMap
TBNRD: https://www.tribasinnrd.org/tbawmn
CNPPID: https://www.cnppid.com/weatheret-data/
CropWatch: https://cropwatch.unl.edu/gdd-etdata
Texting: TBNRD: 308-995-6688 or UNL: 308-995-4222
Email: CNPPID: 308-995-3555

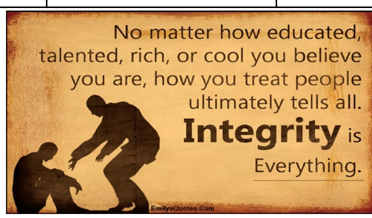
CORN STAGE		DESCRIPTION
R2	Blister	The kernels are white on the outside and resemble a blister in shape. The cob should be close to, if not, at full size by R2. The silks are beginning to dry out and darken in color.
R3	Milk	The kernels display a yellow color on the outside. Inner fluid is milky white. Silks are brown and dry or becoming dry.
R4	Dough	Most kernels contain semi-solid, pasty material.

SOYBEAN STAGE		DESCRIPTION
R3	Beginning Pod	At least one pod of 3/16" length is present at any one of the four upper most main stem nodes having a fully developed leaf. It's not uncommon to see longer pods at lower nodes.
R4	Full Pod	At least one pod of 3/4" length is present at one of the four upper most main stem nodes that have fully developed leaves.
R5	Beginning Seed	At least one pod containing small seeds is present at one of the four upper most main stem nodes that have fully developed leaves. You can hold a pod up to the sky to see the small developing seeds in the pod cavities.

Lake and River Levels

CNPPID Reservoir Elevation and Platte River Flow data listed below and other locations can be found on CNPPID's website at http://cnppid.com/wp-content/uploads/2016/06/lakeRiverData.html.

	August 4, 2022, 8:00 AM	1 Year Ago
Capacity of Lake McConaughy	47.3%	NA
Inflows to Lake McConaughy	146 cfs	270 cfs
Flows on the North Platte at North Platte	911 cfs	1210 cfs
Flows on the South Platte at North Platte	66 cfs	109 cfs
Flows on the Platte at Overton	120 cfs	249 cfs



Websites of Interest

NRCS Nebraska www.ne.nrcs.usda.gov
Farm Service Agency www.fsa.usda.gov
TBNRD Home Page www.tribasinnrd.org/
Central Irrigation District www.cnppid.com/
UNL Cropwatch cropwatch.unl.edu
UNL Extension extensionpubs.unl.edu/
K-State SDI Website www.ksre.ksu.edu/sdi
No-till On The Plains www.notill.org
Soil Health:
www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/
NE State Irrig Assoc
www.nebraskastateirrigationassociation.org/

Rainfall

Rainfall amounts listed below and other locations come from NeRAIN which can be found at website https://nednr.nebraska.gov/NeRain/Maps/maps.

Location:	July 21 – Aug 3	May 1 – Aug 3
Elwood 0.26 mi. S:	2.05	9.86
Bertrand 6.1 mi. SE:	1.29	9.97
Holdrege 0.99 mi. E:	2.58	11.35
Minden 7.2 mi. W:	2.28	10.13
Minden 5.8 mi. E:	0.33	7.88

Average Rain for May-July in Holdrege = 11.32 Inches

****** If you wish to receive this newsletter via e-mail, or have any questions, comments or ideas, feel free to contact Curtis Scheele at the NRCS office in Holdrege or you can email him at curtis.scheele@usda.gov. ******

USDA - Natural Resources Conservation Service

1609 Burlington Street
PO Box 798
Holdrege, NE 68949-0798
308-995-6121, Ext. 3

309 Smith Street
PO Box 41
Elwood, NE 68937-0041
308-785-3307, Ext. 3

1005 South Brown Street
Minden, NE 68959-2601
308-832-1895, Ext. 3

Central Nebraska Public Power & Irrigation District

415 Lincoln Street
PO Box 740
Holdrege, NE 68949
308-995-8601

Tri-Basin Natural Resources District

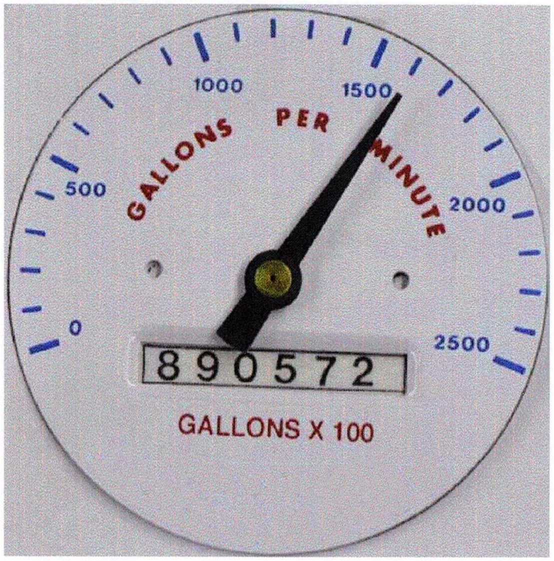
1723 Burlington Street
Holdrege, NE 68949
308-955-6688

Nebraska Extension

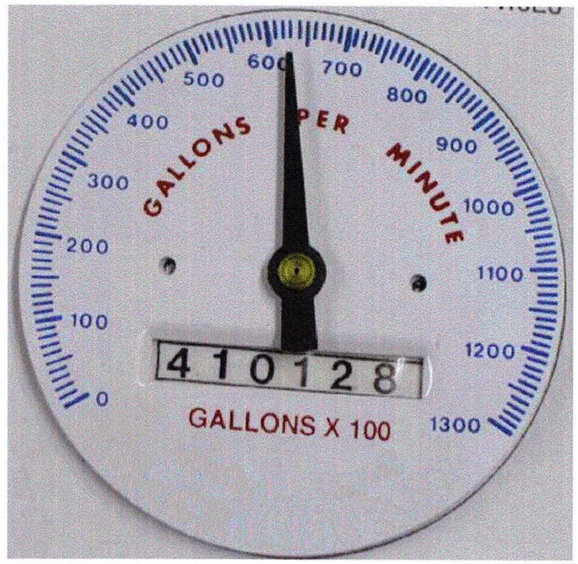
1308 2nd Street
Holdrege, NE 68949
308-995-4222

PO Box 146
Elwood, NE 68937
308-785-2390

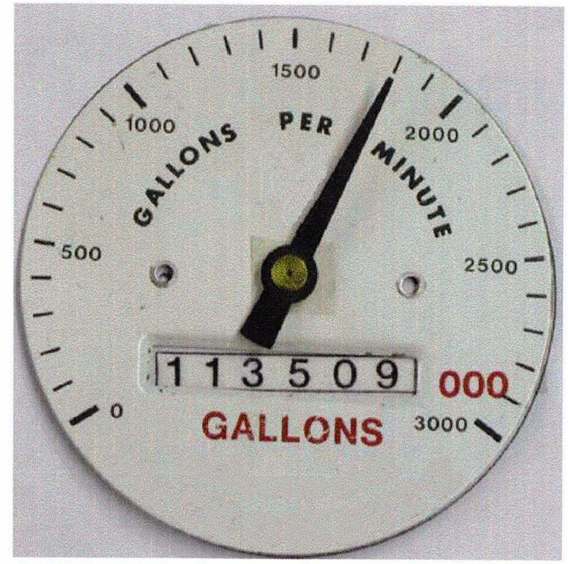
424 North Colorado
PO Box 31
Minden, NE 68959
308-832-0645



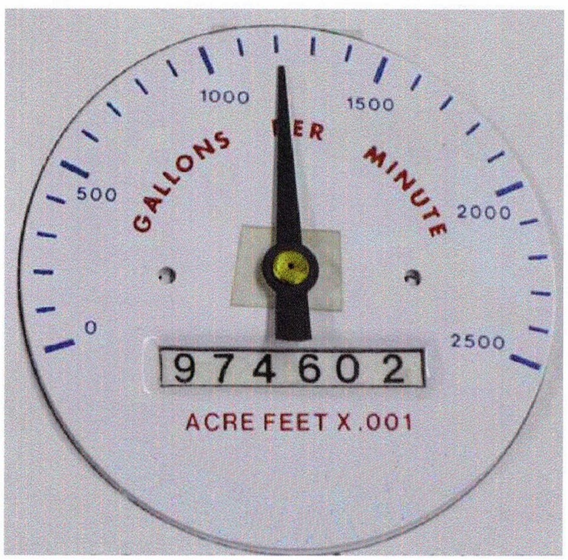
8" Dial Face with Gallon Totalizer x 100
Add 2 zeros to the 6-digit dial face reading.
Total Gallons = 89,057,200



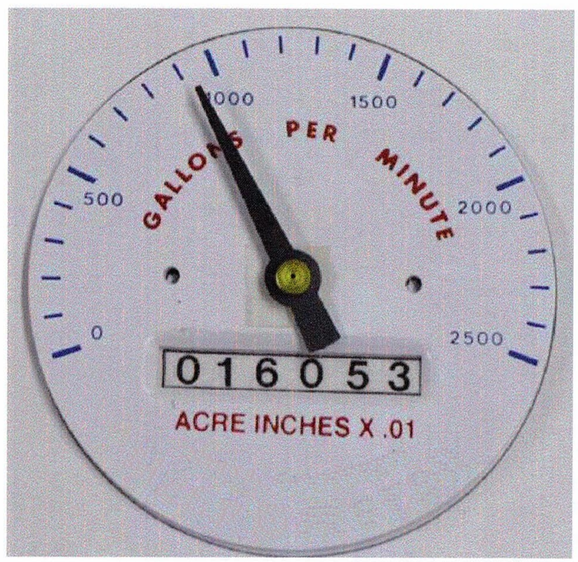
6" Dial Face with Gallon Totalizer x 100
Add 2 zeros to the 6-digit dial face reading.
Total Gallons = 41,012,800



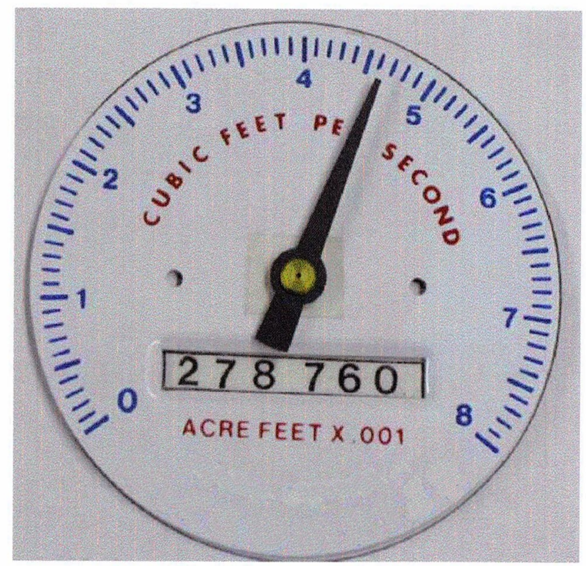
10" Dial Face with 3 fixed zeros.
Include these zeros in your reading.
Total Gallons = 113,509,000



8" Dial Face with Acre Feet Totalizer x .001 and GPM Flow Rate Indicator. Place a Decimal Point 3 places to the left. Acre Feet = 974.602



8" Dial Face with Acre Inches Totalizer x .01 and GPM Flow Rate Indicator. Place a Decimal Point 2 places to the left.
Acre Inches = 160.53



Dial Face with Cubic Feet Per Second flow rate and Acre Feet Totalizer. Place a Decimal Point 3 places to the left. Acre Feet = 278.760

WATER EQUIVALENTS TABLE

1 acre-foot of water…………………………………..325,851 gallons (12” of water over 1 acre)
1 acre-inch of water……………………………………..27,154 gallons (1” of water over 1 acre)
800 gallons per minute ………………………………3.54 acre-feet or 42.42 acre inches per day
450 gallons per minute = 1 cubic foot per second = 2 acre feet per day = 24 acre inches per day

WATER CALCULATIONS

…. To convert gallons totalizer readings to acre-feet

divide gallons used by 325,851

Example:…….present meter reading	89,057,200	gallons
subtract previous reading	48,563,000	gallons
gallons used =	40,494,200	gallons
acre-feet used = gallons used ÷ 325,851 =	124.27	acre feet

….To convert gallons totalizer readings to acre-inches

divide gallons used by 27,154

Example:…….present meter reading	41,012,800	gallons
subtract previous reading	31,444,300	gallons
gallons used =	9,568,500	gallons
acre-inches used = gallons used ÷ 27,154	532.38	acre-inches

….To convert acre-feet totalizer readings to gallons

multiply acre-feet used by 325,851

Example:…….present meter reading	278.760	acre-feet
subtract previous reading	267.334	acre-feet
acre-feet used =	11.426	acre-feet
gallons used = acre-feet used x 325.851 =	3,723,173.53	gallons

….To convert acre-inch totalizer reading to gallons

multiply acre-inches used by 27,154

Example:…….present meter reading	160.530	acre-inches
subtract previous reading	99.560	acre-inches
acre-feet used =	60.970	acre-inches
gallons used = acre-inches used x 27,154	1,655,579.38	gallons

….To check accuracy of the flow rate indicator:

Record the time it takes for several complete revolutions of the far right odometer wheel. Divide the gallons recorded by the time in seconds and then multiply by 60 to get Gallons Per Minute. Your calculations should give you the same rate as the meter needle shows.

….To make calculations if your register rolls over:

Subract end of previous year reading from 1000 acre feet and add amount currently showing on meter. Example: End of 1992-920.328 AC FT & End of 1993-138.491 AC FT
1000 – 920.328 = 79.672 AC FT + 138-491 AC FT = 218.163 ACRE FEET used 1993

calcs.wrl