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API-653 Inspection Report

Modified for Out-of-Service Inspection of Fertilizer Tanks

Growmark, Inc.

Casey, Illinois

October 9, 2020

Tank # 1
Illinois Tank Permit # AC11020240
104’ Diameter X 32’ High Tank
Carbon Steel Construction
32% Nitrogen Solution

Inspector’s Signature

Charlie C. McCluskey
Inspector, Heartland Tank Services, Inc.
API Certification No.:93629
Report No.: HTS-20-305

Reviewed & Approved by:

C.H. Brooks
President, Heartland Tank Services, Inc.

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1.0 EXECUTIVE SUMMARY

An API-653 tank inspection modified for the storage of fertilizer was conducted in accordance with client criterion for Non-Destructive Examination (NDE) that included visual and Ultrasonic Thickness (UT) examinations. The inspection was conducted in accordance with the requirements of the API-653 standards to collect data to evaluate the tank's mechanical integrity and fitness for continued service. Neither radiograph nor soil reports were available at the time of the inspection. Complete tank information is depicted on the Tank Data page, section 2.0.

Ultrasonic Thickness (UT) examinations of tank components (shell, roof, and floor) were completed on all accessible surfaces. UT measurements were performed on the tank's shell plates in six (6) locations according to a consistent test pattern. On the lower courses, every sheet was numbered and tested. On the upper courses four (4) sheets on each course were numbered and tested. On the roof plates, a single measurement was taken in the center of each plate. The roof was divided into quadrants and the lowest measurement of each quadrant is recorded. The sheet and locations are depicted in the appendices, section 5.0.

Summary Conclusions:

- The tank shell is fit for continued service:
  - Shell UT readings are above API minimum thickness requirements.
  - Shell welds are in full configuration and good condition with minor corrosion present.
- The tank roof is fit for continued service:
  - Roof UT readings are above API minimum thickness requirements.
  - Roof welds are in full configuration and good condition with minor corrosion present.
- The PVC Internal Containment Liner is fit for continued service.
  - Liner is soft, pliable, and as originally installed.
  - All nozzles and connection bolts were found to be tight as originally installed.
- RECOMMENDED MAXIMUM LINER FILL HEIGHT IS 30'3" WITH 32% NITROGEN SOLUTION.

Summary Recommendations:

- **To meet API Specifications**
  - None.

- **Discretionary recommendations**
  - Owner should remove residual product from inlet nozzle containment box and repair the nozzle to prevent additional corrosion damage to tank shell.
  - Keep external chime area free of gravel and foliage to prevent corrosion damage from occurring.

Next Inspection intervals are:

- UT Thickness: 10/09/2025
- Internal: 10/09/2025
- External: 10/09/2025
- Internal Liner: 10/09/2025

2.0 TANK DATA

Tank #:	1	***Diameter:***	104’
Illinois Tank Permit #	AC11020240	***Height/Length:***	32’
Client:	Growmark, Inc.	***Corr. Allowance:***	0.000
Location:	Casey, IL	***Joint Efficiency:***	1.00
Inspection Date:	10/09/2020	***Specific Gravity:***	1.33
Type Inspection:	Out-of-Service	***Plate Spec:***	A 36
Test Methods:	UT, Visual	***Course 1 t:***	0.500
Manufacturer:	Heartland Tank, LLC	***Course 2 t:***	0.375
Year Built:	2011	***Course 3 t:***	0.312
Construction Code:	API-650	***Course 4 t:***	0.250
Capacity @ 30’3”:	1,918,960 gallons	***Course 5 t:***	N/A
Shell Construction:	Butt Welded	***Course 6 t:***	N/A
Roof Type:	Fixed/Cone	***Course 7 t:***	N/A
Foundation:	Earthen	***Roof/Head 1t:***	0.187
Product:	32% Nitrogen Solution	***Bttm/Head 2 t:***	0.250
Recommended Maximum Liner Fill Height:	30’3”		

3.0 INSPECTION RESULTS

3.1 *Foundation:*

3.1.1 The tank was constructed on an earthen foundation. The foundation was observed to be in good condition.

3.1.2 A settlement survey was completed from the outside of the tank. Beginning at the highest point, moving clockwise, twelve (12) equally-spaced measurements were performed around the circumference of the tank. Results reveal a planar tilt is present of 0.960" but is within the parameters of API Specifications. The foundation is fit for continued service.

3.2 *Shell:*

3.2.1 UT readings were performed on all shell courses on the tank. A weld joint efficiency of 1.00 and specific gravity of 1.33 were used in the minimum thickness calculations. Results reveal all shell courses to be above API minimum thickness requirements. The tank shell is fit for continued service.

3.2.2 Calculation results from this inspection reveal the maximum fill height of the tank to be 32'. However, to keep product below the top attachments for internal liner, the RECOMMENDED MAXIMUM LINER FILL HEIGHT IS 30'3" WITH 32% NITROGEN SOLUTION.

3.2.3 Visual examination of external vertical and horizontal shell weld joints found the condition to be good with minor corrosion present.

3.2.4 The chime weld was visually examined outside of the tank and found to be in good condition.

3.2.5 External coating was visually examined and found to be in good condition.

3.3 *Appurtenances:*

3.3.1 The tank is equipped with:

- One (1) 4" inlet nozzle in containment box.
- One (1) 6" overhead fill nozzle.
- Two (2) 6" suction nozzles in containment boxes.
- One (1) 30" shell manway.

3.3.2 Welds on all nozzles and the manway were visually examined. The nozzles, manway neck, and reinforcement pads were UT tested. Welds were found to be in good condition with minor corrosion present. The nozzles and manway were found to have proper reinforcement pads with threaded tell-tale holes for testing as required by API Specifications. Nozzles and manway are fit for continued service.

3.3.2.1 The inlet nozzle valve is leaking into the containment box.

3.4 *Roof:*

3.4.1 The plates on the roof are lap-welded. One UT reading was performed in the center of each roof plate. Results reveal all roof plates above API minimum thickness requirements. Tank roof is fit for continued service.

3.4.2 Roof plate weld joints were visually examined and found to be in good condition with minor corrosion present.

3.4.3 The tank roof is equipped with one (1) 10" vent. Vent is equipped with a proper screen to prevent debris from entering roof vent and restricting airflow during the filling and emptying processes.

3.4.4 The tank roof is equipped with one (1) 20" manway and three (3) 4' x 5' machine hatches. Welds on manway and machine hatches were visually examined and found to be in good condition.

3.4.5 The coating on the roof was visually examined and found to be in good condition.

3.5 *Floor:*

3.5.1 The plates on the floor are lap-welded. Due to the presence of an internal containment liner, random UT readings were completed from the outer floor lip extension. Results reveal these locations to be above API minimum thickness requirements.

3.6 *Ancillary Equipment:*

3.6.1 Access to the tank roof was made by way of a spiral stairway welded to the shell. The stairway is equipped with a proper handrail for safety as required by OSHA. Welds on stairway, handrail, and attachments were visually examined and found to be in good condition. The external coating was found to be in good condition.

3.6.2 The tank's center roof support column and roof support rafters were visually examined and appear to be in good condition.

3.6.3 A gauge board and electronic gauge are present and in operable condition.

3.7 *PVC Internal Containment Liner:*

3.7.1 Entry was made inside of the PVC internal containment at the shell manway. The liner was visually examined and found to be as originally installed, still pliable to the touch and flexible with all containment attachments tight and in place. PVC internal containment liner is fit for continued service.

3.7.2 There was no evidence the liner had been overfilled, as the recommended maximum fill height marker by liner installer was still visible.

3.7.3 The boot around the roof support column was found to be in good condition and as originally installed.

3.7.4 The tank is equipped with one (1) leak detection monitor in the lower first shell course. The monitor valve was opened and found to be dry and in operable condition.

4.0 RECOMMENDATIONS

4.1 *Foundation:*

4.1.1 Keep external chime area free of gravel and foliage to prevent corrosion damage from occurring.

4.2 *Shell:*

4.2.1 Maintain the recommended liner fill height of 30’3” with 32% Nitrogen Solution.

4.3 *Appurtenances:*

4.3.1 Owner should remove residual product from inlet nozzle containment box and repair the nozzle to prevent additional corrosion damage to tank shell.

4.4 *Roof:*

4.4.1 None.

4.5 *Floor:*

4.5.1 None.

4.6 *Ancillary Equipment:*

4.6.1 None.

4.7 *PVC Internal Containment Liner:*

4.7.1 None.

4.8 *Next Inspection: Based on The Fertilizer Institute recommendations.*

4.8.1 Next internal inspection is due by 10/09/2025.

4.8.2 Next external inspection is due by 10/09/2025.

4.8.3 Next UT inspection is due by 10/09/2025.

4.8.4 Governing component limiting life of the tank is the shell.

5.0 APPENDICES

Engineering Calculations
Settlement Survey
Thickness Measurement Record
Inspection Drawings
Inspection Photographs
Certifications & Inspection Warranty

Tank Shell Minimum Thickness and Remaining Life Calculations Date 10/09/2020

File No.	Report No.	Client	Tank No.	Temp. (degF)	Initials
4470	HTS-20-305	Growmark, Inc.	TK1		Charlie McCluskey

SHELL MINIMUM THICKNESS CALCULATIONS

$$tmin = \frac{2.6(H-1)DG}{SE}$$

Where:

H = The height above the bottom of the course of study to the maximum liquid level height of the product, in ft. For corroded or pitted areas, H = the height from the bottom of the corroded or pitted area to the maximum liquid level height of the product, in ft.

tmin = The calculated minimum acceptable shell thickness, in inch (cannot be less than 0.10 inch for any course). The minimum acceptable shell thickness allowed by API-653 and STI-SP001 for tank size, in inch .

D = Nominal diameter of tank, in ft.

G = Highest specific gravity of the contents (including test water if tank will, or may, be tested in the future).

S = Maximum allowable stress, in psi. For welded tanks; use the smaller of 0.80Y of 0.429T for bottom and second course or the smaller of 0.88Y or 0.472T for all other courses. For riveted tanks; S = 21000 psi. For STI Tank Inspections S = 26000 psi (E = 1)

Y = Specified minimum yield strength of the plate, in psi; use 30000 psi if not known (N/A for riveted tanks).

T = The smaller of the specified minimum tensile strength of the plate or 80000 psi; use 55000 psi if not known (N/A for riveted tanks).

E = Original joint efficiency for the tank. For welded tanks; use API-653, Table 2-1 ; use E = 1.0 when evaluating the retirement thickness in a corroded plate, when away from welds or joints by at least the greater of one inch or twice the plate thickness. For riveted tanks; use E = 1.0 for shell plates greater than 1 inch away from rivets; use the value of E from API-653 Table 2-1 when within 1 inch of rivets. For STI Tank Inspections E = 1 where S = 26000 psi.

D (ft) 104 G 1.33 E 1.00 Fill Height (ft) 32.0

	Material	Crs H (ft)	H (ft)	S (psi)	tmin (inch)
Course 1	A 36	8	32.0	24900	0.448
Course 2	A 36	8	24.0	24900	0.332
Course 3	A 36	8	16.0	27400	0.197
Course 4	A 36	8	8.0	27400	0.100

Tank Shell Minimum Thickness and Remaining Life Calculations Date 10/09/2020

File No.	Report No.	Client	Tank No.	Temp. (degF)	Initials
4470	HTS-20-305	Growmark, Inc.	TK1		Charlie McCluskey

SHELL REMAINING LIFE CALCULATIONS

Ca = tact-tmin = Remaining Corrosion Allowance (inch)
Cr = tprev-tact / Y = Corrosion Rate (inch/Yr)
RL = Ca / Cr = Remaining Life (year)
Y = 9 = Tank age (year)

Where:

Ca = Remaining corrosion allowance of the shell course under consideration, in inch.

Cr = Corrosion rate of the shell course under consideration, in inch per year.

FHc = Calculated fill Height = (SEtact/2.6DG+1) + (product height below course of interest), in ft.

tact = Minimum thickness measurement of the shell course under consideration, as recorded at the time of inspection, in inch.

tmin = minimum required thickness of shell course, at the maximum allowable fill height, in inch.

tprev = previous thickness measurement of shell course under consideration, as recorded at last inspection or nominal thickness if no previous thickness measurements, in inch.

RL = Estimated remaining life of the shell course under consideration, in year.

Y = Time span between thickness readings or age of the tank if nominal thickness is used for tprev, in year.

	tprev	tact	tmin	Ca	Cr	RL	FHc
Course 1	0.500	0.498	0.448	0.050	0.0002	226	35.48
Course 2	0.375	0.371	0.332	0.039	0.0004	87	34.69
Course 3	0.312	0.309	0.197	0.112	0.0003	336	40.54
Course 4	0.250	0.244	0.100	0.144	0.0007	216	43.59

AST ATMOSPHERIC STORAGE TANK FIXED ROOF EVALUATION
MINIMUM THICKNESS, REMAINING LIFE, PRESSURE CALCULATIONS

Date: 10/09/2020

File No	Report No	Client	Inspector	Tank No	Temp(degF)
2303	HTS-20-305	Growmark, Inc.	Charlie McCluskey	TK1	

Where;
Ca = remaining corrosion allowance of the tank component under consideration, in inch (t act - t min).
Cr = corrosion rate of the tank component under consideration, in inch per year (t prev - t act / Y).
oz = unit of measurement, (weight, in ounces, per square inch), (16 oz per pound)
psi = unit of measurement, (weight, in pounds, per square inch)
RL = estimated remaining life of the tank component under consideration, in year (Ca / Cr).
t act = actual thickness measurement of the tank component under consideration, as recorded at the time of inspection, in inch.
t min = minimum required thickness of tank component, at the design MAWP at the design temperature (200 degF for atm AST's), in inch (greater of psi/wt or 0.090").
t nom = design nominal thickness of tank component under consideration, in inch.
t prev = previous thickness measurement of the tank component under consideration, as recorded at last inspection or nominal thickness if no previous thickness measurements, in inch.
t yn = thickness of the tank component under consideration at the next inspection at twice the calculated corrosion rate, in inch (t act - (2*Cr*Yn).
wt = weight of plate per cubic inch.
wc = unit of measurement, (height, in inch, of water column bearing on 1 Sq.Inch area), (27.7 wc per pound)
Y = time span between thickness readings or age of the tank component if tnom is used for tprev, in year.
Yn = estimated time span to next inspection of the tank component under consideration, in year.

ROOF PLATES - REMAINING LIFE

Y	t prev (inch)	t act (inch)	t min (inch)	Cr (inch/Yr)	Ca (inch)	RL
9	0.187	0.184	0.090	0.00033	0.094	282

ROOF MAXIMUM ALLOWABLE INTERNAL PRESSURE

Material Category	wt	Yn	tyn	psi	oz.	wc
CS/Crom. Stl	0.2833	5	0.181	0.051	0.819	1.422

STORAGE TANK FLOOR EVALUATION
MINIMUM REMAINING THICKNESS (MRT) CALCULATIONS

Date 10/09/2020

File No	Report No	Client	Inspector	Tank No	Temp (degF)
1789	HTS-20-305	Growmark, Inc.	Charlie McCluskey	TK1	

Liner	CP Protec	50mil Liner	RPB	Ca	Shell tmin	Shell tnom	D	H	S
No	No	No	No			0.500	104.000	32.000	

Where;
Ca = corrosion allowance, in (inch).
MRT = minimum remaining thickness at the end of interval Or. This value must meet the requirements of Table 4-1 and sections 2.4.7.4 and 2.4.8.
Or = In-service interval of operation (years to next internal inspection) not to exceed that allowed by 4.4.2.
RTbc = minimum remaining thickness from bottom side corrosion after repairs.
RTip = minimum remaining thickness from internal corrosion after repairs.
StPr = maximum rate of corrosion not repaired on the top side. StPr = 0 for coated areas of the bottom. The expected life of the must equal or exceed Or to use StPr = 0.
tmin = minimum allowable thickness in accordance with requirements of Table 4-1 and sections 2.4.7.4 and 2.4.8.
to = bottom plate original thickness.
UPr = maximum rate of corrosion on the bottom side. To calculate the corrosion rate, use the minimum remaining thickness after repairs. Assume a linear rate based on the age of the tanks. UPr = 0 for areas that have effec
D = nominal diameter of tank, in (ft),
H =Height, in (ft), from the bottom of the 1st shell course to the maximum allowable fill height
S=Stresses are calculated from 2.6(H-1)DG/SE.

GENERAL PLATES-AFTER INSPECTION / REPAIRS

Age	to	RTbc	RTip	UPr	StPr	Or	MRT	tmin	Results
9	0.250	0.244	0.244	0.00067	0.00067	5	0.237	0.100	ACCEPTABLE

PLATES IN CRITICAL ZONE (3") - AFTER INSPECTION / REPAIRS

Age	to	RTbc	RTip	UPr	StPr	Or	MRT	tmin	Results

ANNULAR PLATES - AFTER INSPECTION / REPAIRS

Age	to	RTbc	RTip	UPr	StPr	Or	MRT	tmin	Results

AST STORAGE TANK EVALUATION

Nozzle/Pipe Remaining Life Calculations

Report No	Client	Inspector	Vessel	Date
HTS-20-305	Growmark, Inc.	Charlie McCluskey	TK1	10/09/2020

Minimum Thickness Determinations:

a) The following pipe minimum thicknesses are based on the current in-house engineering standards, which take into consideration, pressures, structural integrity and localized corrosion allowance.

Size (inch)	<2	3	4	6	8	10	12	>12
tmin (inch)	0.080	0.100	0.100	0.125	0.125	0.156	0.188	0.188

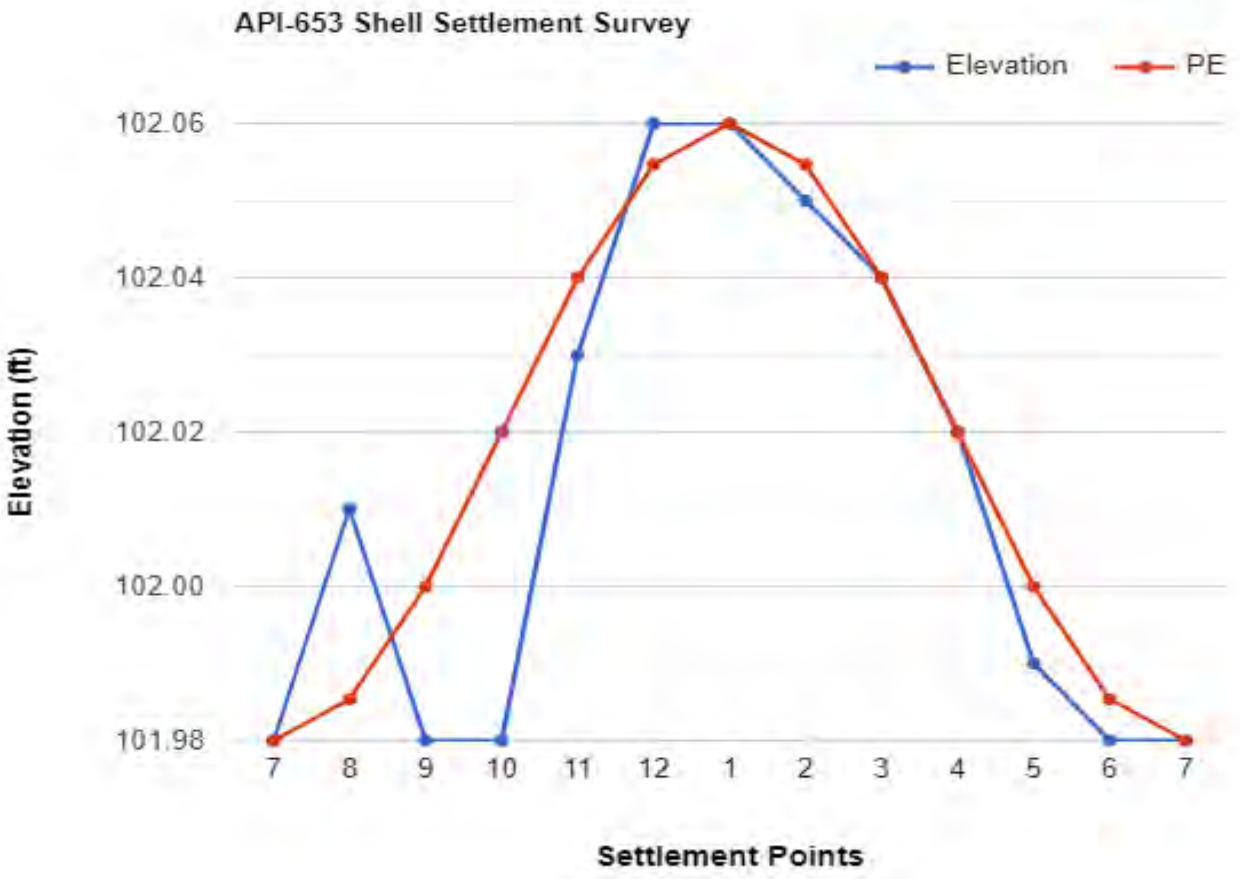
Nozzle Remaining Life Calculations:

CML	Age (year)	Comp.Disc. (inch)	Size (inch)	tprev (inch)	tact (inch)	tmin (inch)	Ca (inch)	Cr (inch/Yr)	RL (year)
035	9	30" MW	30.000	0.625	0.508	0.188	0.320	0.01300	25

API-653 APPENDIX B SHELL SETTLEMENT EVALUATION

(para. B.2.2.4)

Report No	Client	Inspector	Vessel	Date
HTS-20-305	Growmark, Inc.	Charlie McCluskey	TK1	10/09/2020



	Base Elev	Max Elev	ΔElev		
FT	101.980	102.060	0.080	R^2 =	0.938
IN	1223.760	1224.720	0.960		

API-653 APPENDIX B SHELL SETTLEMENT EVALUATION

Report No.: HTS-20-305

D	H	Roof Type	L	1st Crs Plt Spec	Y	E
104	32	F	27.23	A 36	36000	29000000

Where:
D = Tank Diameter, in ft
H = Tank Height, in ft
Roof Type: F = fixed, O = Open
L = Arc length between measurement points, in ft (32' max) (greatest dist. allowed based on even # of points)
Y = Yield strength of shell 1st course , in pounds per Sq.Inch (psi)
E - Young's modulus, in pounds per Sq.Inch (psi)
θ = Angle theta at elevation point, in degrees
PE = Predicted elevation, in ft
Ui = Measured out-of-plane settlement in relation to a cosine curve, in ft
Si = Deflection, in ft, (out-of-plane distortion)
Smax = Maximum allowed deflection, in ft, (out-of-plane distortion)

Smax =((L^2*Y*11)/2*(E*H)) = **0.158**

Point	*Elevation*	*θ*	*PE*	*Ui*	*Si*	*Results*
1	102.060	0	102.060	0.000	0.000	SAT
2	102.050	30	102.055	-0.005	-0.005	SAT
3	102.040	60	102.040	0.000	0.002	SAT
4	102.020	90	102.020	0.000	0.005	SAT
5	101.990	120	102.000	-0.010	-0.007	SAT
6	101.980	150	101.985	-0.005	0.000	SAT
7	101.980	180	101.980	0.000	-0.010	SAT
8	102.010	210	101.985	0.025	0.035	SAT
9	101.980	240	102.000	-0.020	-0.012	SAT
10	101.980	270	102.020	-0.040	-0.025	SAT
11	102.030	300	102.040	-0.010	0.007	SAT
12	102.060	330	102.055	0.005	0.010	SAT

Point one begins on the East side of the tank. Consecutive readings follow a clockwise direction around the tank.

AST Storage Tank Evaluation

AST Component Inspection Data

Report No	Client	Inspector	Vessel	Date
HTS-20-305	Growmark, Inc.	Charlie McCluskey	TK1	10/09/2020

Component Thickness Measurements in (inch)

CML	*Component*	*Location*	*tml-1*	*tml-2*	*tml-3*	*tml-4*	*tml-5*	*tml-6*	*Minimum*
001	Shell Crs 1	Plt 1	0.504	0.505	0.507	0.506	0.506	0.504	0.504
002	Shell Crs 1	Plt 2	0.507	0.507	0.503	0.505	0.499	0.499	0.499
003	Shell Crs 1	Plt 3	0.504	0.506	0.508	0.507	0.504	0.506	0.504
004	Shell Crs 1	Plt 4	0.505	0.504	0.500	0.501	0.499	0.500	0.499
005	Shell Crs 1	Plt 5	0.503	0.502	0.502	0.499	0.505	0.504	0.499
006	Shell Crs 1	Plt 6	0.498	0.502	0.506	0.506	0.502	0.502	0.498
007	Shell Crs 1	Plt 7	0.500	0.505	0.502	0.506	0.504	0.505	0.500
008	Shell Crs 1	Plt 8	0.498	0.502	0.507	0.503	0.503	0.503	0.498
009	Shell Crs 1	Plt 9	0.504	0.502	0.501	0.506	0.503	0.506	0.501
010	Shell Crs 1	Plt 10	0.506	0.505	0.508	0.508	0.503	0.504	0.503
011	Shell Crs 2	Plt 11	0.376	0.373	0.376	0.378	0.378	0.372	0.372
012	Shell Crs 2	Plt 12	0.377	0.371	0.377	0.376	0.371	0.375	0.371
013	Shell Crs 2	Plt 13	0.374	0.377	0.377	0.379	0.378	0.373	0.373
014	Shell Crs 2	Plt 14	0.379	0.378	0.378	0.375	0.378	0.378	0.375
015	Shell Crs 2	Plt 15	0.372	0.374	0.375	0.380	0.381	0.378	0.372
016	Shell Crs 2	Plt 16	0.380	0.377	0.378	0.381	0.378	0.376	0.376
017	Shell Crs 2	Plt 17	0.380	0.380	0.382	0.379	0.380	0.379	0.379
018	Shell Crs 2	Plt 18	0.381	0.374	0.378	0.374	0.379	0.378	0.374
019	Shell Crs 2	Plt 19	0.372	0.375	0.375	0.378	0.381	0.379	0.372
020	Shell Crs 2	Plt 20	0.372	0.376	0.375	0.375	0.379	0.374	0.372
021	Shell Crs 3	North	0.312	0.315	0.314				0.312
022	Shell Crs 3	South	0.312	0.310	0.311				0.310
023	Shell Crs 3	East	0.310	0.309	0.312				0.309
024	Shell Crs 3	West	0.312	0.311	0.312				0.311
025	Shell Crs 4	North	0.254	0.252	0.253				0.252
026	Shell Crs 4	South	0.248	0.246	0.249				0.246
027	Shell Crs 4	East	0.246	0.244	0.248				0.244
028	Shell Crs 4	West	0.249	0.247	0.248				0.247
029	Roof	Q1	0.186						0.186
030	Roof	Q2	0.184						0.184
031	Roof	Q3	0.185						0.185
032	Roof	Q4	0.186						0.186
033	Floor	Lip Ext	0.249	0.253	0.244	0.254	0.249	0.247	0.244
034	Floor	Lip Ext	0.249	0.250	0.252	0.250			0.249

API-653 STORAGE TANK EVALUATION

Nozzle Inspection Data

Report No	Client	Inspector	Vessel	Date
HTS-20-305	Growmark, Inc.	Charlie McCluskey	TK1	10/09/2020

Nozzle Thickness Measurements in (inch)

Components with Vert. Axis: tml-1 N., tml-2 E., tml-3 S., tml-4 W. (Drawing N.)

Component with Horz. Axis:tml-1 Top, tml-2 Side, tml-3 Bttm., tml-4 Side (Clock Wise)

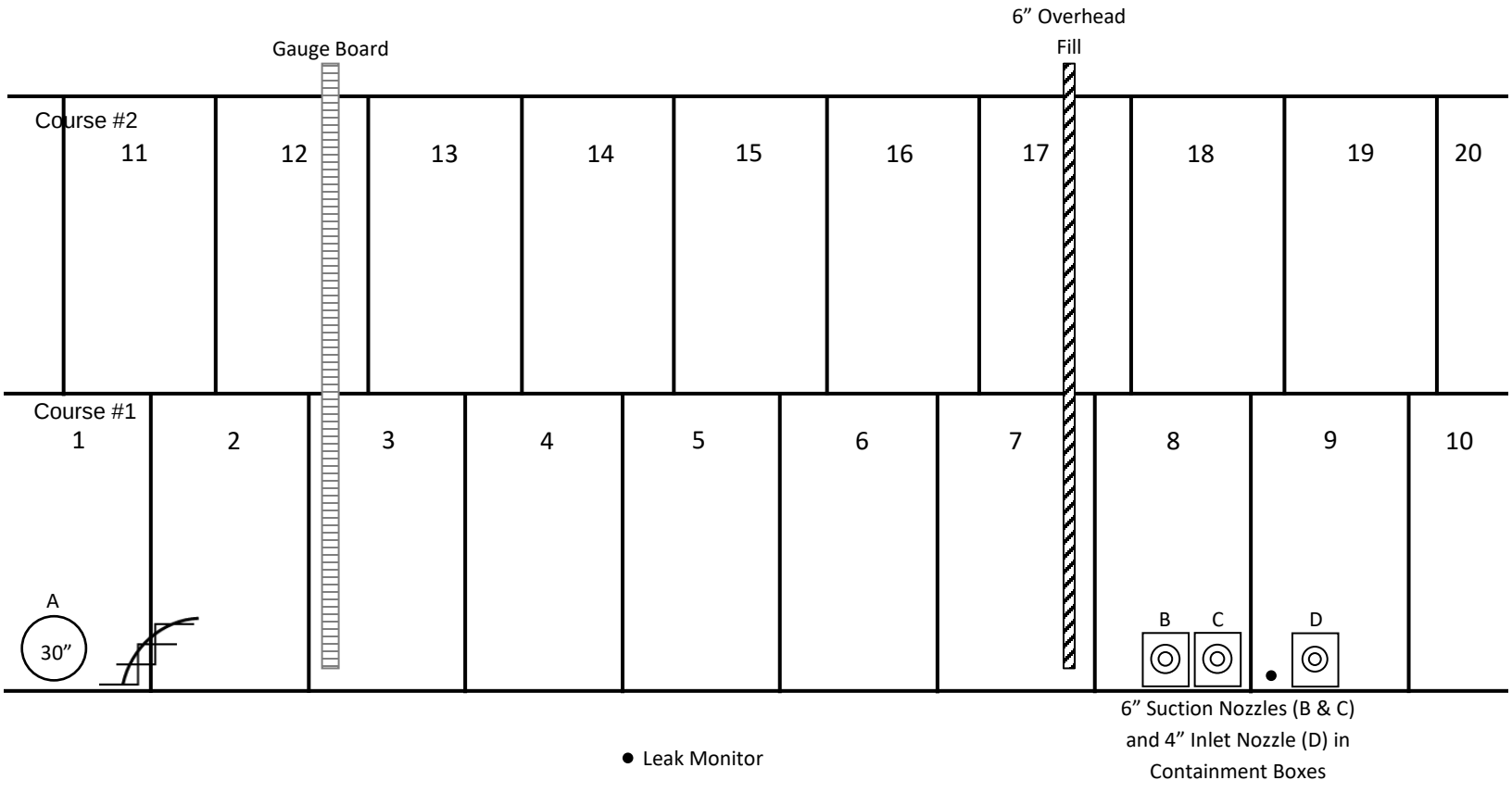
CML #	*Comp. ID*	*Size*	*Location*	*Service*	*tml-1*	*tml-2*	*tml-3*	*tml-4*	*Minimum*
035	30" MW	30.000	A	Manway	0.508	0.509	0.509	0.510	0.508

Customer: Growmark, Inc.	**City, State:** Casey, IL	**Tank #:** 1
Diameter: 104’	**Height**: 32’	**Date of Inspection:** 10/9/2020

Drawing is not to scale

SHELL CML LOCATIONS

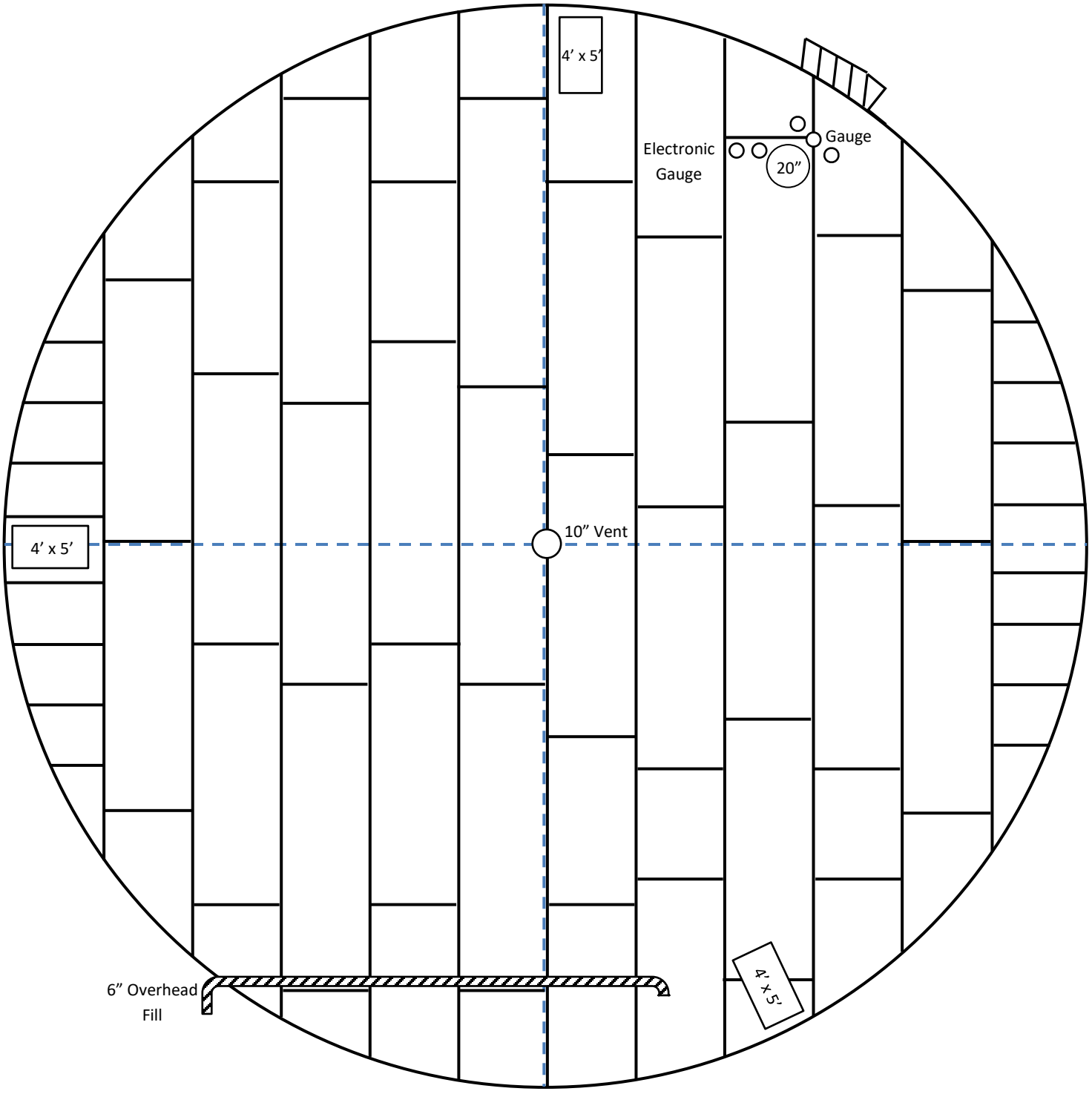
COURSE	NORTH	SOUTH	EAST	WEST
4	25	26	27	28
3	21	22	23	24



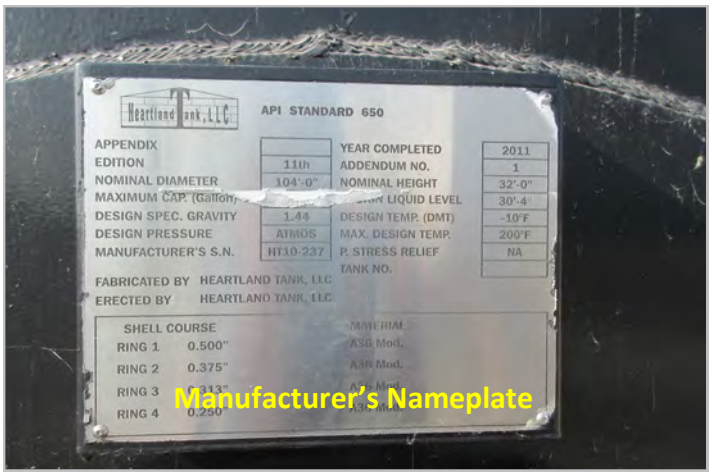
Customer: Growmark, Inc.	**City, State:** Casey, IL	**Tank #:** 1
Diameter: 104’	**Height**: 32’	**Date of Inspection:** 10/9/2020

Drawing is not to scale

ROOF CML LOCATIONS
North



Growmark, Inc.—Casey, IL Tank 1



Manufacturer's Nameplate

30" Shell Manway—A

6" Suction Nozzle in Containment Box—B

Inside of Containment Box—B

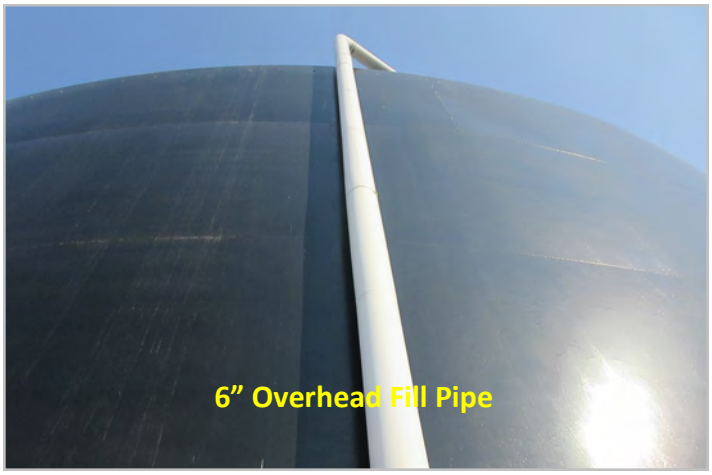
6" Suction Nozzle in Containment Box—C

Inside of Containment Box—C

4" Inlet Nozzle in Containment Box—D

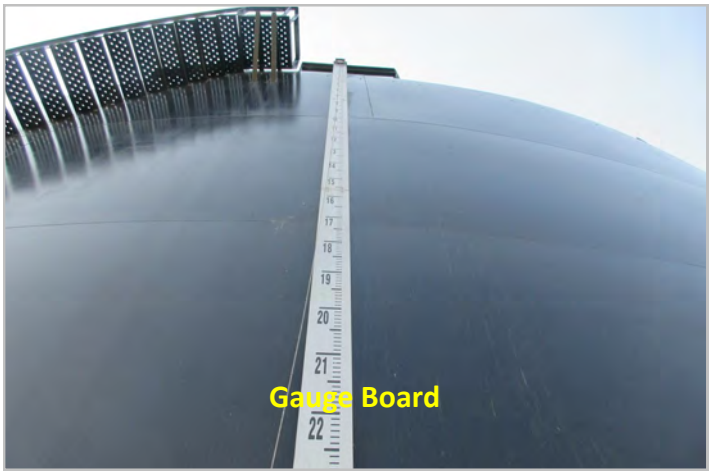

Inside of Containment Box; 4" Valve Leaking —D


6” Overhead Fill Pipe


6” Overhead Fill Pipe

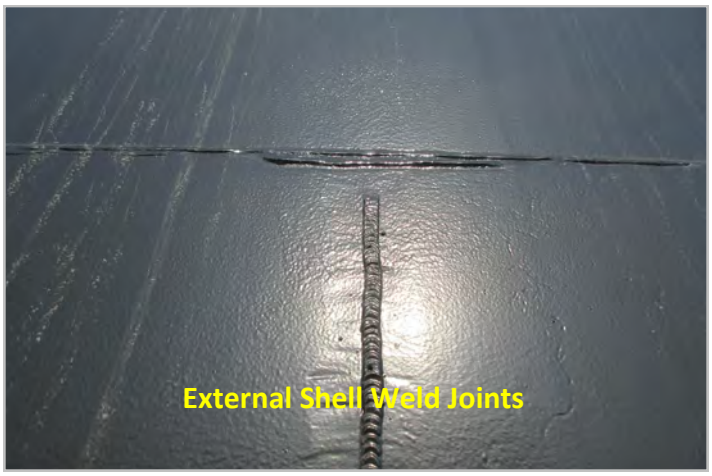

Leak Monitor

Gauge Board


Gauge Board

Floor Lip Extension

Floor Lip Extension



External Shell Weld Joints

External Shell Weld Joints

External Horizontal Shell Weld Joint, Stairs

Stairway Landing

20” Roof Manway

Gauge

4’ x 5’ Machine Hatch

4’ x 5’ Machine Hatch

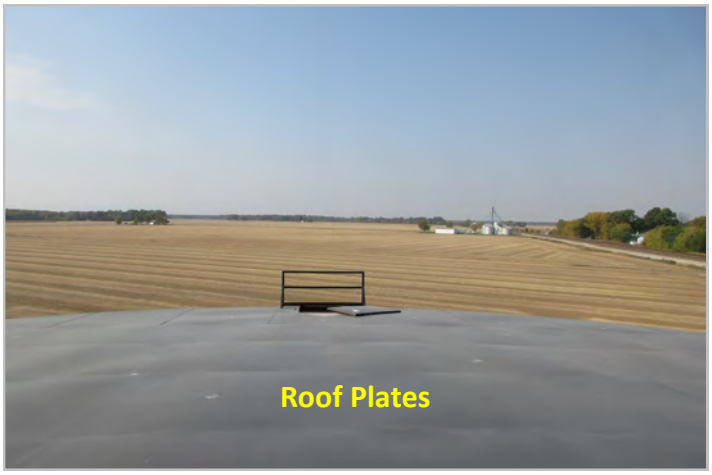
6” Overhead Fill Pipe

6” Overhead Fill Pipe

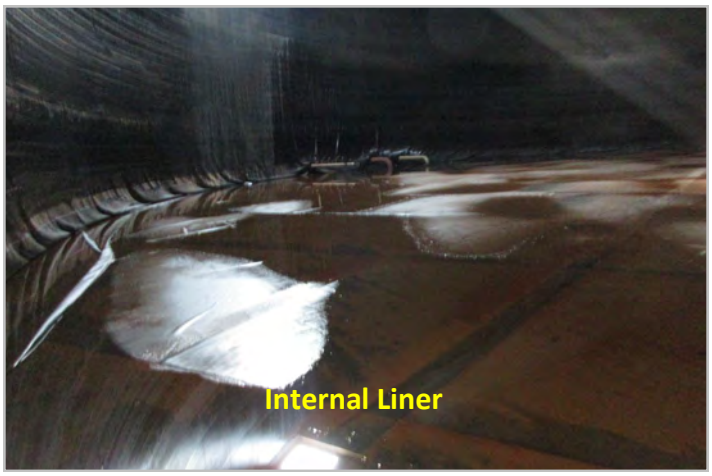
Roof Plates, 10” Vent

Roof Plates, Stairway Landing

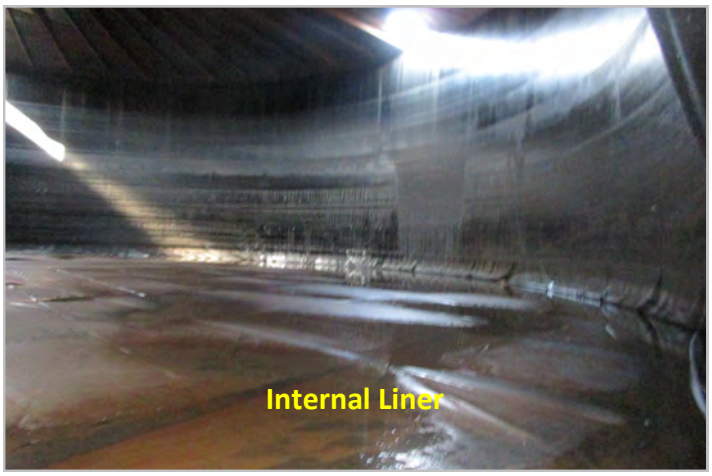
Roof Plates



Roof Plates

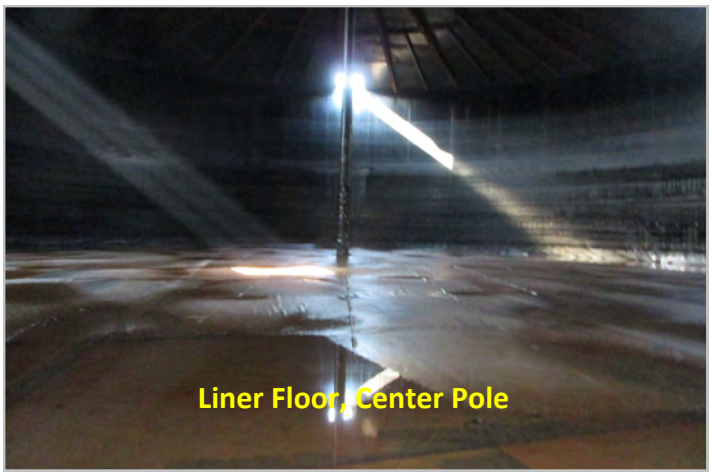


Internal Liner



Internal Liner

Liner Floor, Center Pole



Liner Floor, Center Pole

Max Fill Line, Roof Rafter

Roof Rafters

AMERICAN PETROLEUM INSTITUTE
Individual Certification Programs: ICP™

API Individual Certification Programs

verifies that

Charles Curtis McCluskey

has met the requirements for API certification

API-653 Aboveground Storage Tank Inspector

Certification Number *93629*

Original Certification Date *January 31, 2020*

Current Certification Date *January 31, 2020*

Expiration Date *January 31, 2023*

Manager, Individual Certification Programs

ICP

2015-027 | PDF


NLPA Special Inspector - Level 2C
NLPA 631 & SNT-TC-1A
has been successfully completed by
Richard Buntt
DATE: 04/04/19
Authorized NLPA Instructor
T.R.Consulting, Inc
5351 Setters Way
CO Sprgs CO 8091
(719) 359-8467
#CO-0046-08-2C


NLPA Special Inspector - Level 2C
NLPA 631 & SNT-TC-1A
has been successfully completed by
Michael Buntt
DATE: 04/04/19
Authorized NLPA Instructor
T.R.Consulting, Inc.
5351 Setters Way
CO Sprgs CO 80919
(719) 359-8467
#CO-0047-08-2C


NLPA Special Inspector - Level 1C
NLPA 631 & SNT-TC-1A
has been successfully completed by
Jerry Pickens
DATE: 04/04/19
Authorized NLPA Instructor
T.R.Consulting, Inc
5351 Setters Way
CO Sprgs CO 8091
(719) 359-8467
#IL-0086-15-1C


NLPA Special Inspector - Level 1
NLPA 631 & SNT-TC-1A
has been successfully completed by
Dennis Dixon
DATE: 04/04/19
Authorized NLPA Instructor
T.R.Consulting, Inc.
5351 Setters Way
CO Sprgs CO 80919
(719) 359-8467
#OK-0085-15-1C

CONFINED SPACE SAFETY

29 CFR Part 1926.1207
has been successfully completed by

Jerry Pickens

DATE: 03/31/20

T.R. Consulting, Inc.
5351 Setters Way

CO Springs CO 80919
(719) 359-8467

AUTHORIZED INSTRUCTOR #OK20033118

CONFINED SPACE SAFETY

29 CFR Part 1926.1207
has been successfully completed by

Michael Buntt

DATE: 03/31/20

T.R. Consulting, Inc.
5351 Setters Way

CO Springs CO 80919
(719) 359-8467

AUTHORIZED INSTRUCTOR #OK20033117

CONFINED SPACE SAFETY

29 CFR Part 1926.1207
has been successfully completed by

Dennis Dixon

DATE: 03/31/20

T.R. Consulting, Inc.
5351 Setters Way

CO Springs CO 80919
(719) 359-8467

AUTHORIZED INSTRUCTOR #OK20033107

CONFINED SPACE SAFETY

29 CFR Part 1926.1207
has been successfully completed by

Richard Buntt

DATE: 03/31/20

T.R. Consulting, Inc.
5351 Setters Way

CO Springs CO 80919
(719) 359-8467

AUTHORIZED INSTRUCTOR #OK20033103

TR Consulting
5351 Setters Way
Colorado Springs, CO 80919

Colorado Springs CO Phone: (719) 359-8467
Los Angeles CA Phone: (213) 787-6800
Central Facsimile Number: (310) 844-7240
http://www.trconsultinggroup.com

03/31/2020

Mr. Chris Brooks
Heartland Tank Services
P.O. Box 3668
Englewood, CO 80155-3668

Re: Training conducted 31 March, 2020 at your facility in Oklahoma City, OK.

Dear Mr. Brooks,

First let me thank you for giving T.R. Consulting, Inc. the opportunity to assess your company's safety training needs, listen to your safety goals, and develop and implement a training program to meet those goals. As such, the following training programs were completed on Tuesday March 31st of this year:

- Lock Out/Tag Out in accordance with 29 CFR Part 1910.147
- HAZCOM/GHS in accordance with 29 CFR 1910.1200
- Bloodborne Pathogens in accordance with 29 CFR 1910.1030
- Confined Space Safety in accordance with the requirements of 29 CFR Part 1926.1207
- Ladder Safety in accordance with 29 CFR Parts 1926.1053 and 1910.27
- Aerial Lifts in accordance with 29 CFR 1910.67
- Fire Protection/Extinguishers in accordance with 29 CFR 1910.157
- Hand and Power Tool Safety in accordance with 29 CFR 1926.300
- Process Safety Management – Contractor Responsibilities 29 CFR 1910.119
- Excavation/Trenching Safety – Trenching/Shoring in accordance with 29 CFR 1926.650
- Spill Prevention/Response – 29 CFR 1910.120 Appendix C
- Heat Stress Prevention

The following Heartland Tank Services employees completed the above-listed training programs:

Chris Brooks	Juan Carlos Paredes	Jesus Herrera	Elizabeth Jenkins
Mario Romero	Dennis Dixon	Terry Cuthbertson	Michael Buntt
Richard Buntt	Salvador Villagran	Luis Corral	Jerry Pickens
Jose Trejo Macias	Cesar Romero	Diego Romero Ceja	Ramon Sanchez Luque

Thank you again for the opportunity to address your company's safety program needs. I look forward to working with you in the future.

Sincerely,

T.R. Consulting, Inc.

Tony Rieck (Tony)
President/CEO
TR/bfc

TR Consulting
5351 Setters Way
Colorado Springs, CO 80919

Colorado Springs CO Phone: (719) 359-8467
Los Angeles CA Phone: (213) 787-6800
Central Facsimile Number: (310) 844-7240
http://www.trconsultinggroup.com

04/01/2020

Mr. Chris Brooks
Heartland Tank Services
P.O. Box 3668
Englewood, CO 80155-3668

Re: Training conducted 01 April, 2020 at your facility in Oklahoma City, OK.

Dear Mr. Brooks,

First let me thank you for giving T.R. Consulting, Inc. the opportunity to assess your company's safety training needs, listen to your safety goals, and develop and implement a training program to meet those goals. As such, the following training programs were completed on Wednesday April 01st of this year:

- Scaffold User in accordance with the requirements of 29 CFR Parts 1926.451 & 1910.28
- Rigging Material Handling in accordance with 29 CFR 1926.251
- Electrical Safety Awareness in accordance with 29 CFR 1926.400 & Assured Grounding/GFCI
- Personal Protective Equipment in accordance with 29 CFR Parts 1910.132, 1910.133, 1910.135, 1910.136 & 1910.138
- Respiratory Protection in accordance with 29 CFR 1910.134
- Noise Exposure in accordance with 29 CFR 1910.95
- Fall Protection in accordance with 29 CFR Part 1926.500-503
- Hydro Blasting Safety in accordance with ASTM E1575

The following Heartland Tank Services employees completed the above-listed training program:

Chris Brooks	Juan Carlos Paredes	Jesus Herrera	Elizabeth Jenkins
Mario Romero	Dennis Dixon	Terry Cuthbertson	Michael Buntt
Richard Buntt	Salvador Villagran	Luis Corral	Jerry Pickens
Jose Trejo Macias	Cesar Romero	Diego Romero Ceja	Ramon Sanchez Luque

Thank you again for the opportunity to address your company's safety program needs. I look forward to working with you in the future.

Sincerely,

T.R. Consulting, Inc.

Tony Rieck (Tony)
President/CEO
TR/bfc

J.A. KING

PRECISION MEASUREMENT PROFESSIONALS

Certificate Of Calibration and Traceability

Certificate #: OKC-53389-1042676-1

Calibration Performed By:

J.A. King

1100 SE 66th Street

Oklahoma City, OK 73149

Toll Free: 800-327-7727

For:

Heartland Tank Services, Inc

5200 South Hattie Ave.

Oklahoma City, OK 73129

P. O. Number: Maritza Rodriguez

Procedure No.:	ICP-164 Coating. Film. and Ultrasonic Thickness Gages	**Performed At:**	J.A. King & Co.
Tolerance:	Manufacturer's Specifications	**Equipment ID:**	77630
Temp./RH:	74.4 F / 45.3%	**Manufacturer:**	Dakota Ultrasonics
Cal Interval:	12 Month(s)	**Model Number:**	MVX
Cal Date:	06/16/2020	**Serial Number:**	77630
Cal Due Date:	06/16/2021	**Description:**	Ultrasonic Thickness Gauge
Calibration Result:	Pass	**Capacity x Resolution:**	0.1 to 4 x 0.001 in
Technician:	Chandler, Dante T	**Department:**	N/A

Remarks: In Tolerance - Meets The Manufacturer's Published Specifications.

Thickness

Description	Nominal	Tolerance -	Tolerance +	Results	As Found	As Left	Units
Thickness Measurement	0.100	0.099	0.101	P	0.100	0.100	in
Thickness Measurement	0.200	0.199	0.201	P	0.200	0.200	in
Thickness Measurement	0.500	0.499	0.501	P	0.499	0.499	in
Thickness Measurement	1.000	0.999	1.001	P	1.001	1.001	in
Thickness Measurement	2.000	1.999	2.001	P	2.000	2.000	in

P=Passed "As Found/As Left" **A=Out of Tolerance "As Found"** **F=Out of Tolerance "As Found/As Left"** **R=Report of Actual Value**

Standards Used To Calibrate Equipment

Traceability#	I.D.	Description	Last Cal.	Cal. Due Date
44525-8691-1	ALI-O-048	Gage Block Set 36 pcs.	06/13/2019	06/23/2020

Certification Done and Authorized By: **Chandler, Dante T Calibration Technician** (6/16/2020 17:14:51 UTC)

J.A. KING

PRECISION MEASUREMENT PROFESSIONALS

Certificate Of Calibration and Traceability

Certificate #: OKC-53689-996085-1

Calibration Performed By:
J.A. King
1100 SE 66th Street
Oklahoma City, OK 73149
Toll Free: 800-327-7727

For:
Heartland Tank Services, Inc
5200 South Hattie Ave.
Oklahoma City, OK 73129
P. O. Number: Credit Card

Procedure No.:	ICP-164 Coating. Film. and Ultrasonic Thickness Gages	**Performed At:**	J.A. King & Co.
Tolerance:	± 0.001 in	**Equipment ID:**	77518
Temp./RH:	72 F / 47%	**Manufacturer:**	Dakota Ultrasonics
Cal Interval:	12 Month(s)	**Model Number:**	MVX
Cal Date:	06/23/2020	**Serial Number:**	77518
Cal Due Date:	06/23/2021	**Description:**	Ultrasonic Thickness Gauge
Calibration Result:	Pass	**Capacity x Resolution:**	0.025 to 9.999 x 0.001 in
Technician:	Perry, Lawrence D	**Department:**	N/A

Remarks: In Tolerance - Meets The Manufacturer's Published Specifications.

Thickness

Description	Nominal	Tolerance -	Tolerance +	Results	As Found	As Left	Units
Thickness Measurement	0.100	0.099	0.101	P	0.101	0.101	in
Thickness Measurement	0.250	0.249	0.251	P	0.249	0.249	in
Thickness Measurement	0.500	0.499	0.501	P	0.500	0.500	in
Thickness Measurement	1.000	0.999	1.001	P	1.000	1.000	in
Thickness Measurement	2.000	1.999	2.001	P	2.001	2.001	in

P=Passed "As Found/As Left" **A=Out of Tolerance "As Found"** **F=Out of Tolerance "As Found/As Left"** **R=Report of Actual Value**

Standards Used To Calibrate Equipment

Traceability#	I.D.	Description	Last Cal.	Cal. Due Date
OKC-47897-8743-1	ALI-O-060B	Gage Block Set 81 pcs.	10/17/2019	07/17/2020

This instrument has been processed and calibrated in accordance with the J. A. King Quality Assurance manual and is traceable to the International System of Units (SI) via national metrology institutes (e.g., NIST) that are signatories to the CIPM Mutual Recognition Arrangement. Reported uncertainties are expressed as expanded uncertainty values at approximately the 95% confidence level using a coverage factor of K=2. Statements of compliance, where applicable, are based upon the test results falling within the specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced, except in full without the written permission of J. A. King. Calibration due dates appearing on the Certificate of Calibration and label are determined by the customer and do not imply continued conformance to specifications. The J. A. King Quality Management system complies with the requirements of ISO/IEC 17025. View our Scope of Accreditation at www.jaking.com.

Certification Done and Authorized By: **Perry, Lawrence D Calibration Technician** (6/23/2020 14:24:9 UTC)

Corporate Office
PO Box 3668
Englewood, CO 80155-3668

800.774.3230
303.773.3230
Fax: 800.774.3201

INSPECTION WARRANTY

Heartland Tank Services, Inc. has evaluated the condition of this tank based on the observations and measurements made by the Heartland Tank Services, Inc. inspector. While our evaluation accurately describes the condition of the tank at the time of inspection, the tank owner/operator must independently assess the inspection information/report provided by Heartland Tank Services, Inc. and any conclusions reached by the tank owner/operator and any action taken or omitted are the sole responsibility of the owner/operator. With respect to the inspection and testing, Heartland Tank Services, Inc. warrants only that the services have been performed in accordance with accepted industry practice. If any such services fail to meet the foregoing warranty, Heartland Tank Services, Inc. shall re-perform the service to the same extent and on the same conditions as the original service.

The preceding paragraph sets forth the exclusive remedy for claims based on failure or defect in materials or services, whether such claim is made in contract or tort (including negligence) and however instituted, and, upon expiration of the warranty period, all such liability shall terminate. The foregoing warranty is exclusive and in lieu of all other warranties, whether written, oral, implied or statutory. NO IMPLIED WARRANTY OF MERCHANTABILITY FOR FITNESS OR PURPOSE SHALL APPLY, nor shall Heartland Tank Services, Inc. be liable for any loss or damage whatsoever by reason of its failure to discover, report, repair or modify latent defects or defects inherent in the design of any tank inspected. In no event, whether a result of breach of contract, warranty or tort (including negligence) shall Heartland Tank Services, Inc. be liable for any consequential or incidental damages including, but not limited to, loss of profit or revenues, loss of use of equipment tested or services by Heartland Tank Services, Inc. or any associated damage to facilities, down-time costs or claims of other damages.

For further information regarding this report, please contact our office at 1-800-774-3230.

Thank you for your business!