



Receipt Date: July 27, 2017
Cal. Date: July 27, 2017
Report Date: July 27, 2017

Report No.: 338020
Serial No.: 3610-02
Barcode: 200685

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 100 Gallon Prover
Manufacturer: Brownie
Material: Mild Steel
Type: No Bottom Zero
Condition: Good
Temperature: 24.6 °C
Pressure: 739.1 mmHg
Relative Humidity: 53.1 %
Standard H₂O Temp.: 17.4 °C
Artifact H₂O Temp.: 17.6 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
100	As Found	99.9933	-1.5	2.00	2.3	0.0000186
	As Left	99.9933	-1.5			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe

Metrologist

Reviewed by:

Erik Alfvin

Metrologist



Receipt Date: May 5, 2017
Cal. Date: May 5, 2017
Report Date: May 5, 2017

Report No.: 337713
Serial No.: 051271555-0103
Barcode: 202102

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 07

Item(s) Submitted: 100 Gallon Prover
Manufacturer: Determan Brownie, Inc.
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Excellent
Temperature: 21.7 °C
Pressure: 730.4 mmHg
Relative Humidity: 49.0 %
Standard H₂O Temp.: 11.1 °C
Artifact H₂O Temp.: 11.2 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
100	As Found	99.996	-1.0	2.00	2.3	0.0000288
	As Left	99.996	-1.0			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Mark Nicollet

Quality Manager

Reviewed by:

Erik Alfvin

Metrologist



Receipt Date: August 25, 2017
Cal. Date: August 28, 2017
Report Date: August 28, 2017

Report No.: 338151
Serial No.: 1214688351-2
Barcode: 202839

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 100 Gallon Prover
Manufacturer: Westmor Fluid Solutions
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 23.1 °C
Pressure: 739.5 mmHg
Relative Humidity: 52.3 %
Standard H₂O Temp.: 17.7 °C
Artifact H₂O Temp.: 17.8 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
100	As Found	100.0119	2.8	2.00	2.3	0.0000288
	As Left	100.0119	2.8			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe

Metrologist

Reviewed by:

Benjamin FitzPatrick

Deputy Director



Receipt Date: June 5, 2017
Cal. Date: June 6, 2017
Report Date: June 6, 2017

Report No.: 337796
Serial No.: 1214688350-2
Barcode: 202754

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 100 Gallon Prover
Manufacturer: Westmor Fluid Solutions
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 22.2 °C
Pressure: 739.8 mmHg
Relative Humidity: 43.2 %
Standard H₂O Temp.: 13.6 °C
Artifact H₂O Temp.: 13.8 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
100	As Found	99.9890	-2.5	2.00	2.3	0.0000288
	As Left	99.9890	-2.5			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe

Pete Whebbe
Metrologist

Reviewed by:

Mark Nicollet

Mark Nicollet
Quality Manager



Receipt Date: May 12, 2017
Cal. Date: May 16, 2017
Report Date: May 16, 2017

Report No.: 337733
Serial No.: 314542120
Barcode: 202504

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038

Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 100 Gallon Prover
Manufacturer: Westmor Fluid Solutions
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 22.3 °C
Pressure: 725.8 mmHg
Relative Humidity: 52.6 %
Standard H₂O Temp.: 12.8 °C
Artifact H₂O Temp.: 12.7 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
100	As Found	99.9898	-2.4	2.00	2.3	0.0000288
	As Left	99.9898	-2.4			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe

Metrologist

Reviewed by:

Erik Alfvin

Metrologist



Receipt Date: February 13, 2017
Cal. Date: February 16, 2017
Report Date: February 16, 2017

Report No.: 337230
Serial No.: 0615785533-2
Barcode: 202963

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038

Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: None
SOP: 19
Technician ID: 19

Item(s) Submitted: 100 Gallon Prover
Manufacturer: Westmor Fluid Solutions
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 18.8 °C
Pressure: 729.7 mmHg
Relative Humidity: 39.9 %
Standard H₂O Temp.: 6.3 °C
Artifact H₂O Temp.: 6.4 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
100	As Found	99.985	-3.6	2.00	2.3	0.0000288
	As Left	99.985	-3.6			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Erik Alfvín

Metrologist

Reviewed by:

Pete Whebbe

Metrologist



Receipt Date: July 28, 2017
Cal. Date: August 1, 2017
Report Date: August 1, 2017

Report No.: 338022
Serial No.: 051320997-0102
Barcode: 202342

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 100 Gallon Prover
Manufacturer: Determan Brownie Inc
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 24.7 °C
Pressure: 738.2 mmHg
Relative Humidity: 50.4 %
Standard H₂O Temp.: 16.8 °C
Artifact H₂O Temp.: 16.9 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
100	As Found	99.9874	-2.9	2.00	2.3	0.0000288
	As Left	99.9874	-2.9			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe

Metrologist

Reviewed by:

Erik Alfvén

Metrologist





Receipt Date: May 8, 2017
Cal. Date: May 11, 2017
Report Date: May 11, 2017

Report No.: 337722
Serial No.: 060810915-0201
Barcode: 200748

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: None
Procedure: NIST SOP 19
Technician ID: 19

Item(s) Submitted: 100 Gallon Prover
Manufacturer: Determan Brownie Inc
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 21.8 °C
Pressure: 739.3 mmHg
Relative Humidity: 43.2 %
Standard H₂O Temp.: 11.2 °C
Artifact H₂O Temp.: 11.3 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
100	As Found	100.0008	0.2	2.00	2.3	0.0000288
	As Left	100.0008	0.2			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Erik Alfvin

Metrologist

Reviewed by:

Mark Nicollet

Quality Manager



Receipt Date: May 5, 2017
Cal. Date: May 5, 2017
Report Date: May 5, 2017

Report No.: 337712
Serial No.: 031271251-0101
Barcode: 202101

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 07

Item(s) Submitted: 500 Gallon Prover
Manufacturer: Determan Brownie, Inc.
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Excellent
Temperature: 21.6 °C
Pressure: 731.8 mmHg
Relative Humidity: 47.9 %
Standard H₂O Temp.: 10.5 °C
Artifact H₂O Temp.: 10.7 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
500	As Found	499.966	-8	2.02	25	0.0000288
	As Left	499.966	-8			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Mark Nicollet

Quality Manager

Reviewed by:

Erik Alfvén

Metrologist



Receipt Date: April 24, 2017
Cal. Date: April 25, 2017
Report Date: April 25, 2017

Report No.: 337630
Serial No.: 5956670-01
Barcode: 019278

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 500 Gallon Prover
Manufacturer: Brownie
Material: Mild Steel
Type: No Bottom Zero
Condition: Good
Temperature: 20.7 °C
Pressure: 725.3 mmHg
Relative Humidity: 47.5 %
Standard H₂O Temp.: 10.3 °C
Artifact H₂O Temp.: 10.5 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
500	As Found	499.933	-15	2.02	25	0.0000186
	As Left	499.933	-15			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe

Metrologist

Reviewed by:
Mark Nicollet

Quality Manager



Receipt Date: May 8, 2017
Cal. Date: May 10, 2017
Report Date: May 10, 2017

Report No.: 337721
Serial No.: 060810915-0101
Barcode: 200749

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: None
Procedure: NIST SOP 19
Technician ID: 19

Item(s) Submitted: 1000 Gallon Prover
Manufacturer: Determan Brownie Inc
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 21.8 °C
Pressure: 735.8 mmHg
Relative Humidity: 43.8 %
Standard H₂O Temp.: 11.4 °C
Artifact H₂O Temp.: 11.4 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
1000	As Found	1000.059	14	2.02	49	0.0000288
	As Left	1000.059	14			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Erik Alfvín

Metrologist

Reviewed by:

Pete Whebbe

Metrologist



Receipt Date: February 13, 2017
Cal. Date: February 15, 2017
Report Date: February 15, 2017

Report No.: 337229
Serial No.: 0615785533-1
Barcode: 202964

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: None
SOP: 19
Technician ID: 19

Item(s) Submitted: 1000 Gallon Prover
Manufacturer: Westmor Fluid Solutions
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 18.5 °C
Pressure: 737.8 mmHg
Relative Humidity: 44.9 %
Standard H₂O Temp.: 6.7 °C
Artifact H₂O Temp.: 7.0 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
1000	As Found	999.95	-11	2.02	49	0.0000288
	As Left	999.95	-11			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Erik Alfvin

Metrologist

Reviewed by:

Pete Whebbe

Metrologist



Receipt Date: July 28, 2017
Cal. Date: August 1, 2017
Report Date: August 1, 2017

Report No.: 338025
Serial No.: 11978368-1
Barcode: 202341

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 1000 Gallon Prover
Manufacturer: Determan Brownie Inc
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 24.5 °C
Pressure: 739.2 mmHg
Relative Humidity: 50.7 %
Standard H₂O Temp.: 16.5 °C
Artifact H₂O Temp.: 16.7 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
1000	As Found	1000.045	10	2.01	49	0.0000288
	As Left	1000.045	10			

Neck Calibration: No neck calibration was performed at this time.

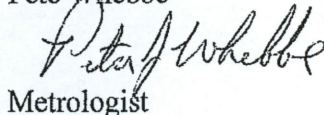
This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe



Metrologist

Reviewed by:

Erik Alfvén



Metrologist



Receipt Date: May 12, 2017
Cal. Date: May 16, 2017
Report Date: May 16, 2017

Report No.: 337734
Serial No.: 0114527708
Barcode: 202505

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 1000 Gallon Prover
Manufacturer: Westmor Fluid Solutions
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 22.3 °C
Pressure: 727.8 mmHg
Relative Humidity: 55.3 %
Standard H₂O Temp.: 12.5 °C
Artifact H₂O Temp.: 12.4 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
1000	As Found	999.992	-2	2.02	49	0.0000288
	As Left	999.992	-2			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe

Metrologist

Reviewed by:

Erik Alfvin

Metrologist



Receipt Date: August 25, 2017
Cal. Date: August 28, 2017
Report Date: August 28, 2017

Report No.: 338150
Serial No.: 1214688351-1
Barcode: 202838

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 1000 Gallon Prover
Manufacturer: Westmor Fluid Solutions
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 22.9 °C
Pressure: 739.4 mmHg
Relative Humidity: 47.1 %
Standard H₂O Temp.: 17.2 °C
Artifact H₂O Temp.: 17.4 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
1000	As Found	999.959	-10	2.01	49	0.0000288
	As Left	999.959	-10			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe

Metrologist

Reviewed by:

Benjamin FitzPatrick

Deputy Director



Receipt Date: June 5, 2017
Cal. Date: June 5, 2017
Report Date: June 5, 2017

Report No.: 337795
Serial No.: 1214688350-1
Barcode: 202753

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 19
Technician ID: 11

Item(s) Submitted: 1000 Gallon Prover
Manufacturer: Westmor Fluid Solutions
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 23.2 °C
Pressure: 736.9 mmHg
Relative Humidity: 47.7 %
Standard H₂O Temp.: 13.2 °C
Artifact H₂O Temp.: 13.5 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
1000	As Found	999.9149	-20	2.02	49	0.0000288
	As Left	999.9149	-20			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Pete Whebbe

Pete Whebbe
Metrologist

Reviewed by:

Mark Nicollet

Mark Nicollet
Quality Manager



Receipt Date: May 30, 2017
Cal. Date: June 1 & 2, 2017
Report Date: June 2, 2017

Report No.: 337779
Serial No.: 090610694-0201
Barcode: 200498

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: None
Procedure: NIST SOP 19
Technician ID: 19

Item(s) Submitted: 1500 Gallon Prover
Manufacturer: Determan Brownie
Material: Stainless Steel (304)
Type: No Bottom Zero
Condition: Good
Temperature: 22.5 °C
Pressure: 737.6 mmHg
Relative Humidity: 40.7 %
Standard H₂O Temp.: 13.1 °C
Artifact H₂O Temp.: 13.4 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
1500	As Found	1500.024	6	2.02	74	0.0000288
	As Left	1500.025	6			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow.

The vessel listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-3 (2010). Uncertainty calculations contain the components in NIST SOP 19 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F
Conversion to SI unit: 1 gallon = 231 in³ = 0.00378541 m³.

Erik Alfvín

Metrologist

Reviewed by:

Pete Whebbe

Metrologist



Receipt Date: June 12, 2017
Cal. Date: June 13, 2017
Report Date: June 13, 2017

Report No.: 337826
Serial No.: 24360
Barcode: 201188

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 21
Technician ID: 11

Item(s) Submitted: 25 Gallon LPG Prover
Manufacturer: Arrow
Material: Mild Steel
Description: Zero Bottom
Condition: Good
Temperature: 23.9 °C
Pressure: 731.3 mmHg
Relative Humidity: 54.6 %
Standard H₂O Temp. 16.3 °C
Artifact H₂O Temp.: 17.2 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (1/°F)
25	As Found (at 100 psig)	25.0356	8.2	2.16	1.5	0.0000186
	As Left (at 100 psig)	25.0356	8.2			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow. The prover listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-4 (2016). Uncertainty calculations contain the components in NIST SOP 21 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F.

Pete Whebbe

Metrologist

Reviewed by:

Erik Alfvin

Metrologist





DEPARTMENT OF COMMERCE
WEIGHTS & MEASURES DIVISION

14305 Southcross Drive #150
 Burnsville, MN 55306-7008
 mn.gov/commerce/
 651.539.1555 FAX 952.435.4040
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Receipt Date: June 12, 2017
 Cal. Date: June 13, 2017
 Report Date: June 13, 2017

Report No.:
 Serial No.:
 Barcode:

Pressure Correction Chart

WESTMOR FLUID SOLUTIONS LLC
 14044 W. FREEWAY DRIVE
 COLUMBUS, MN 55038
 Contact: Ryan Hartin
 Phone: 651-842-2551
 PO Number: NONE
 SOP: NIST SOP 21
 Technician ID: 11

Item(s) Submitted: 25 Gallon LPG Prover
 Manufacturer: Arrow
 Material: Mild Steel
 Description: Zero Bottom
 Condition: Good
 Temperature: 23.9 °C
 Pressure: 731.3 mmHg
 Relative Humidity: 54.6 %

Pressure Gauge Reading (psig)	Corrected Volume (gal)
0	24.978
10	24.986
20	24.994
30	25.002
40	25.010
50	25.018
60	25.021
70	25.025
80	25.029
90	25.032
100	25.036
110	25.040
120	25.043
130	25.047
140	25.050
150	25.054
160	25.058
170	25.062
180	25.066
190	25.071
200	25.075

Pete Whebbe

Metrologist
NVLAP[®]

CALIBRATION
 NVLAP LAB CODE 105003-0



Receipt Date: June 12, 2017
Cal. Date: June 14, 2017
Report Date: June 14, 2017

Report No.: 337825
Serial No.: 28816
Barcode: 019785

Calibration Certificate

WESTMOR FLUID SOLUTIONS LLC
14044 W. FREEWAY DRIVE
COLUMBUS, MN 55038
Contact: Ryan Hartin
Phone: 651-842-2551
PO Number: NONE
Procedure: NIST SOP 21
Technician ID: 11

Item(s) Submitted: 100 Gallon LPG Prover
Manufacturer: Arrow
Material: Mild Steel
Description: Zero Bottom
Condition: Good
Temperature: 23.4 °C
Pressure: 731.3 mmHg
Relative Humidity: 52.1 %
Standard H₂O Temp. 15.5 °C
Artifact H₂O Temp.: 16.0 °C

Nominal		Calibrated				
Volume (gal)		Volume (gal)	Error (in ³)	<i>k</i>	U (in ³)	CCE (°F)
100	As Found (at 100 psig)	99.9147	-19.7	2.02	5.3	0.0000186
	As Left (at 100 psig)	99.9147	-19.7			

Neck Calibration: No neck calibration was performed at this time.

This prover has been calibrated as a "to contain after wet down" vessel with a drain time of 30 seconds after cessation of full flow. The prover listed above has been compared by volumetric transfer methods to the standards of the State of Minnesota using water as the calibration medium. The standards are traceable to the SI through NIST. Statistical process control charts indicate standards are currently in control. All gauges were sealed in place.

All tolerances and specifications were evaluated according to NIST Handbook 105-4 (2016). Uncertainty calculations contain the components in NIST SOP 21 and conform to the ISO/IEC Guide to the Expression of Uncertainty in Measurement (2008), including coverage factors (*k*) calculated at the approximate 95.45 % confidence level. Results apply to item identified in this report only.

CCE is the cubical coefficient of thermal expansion, and the reference temperature is 60 °F.

Pete Whebbe

Metrologist

Reviewed by:

Erik Alfvín

Metrologist



DEPARTMENT OF COMMERCE
WEIGHTS & MEASURES DIVISION

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 An equal opportunity employer



Receipt Date: June 12, 2017
 Cal. Date: June 14, 2017
 Report Date: June 14, 2017

Report No.:
 Serial No.:
 Barcode:

Pressure Correction Chart

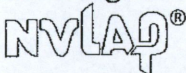
WESTMOR FLUID SOLUTIONS LLC
 14044 W. FREEWAY DRIVE
 COLUMBUS, MN 55038
 Contact: Ryan Hartin
 Phone: 651-842-2551
 PO Number: NONE
 SOP: NIST SOP 21
 Technician ID: 11

Item(s) Submitted: 100 Gallon LPG Prove
 Manufacturer: Arrow
 Material: Mild Steel
 Description: Zero Bottom
 Condition: Good
 Temperature: 23.4 °C
 Pressure: 731.3 mmHg
 Relative Humidity: 52.1 %

Pressure Gauge Reading (psig)	Corrected Volume (gal)
0	99.754
10	99.780
20	99.807
30	99.833
40	99.859
50	99.886
60	99.892
70	99.897
80	99.903
90	99.909
100	99.915
110	99.924
120	99.932
130	99.941
140	99.950
150	99.959
160	99.963
170	99.967
180	99.970
190	99.974
200	99.978

Pete Whebbe

Metrologist



CALIBRATION

MVLAP LAB CODE 105003-0

United States Department of Commerce

National Institute of Standards and Technology

Certificate of Metrological Traceability For:

Minnesota

This laboratory has demonstrated evidence of an unbroken chain of metrological traceability of its standards to the international system of units (SI), documented measurement uncertainties, uses documented measurement procedures, successfully completed training and proficiency tests, documented calibration intervals, submitted a quality management system, and demonstrated suitable measurement assurance for the Scope listed on this certificate.

The Office of Weights and Measures Program assesses laboratories to NIST Handbook 143 - Program Handbook for State Weights and Measures Laboratories and ISO/IEC 17025:2005.

Scope

Mass Echelon I 10 kg to 1 mg	Mass Echelon III 50 kg to 1 mg 5000 lb to 0.001 lb	Volume Gravimetric, I 20 L to 10 ml 100 gal to 0.25 qt
Mass Echelon II 50 kg to 1 mg 1000 lb to 0.001 lb 4 oz to 0.03125 oz	Weight Carts 10 000 lb to 2000 lb	Volume Transfer, II 1500 gal to 5 gal 100 gal to 25 gal LPG
	Wheel Load Weighers 20 000 lb to 2000 lb	
	Railroad Test Cars 110 000 lb to 80 000 lb	



2017

Georgia L. Harris
Georgia L. Harris, Acting Chief
NIST Office of Weights and Measures

Effective Dates: 2017-01-01 to 2017-12-31

Amended: 2016-12-31

Scope modified for 2017.