



The ! Voice

Message from the President

Glenn Walker, President, VST { walker@vsthose.com }



Dear Friends of VST:

As you may have already seen from VST’s most recent announcement, we have become a carbon neutral company. However, this is not what I am going to focus upon, but rather upon VST’s commitment to our distributors, Oil Companies, and employees as well as the overall environment.

Long before the “green economy,” VST believed it was just good business with the commitment to recycle, reclaim, and cost reduce for our customers as well as for the economy. If you are currently a VST customer, you have already been exposed to the equipment savings in the recycled components without compromising safety and performance.

The beauty is, our business approach costs you nothing - and beginning very soon - VST will be announcing a new interactive spreadsheet that can easily be used to calculate the actual savings, not only to the environment but to your bottom line. In all, with our processor technologies used in conjunction with our forecourt equipment, the actual savings far exceed the hydrocarbon savings associated with being green.

In fact, VST has become the major player in the most regulated market in the world, California. We have accelerated our development with new products in new markets by utilizing the many years of development that we devoted to that market.

In the past number of years, VST has taken our technology advancements into other world markets with substantial fuel savings, over and above, the environmental impact to countries like Mexico with others on the horizon. In addition to the regulatory demands of the new markets, VST’s product offerings provide additional savings well above and beyond the local demands, and as said, costs nothing to the industry. It is just good business for VST’s customers, employees, investors, and of course the environment.

We don’t just talk the talk but walk the walk. That is what we do. As someone once said, *“If you can do it; it is not bragging!”*

Thanks for listening and very soon look forward to our new interactive program that can be used to accurately calculate the actual fuel savings as well as quantifying your benefits in becoming green.

Glenn Walker

President, VST



VST Mission

To design and manufacture innovative products for retail refueling systems that are specifically engineered to protect the environment and consumers with safety and reliability.



VST Values

R: Respect
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VST strives to become the most trusted company in the global gasoline dispensing industry by manufacturing environmentally sustainable products and solutions that reduce harmful vapor emissions to create a future that protects the communities in which people live and work every day.

650 Pleasant Valley Dr. * Springboro, OH * 45066 * 937-704-9333 * www.vsthose.com





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VST Becomes a Certified CarbonNeutral® Company

Gonzalo Perez, Application Engineer { perez@vsthose.com }



VST is pleased to announce that we have been officially designated a Certified CarbonNeutral® company. By supporting Natural Capital Partners' renewable energy portfolio, VST has enhanced our dedication to the environment by fully offsetting our operational emissions.



Since VST's inception, our focus has been dedicated towards the development and manufacturing of engineered solutions aimed at improving the environment. Our solutions reduce the release of multiple tons of harmful fugitive Volatile Organic Compounds (VOCs) to atmosphere and ground water at gasoline dispensing facilities.

Examples include Phase II vapor recovery hoses, safety breakaways, nozzles; ENVIRO-LOC™ low permeation gasoline dispensing hoses; ENVIRO-LOC™ ECO nozzles; and our underground storage tank (UST) pressure management processor – the GREEN MACHINE™.

Additionally, our manufacturing processes incorporate multiple recycling protocols that reduce the volume of material that would otherwise end up in a landfill. Examples include the rebuilding or recycling of used nozzles, safety breakaways, and vacuum pumps. VST's products and processes are a testament to Safety, Quality, and Sustainability.

This combination of producing environmentally friendly products, recycling, and dedication to CO2 emission reduction campaigns all add up to creating a healthier, more sustainable environment for future generations.

Learn more at www.vsthose.com



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The ! Voice

Short Cuts - Web Links - Equations

Doug Harty, Sr. Application Engineer { harty@vsthose.com }



Back in my service technician days, I learned from experience that you're bound to encounter similar field and equipment issues most every day. To avoid the tedious process of hunting down information, I created a quick reference guide for myself that I put in a sturdy binder along with my certifications. I've faithfully carried that trusty binder in my service truck, and for sure, I've used most every day since the day I created it!

Over the years, I've added many helpful notes as I encountered new situations or learned new things, so I thought I'd make a printable cheat sheet with some of the most common conversions, formulas, tables, and web links to share with you.

I plan on continuing to improve and update these notes as I learn more. I'd love any ideas and feedback you may have that would make these notes even better!

The following pages contain helpful information for these 8 topics:

1. AQ Testing Limit
2. Calculations, Common
3. Conversions, Common
4. Pressure Decay Criteria: Phase II Assist Systems
5. Pressure Decay Criteria: Phase II Balance Systems
6. TLS-350 Command Codes: ISD
7. TLS-350 Command Codes: Testing & Alarm History
8. Web Resources



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Short Cuts - Web Links - Equations, continued

Doug Harty, Sr. Application Engineer { harty@vsthose.com }



1. AQ Testing Limit

- Dynamic Backpressure - Balance - Nozzle to UST
- 60 CFH of N2 ≤ 0.35 inches H2O
- 80 CFH of N2 ≤ 0.62 inches H2O
- Dynamic Backpressure - Assist – Vapor riser to UST
60 CFH of N2 ≤ 0.05 inches H2O

2. Calculations: Common:

Flow Rate:	(Gallons/Seconds) x 60
Liquid Removal Rate:	$\frac{(\text{Initial volume}-\text{Wall Adhesion}) - \text{Liquid remaining}}{\text{Gallons}}$
Vapor / Liquid:	$\frac{\text{Correction Factor} (\text{End Cubic Feet} - \text{Start Cubic Feet})}{(\text{Gallon Final}-\text{Gallon Start}) \times 7.481}$

3. Conversions: Common:

Gallons to Cubic feet:	1 cubic foot = 7.481 gallons
CFH to ml/min :	1 CFH = 471.95 ml/min



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Short Cuts - Web Links - Equations, continued

Doug Harty, Sr. Application Engineer { harty@vstthose.com }



4. Pressure Decay Criteria: Phase II Assist Systems



TABLE 1B
PHASE II ASSIST SYSTEMS
PRESSURE DECAY CRITERIA
 INITIAL PRESSURE OF 2 INCHES WATER COLUMN (WC)
MINIMUM PRESSURE AFTER 5 MINUTES, INCHES WC

ULLAGE, GALLONS	NUMBER OF AFFECTED NOZZLES				
	01-06	07-12	13-18	19-24	≥24
500	0.73	0.69	0.65	0.61	0.57
550	0.80	0.76	0.72	0.68	0.64
600	0.87	0.82	0.78	0.74	0.71
650	0.93	0.88	0.84	0.80	0.77
700	0.98	0.94	0.90	0.86	0.82
750	1.03	0.98	0.94	0.91	0.87
800	1.07	1.03	0.99	0.95	0.92
850	1.11	1.07	1.03	1.00	0.96
900	1.15	1.11	1.07	1.03	1.00
950	1.18	1.14	1.11	1.07	1.04
1,000	1.21	1.18	1.14	1.10	1.07
1,200	1.32	1.28	1.25	1.22	1.19
1,400	1.40	1.37	1.34	1.31	1.28
1,600	1.46	1.43	1.41	1.38	1.35
1,800	1.51	1.49	1.46	1.44	1.41
2,000	1.56	1.53	1.51	1.49	1.46
2,200	1.59	1.57	1.55	1.53	1.51
2,400	1.62	1.60	1.58	1.56	1.54
2,600	1.65	1.63	1.61	1.59	1.57
2,800	1.67	1.65	1.64	1.62	1.60
3,000	1.69	1.68	1.66	1.64	1.62
3,500	1.73	1.72	1.70	1.69	1.67
4,000	1.76	1.75	1.74	1.72	1.71
4,500	1.79	1.78	1.77	1.75	1.74
5,000	1.81	1.80	1.79	1.78	1.77
6,000	1.84	1.83	1.82	1.81	1.80
7,000	1.86	1.85	1.85	1.84	1.83
8,000	1.88	1.87	1.86	1.86	1.85
9,000	1.89	1.89	1.88	1.87	1.87
10,000	1.90	1.90	1.89	1.88	1.88
15,000	1.93	1.93	1.93	1.92	1.92
20,000	1.95	1.95	1.94	1.94	1.94
25,000	1.96	1.96	1.96	1.95	1.95

Note: For manifolded Phase II Assist Systems, the "Number of Affected Nozzles" shall be the total of all gasoline nozzles. For dedicated return configurations, the "Number of Affected Nozzles" shall be the total of those nozzles served by the tank being tested.



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Short Cuts - Web Links - Equations, continued

Doug Harty, Sr. Application Engineer { harty@vsthose.com }



5. Pressure Decay Criteria: Phase II Balance Systems



TABLE 1A
PHASE II BALANCE SYSTEMS
PRESSURE DECAY CRITERIA
 INITIAL PRESSURE OF 2 INCHES WATER COLUMN (WC)
MINIMUM PRESSURE AFTER 5 MINUTES, INCHES WC

ULLAGE, GALLONS	NUMBER OF AFFECTED NOZZLES				
	01-06	07-12	13-18	19-24	>24
500	0.44	0.41	0.38	0.36	0.34
550	0.50	0.47	0.45	0.42	0.40
600	0.56	0.53	0.51	0.48	0.46
650	0.62	0.59	0.56	0.54	0.51
700	0.67	0.64	0.62	0.59	0.56
750	0.73	0.70	0.67	0.64	0.61
800	0.77	0.74	0.71	0.69	0.66
850	0.82	0.79	0.76	0.73	0.70
900	0.86	0.83	0.80	0.77	0.75
950	0.90	0.87	0.84	0.81	0.79
1,000	0.93	0.91	0.88	0.85	0.82
1,200	1.06	1.03	1.01	0.98	0.95
1,400	1.16	1.14	1.11	1.09	1.06
1,600	1.24	1.22	1.19	1.17	1.15
1,800	1.31	1.29	1.27	1.24	1.22
2,000	1.37	1.35	1.32	1.30	1.28
2,200	1.42	1.40	1.38	1.36	1.34
2,400	1.46	1.44	1.42	1.40	1.38
2,600	1.49	1.47	1.46	1.44	1.42
2,800	1.52	1.51	1.49	1.47	1.46
3,000	1.55	1.54	1.52	1.50	1.49
3,500	1.61	1.59	1.58	1.57	1.55
4,000	1.65	1.64	1.63	1.61	1.60
4,500	1.69	1.68	1.67	1.65	1.64
5,000	1.72	1.71	1.70	1.69	1.67
6,000	1.76	1.75	1.74	1.73	1.72
7,000	1.79	1.79	1.78	1.77	1.76
8,000	1.82	1.81	1.80	1.80	1.79
9,000	1.84	1.83	1.83	1.82	1.81
10,000	1.85	1.85	1.84	1.84	1.83
15,000	1.90	1.90	1.89	1.89	1.89
20,000	1.93	1.91	1.92	1.92	1.91
25,000	1.94	1.94	1.94	1.93	1.93

Note: For manifolded Phase II Balance Systems, the "Number of Affected Nozzles" shall be the total of all gasoline nozzles. For dedicated return configurations, the "Number of Affected Nozzles" shall be the total of those nozzles served by the tank being tested.



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Short Cuts - Web Links - Equations, continued

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6. TLS-350 Command Codes: ISD



[CNTRL-A]IV0200yyyymm	ISD Monthly Status Report
[CNTRL-A]IV0300YYYYMMDD	ISD Daily Status Report
[CNTRL-A]IV0400yyyymm	ISD Daily Report Details (by month)
[CNTRL-A]IV0500ddd	ISD Daily Report Details (by day(s))
[CNTRL-A]IV0600yyyymm	ISD Daily Report Details, 132 columns (by month)
[CNTRL-A]IV0700ddd	ISD Daily Report Details (by day(s))
[CNTRL-A]IV0800yyyymmCCC	ISD Daily Report Details (by month) CCC=Columns
[CNTRL-A]IV0900dddCCC	ISD Daily Report Details, user input columns (by day(s))
[CNTRL-A]IV1200nnn	Vapor Collection Test Results # OF RECORDS
[CNTRL-A]IV8100	Percent Hydrocarbon Report
[CNTRL-A]IV8200	Vapor Processor Status Report
[CNTRL-A]IV8500yyyyymmddnnnn	PMC Daily Vapor Polisher Diagnostic

Flow Meter Operability/Query

[CNTRL-A]IV8700	Current Flow meter position BALANCE
[CNTRL-A]&18XX09950005	Last 5 Transactions – Assist XX=AFM Pos



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Short Cuts - Web Links - Equations, continued

Doug Harty, Sr. Application Engineer { harty@vsthose.com }



7. TLS-350 Command Codes: Testing & Alarm History



System Reports

<CTRL-A> <I> 10100	System Status Report
<CTRL-A> <I> 10200	System Configuration Report (modules installed)
<CTRL-A> <I> 11100	Priority Alarm History Report
<CTRL-A> <I> 11200	Non-Priority Alarm History Report
<CTRL-A> <I> 12100	Active Alarm Report

In-Tank Reports

<CTRL-A> <I> 20100	In-Tank Inventory Report
<CTRL-A> <I> 20200	In-Tank Delivery Report
<CTRL-A> <I> 20300	In-Tank Leak Detect Report
<CTRL-A> <I> 20600	In-Tank Alarm History Report
<CTRL-A> <I> 20700	In-Tank Leak Test History Report
<CTRL-A> <I> 25100	CSLD Results Report

In-Tank Set-up Reports

<CTRL-A> <I> 60500	4-Point Volumes
<CTRL-A> <I> 60900	Thermal Coefficients
<CTRL-A> <I> 61200	Manifold Partners

CSLD Diagnostics

<CTRL-A> <I> A5100	Rate Table
<CTRL-A> <I> A5200	Rate Test
<CTRL-A> <I> A5300	Volume History Table
<CTRL-A> <I> A5400	Moving Average Table
<CTRL-A> <I> A5500	Leak Test Status
<CTRL-A> 980	SOFTWARE VERSION



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8. Web Resources

CCR Title 23	https://www.waterboards.ca.gov/ust/regulatory/docs/CCR_Ch16_10_2018.pdf
CFR 40 UST rules	https://www.ecfr.gov/current/title-40
Tank Charts	https://www.unidocs.org/hazmat/ust/installation/tankcharts.html
Designated Operator	https://www.unidocs.org/master_list.html#ust_dustop
Leak/Spill reporting	https://www.unidocs.org/master_list.html#un028
Testing Forms	https://www.unidocs.org/master_list.html#ust_testing
Unit Conversions	https://www.onlineconversion.com/



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ENVIRO-LOC™ ECO Dripless/Spitless Nozzles

Scott Brown, VP Sales & Marketing { brown@vsthose.com }



VST was an early innovator of the ECO Dripless/Spitless nozzle technology.

The California Air Resource Board (CARB) initiated this specification requirement for Vapor Recovery nozzles when they introduced their standards for Enhanced Vapor Recovery (EVR) in the early 2000's. The intent was to reduce fuel spillage that in turn would reduce the amount of fugitive Volatile Organic Compounds (VOCs) released to atmosphere, as well as create a cleaner forecourt.

Fuel nozzle manufacturers were challenged to develop this new type of product which had never been made before. VST embraced this challenge and was the first company to introduce an EVR ECO Dripless/Spitless Phase II Balance nozzle to the marketplace. It exceeded the requirements of the standard. (See Below Chart)

Nozzle Category	Current USA Standards	CARB EVR Requirement	VST EVR Nozzle CARB Test Results
Liquid Retention	No known standard	≤ 100 ml per 1,000 gal. dispensed	Zero
Spillage	≤ 0.70 lbs. per 1000 gal. dispensed	≤ 0.24 lbs. per 1,000 gal. dispensed	< 0.003 lbs. per 1,000 gal. dispensed
Spitting	No known standard	≤ 1.0 ml per refueling	Zero
Drops/Refueling	No known standard	** ≤ 3 drops per refueling	** ≤ 1 drop per refueling

** indicates that this was included in the spillage totals

In addition, VST is the ONLY manufacturer to include a patented safety interlock mechanism designed to be inoperable when the safety interlock becomes damaged, thus protecting against errant spills.



VST has gone on to utilize this environmentally friendly technology by expanding our product offering to include ECO Dripless/Spitless nozzles for conventional gasoline and retail diesel dispensing applications. The benefits of this technology have led to multiple states incorporating these unique gasoline nozzles into their regulatory requirements...i.e., California, New Jersey, and Washington with others joining soon.

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Striving Towards Sustainability



The ! Voice

VST Training & Certifications

Susie McLaughlin, Manager, Training & Certifications
 { mclaughlin@vsthose.com }



Training & Certification Links

It's never been easier to get a new VST Certification than it is right now. Below is a list of links taking you directly to the VST online training that is right for you.

All the training can be easily done on your phone, and you will be able to immediately receive and retrieve your certification.

Training Level	Description	Link
Level A	EVR Hanging Hardware Install & Repair	Level A
Level E	CS2 USA GREEN MACHINE™ General Contractor	General Contractor
Level E1	CS2 USA GREEN MACHINE™ Electrical Install	Electrical Install
Level E2	CS2 USA GREEN MACHINE™ Vapor Piping Install	Vapor Piping Install
Level E3	CS2 USA GREEN MACHINE™ Start-Up Contractor	Start-Up Contractor
Level E4	CS2 USA GREEN MACHINE™ Service Contractor	Service Contractor

VST Level A Training on Your Smartphone

Completing your Level A training for certification or re-certification has never been easier – now it can be done on your Smartphone!

Click this link for a short video that walks you through the steps.

[How to Take VST Level A Training on Your Smartphone](#)

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