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“Helping Industry Reduce GHG Emissions and Improve Profitability”

Groundbreaking innovators of best practice in storage tank venting

Helping Industry to improve tank/digester storage integrity

Advisors to API, ISO & Environment Agency

Helping customers to achieve Net-Zero by revolutionizing Breather Valve Selection and Testing

Registered Office: Mount Pleasant Farm,
Gorran, St Austell, PL26 6LR

Ewart Cox – Managing Director. Assentech Group

Mechanical Engineer . Over 25 years experience in the tank venting industry. Set up Assentech 12 years ago with the focus on supplying and servicing equipment that fully meets international standards. Technical expert on API2000 and ISO28300 Standards Committees.

Currently leading task groups in both API2000 and ISO28300 to further develop testing criteria for production vents.

Leading a working group to draft a new annex to ISO28300 on tank venting and the environment.

Committee member and contributor to the development of EEMUA guidelines

Developed the first automated, fully mobile tank vent test bench

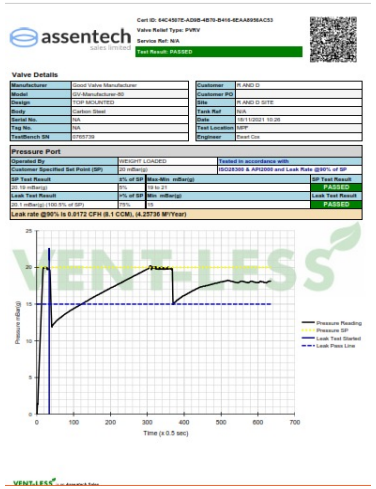
Adviser to multiple regulatory bodies on best practice in tank vent management and maintenance.

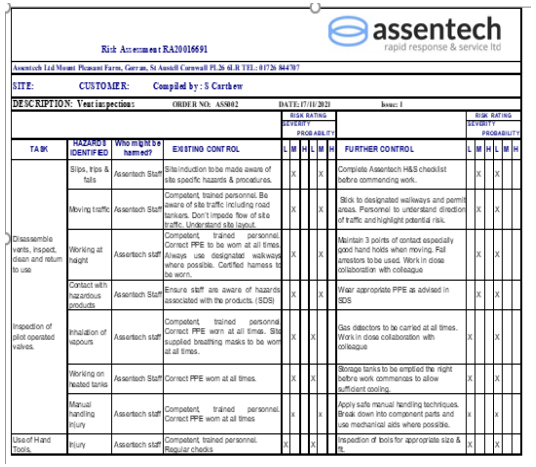
2 Patents in his name for technologies related to protecting the environment

Silver Medal winner 2022 for World Tank Storage Awards for Environmental Performance

What do we do?

Service	Equipment	Documentation	Knowledge





- 25 years Experience
- All Industries
- Leading 2 WG's for environment
- ADBA
- WBA
- IFEAA
- EEMUA (MIPC)
- TSA
- BSI PSG17
- ISO
- IOGP
- API

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Mission – Reduce fugitive emissions from low pressure tank vents

- Operating Pressure range <1 barg. Most <30mbarg
  - Final emergency pressure relief from digesters
    - Biogas used for electricity/gas generation
    - Excess to flare
    - Emergency relief via pressure/vacuum vent
- All valves should meet international standards API2000 or ISO28300
- No specific biogas standard
- Valve will begin to open from 75% of set point
- Many digesters run <90% of MAWP
- 9 out of 10 valve manufacturers do not test production vents according to section 5.4 (API2000) 6.4 (ISO28300)

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Environment Agency Regulation 61: Emissions to Air – Table S3.1

- Biowaste from Food, Drink & Milk treatment facilities
- Best Available Techniques – Purchase and Maintain to API2000 or ISO28300.
- Operating pressure no higher than 75% of valve set point.
- Purchase valve only supplied with a factory leak test certificate acc. Table 10.
- Inspect 1 or 2 times per annum or following foam over/overfill.
- Full service & functional retest <3 years subject to application.
- Document volume leak rate at digester operating pressure.
- Demonstrate sustainability and incremental improvement.

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Huge leaks can be invisible to the human eye – This tank was next to a school

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Case Study – September 2019

- Client: Biowaste Treatment Facility

- Problem: Environment Agency found that emissions on site were too high
  - Odour complaints by public
  - OGI footage of leaks

  Source: 4 Low quality valves mounted on digesters
  - 2 x 10”
  - 2 x 12”
  - Serviced every 6 months by the manufacturer. Never leak tested.

  Resolution: Client approached Assentech to assist with resolution to fugitive emission/odours. We replaced cheap faulty devices with quality serviceable replacement devices

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The Detail

Asset		Maintenance		Leak Rate		Gas Composition 60% methane/40% Co2				Cost of methane leakage per year		Environmental Impact	Volume of loss
Test Conducted on valve	Valve Purchase Price	Service Kits over 20 yrs	Overall Maintenance Costs over 20 yrs - Includes Inspections, Service, Kits and	Biogas		Methane CH4		Co2		Therms	GBP £	Total GWP (kg/yr)	Double Decker Bus Volume Per Year
				CFH	M3/yr	M3/Yr	GWP kg/yr	M3/yr	GWPkg/yr				
Poor Quality 12" Valve (not API2000 Compliant)	£2,777.00	£6,954.00	£20,666.50	50.9	12626.01	7575.60	151087.86	5050.40	9999.80	2657.17	£5,825.06	161087.66	112.23
High Quality 12" Valve (API2000 Compliant)	£6,262.00	£4,488.00	£12,563.00	0.05	12.40	7.44	148.42	4.96	9.82	2.61	£5.72	158.24	0.11

Notes

a -This information is based on a real case study with leak test evidence. These results show leakage from the tested valves at 90% of set point.

b - All valves serviced every 3 years

c - Frequency of inspections follow Manufacturers guidance (6 monthly for Cheapest Valve vs. 12 monthly for other valves)

d - The High Quality Valve has metal/metal seat on pressure side so no diaphragm which means less cost to service

e - Methane leakage cost calculated @ 219.22/Therm - UK Natural Gas NBP Spot Price for October 2021 Source https://www.erce.energy/graph/uk-natural-gas-nbp-spot-price/

f - Methane GWP potential of x 36 that of CO_2 in accordance with the International Committee on Climate Change (IPCC).

g - Poor Quality Valve spares kit every 3 years (Prices taken from Manufacturer Quote Nov-21) £1,159.00

h - Quality Valve spares kit every 3 years (Prices taken from Manufacturer Quote Nov-21) £1,400.00

i - High Quality Valve spares kit every 3 years (Prices taken from Manufacturer Quote Nov-21) £748.00

j - Each inspection cost £275 (Nov 21 costing) £275.00

k - Service cost fitting new seal kit (Nov 21 costing) £375.00

l - Cost to remove a valve for servicing (Nov 21- estimated as can vary by circumstance) £375.00 Valves should always be moved from tank for full service on safety grounds. Performing maintenance on a vent in situ is extremely hazardous and not recommended.

m - £ to $ conversion calculated at x 1.3696 - Bank of England month average for October 2021 Source https://www.bankofengland.co.uk/boeapps/database/Rates.asp?TD=11&TM=Nov&TY=2021&into=GBP&rateview=A

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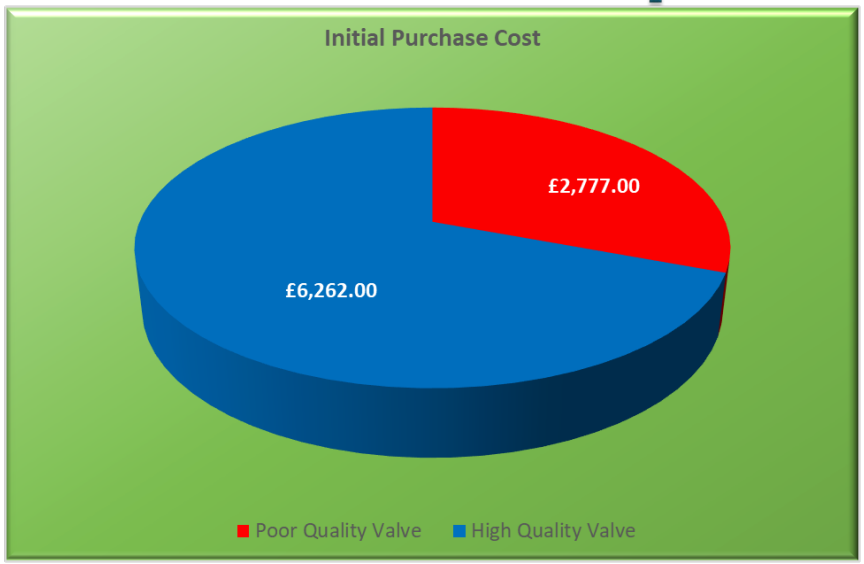
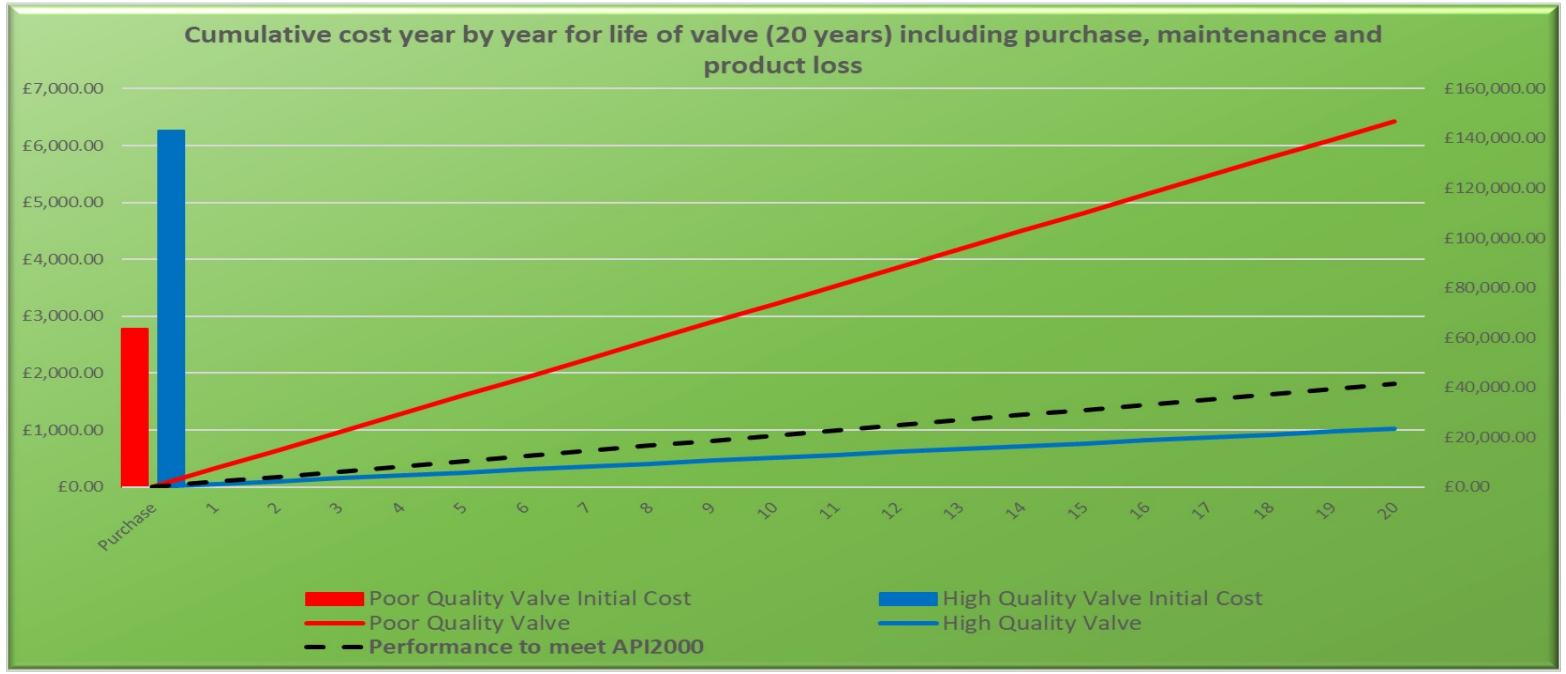
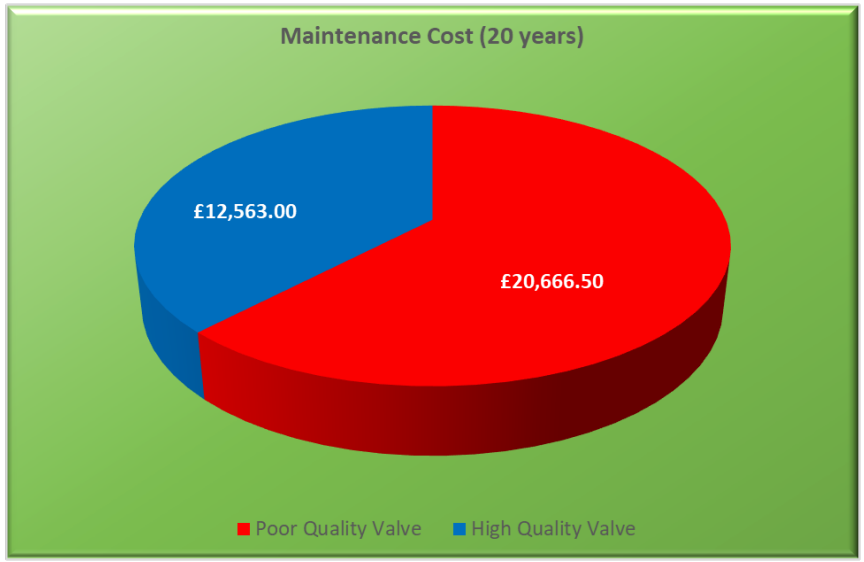
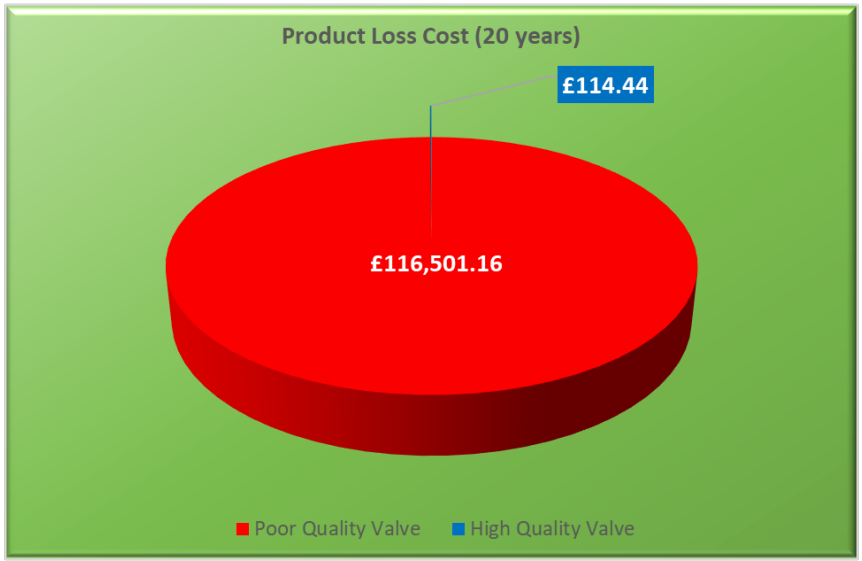
Financial Impact









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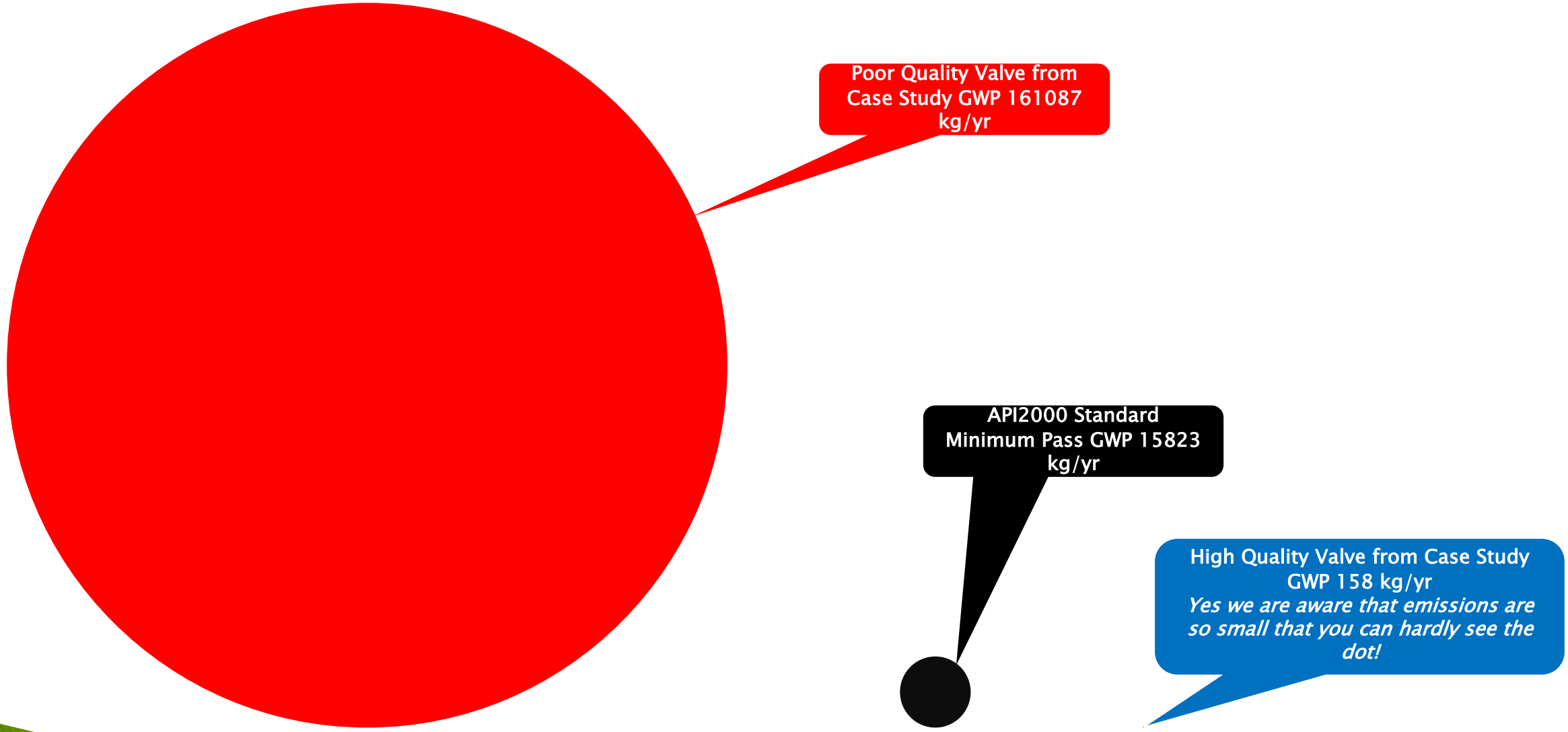
Environmental Impact



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VENT-LESS®

Automatic Test Bench

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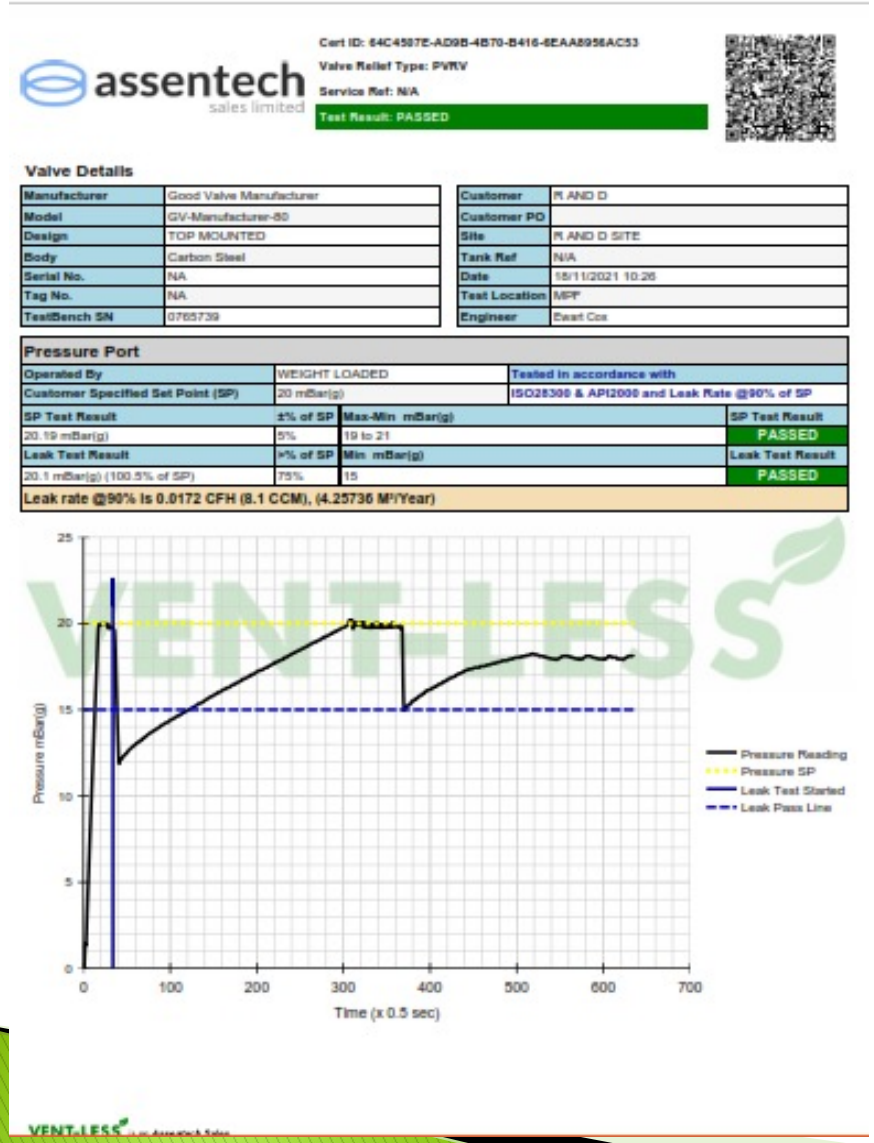
Test Certificate – Customer can upload their own logo to the certificate



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Cert ID: 64C4507E-AD9B-4B70-B416-6EAA8958AC53
Valve Relief Type: PVRV
Service Ref: N/A
Test Result: PASSED

Valve Details

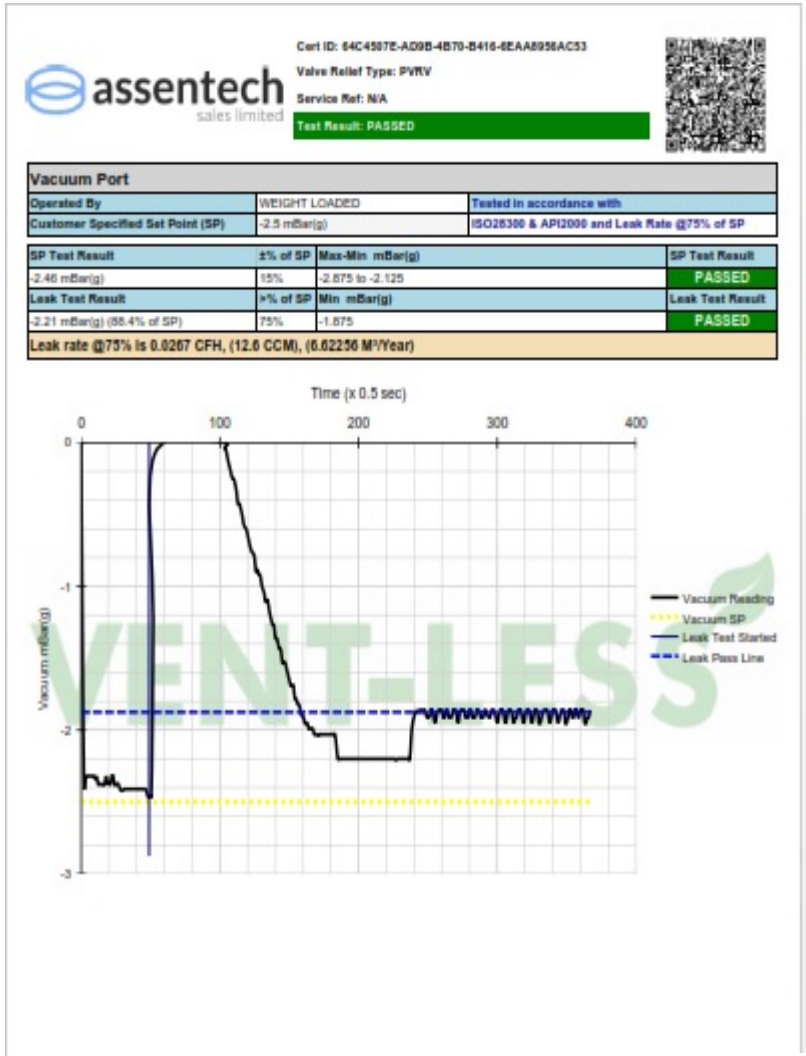
Manufacturer	Good Valve Manufacturer	Customer	R AND D
Model	GV-Manufacturer-80	Customer PO	
Design	TOP MOUNTED	Site	R AND D SITE
Body	Carbon Steel	Tank Ref	N/A
Serial No.	NA	Date	18/11/2021 10:26
Tag No.	NA	Test Location	MPP
TestBench SN	0765739	Engineer	Ewart Cox

Pressure Port

Operated By	WEIGHT LOADED	Tested in accordance with
Customer Specified Set Point (SP)	20 mBar(g)	ISO28300 & API2000 and Leak Rate @90% of SP

SP Test Result	±% of SP	Max-Min mBar(g)	SP Test Result
20.19 mBar(g)	5%	19 to 21	PASSED
Leak Test Result	**>% of SP**	**Min mBar(g)**	**Leak Test Result**
20.1 mBar(g) (100.5% of SP)	75%	15	PASSED

Leak rate @90% is 0.0172 CFH (8.1 CCM), (4.25736 M³/Year)



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Cert ID: 64C4507E-AD9B-4B70-B416-6EAA8958AC53
Valve Relief Type: PVRV
Service Ref: N/A
Test Result: PASSED

Vacuum Port

Operated By	WEIGHT LOADED	Tested in accordance with
Customer Specified Set Point (SP)	-2.5 mBar(g)	ISO28300 & API2000 and Leak Rate @75% of SP

SP Test Result	±% of SP	Max-Min mBar(g)	SP Test Result
-2.46 mBar(g)	15%	-2.875 to -2.125	PASSED
Leak Test Result	**>% of SP**	**Min mBar(g)**	**Leak Test Result**
-2.21 mBar(g) (88.4% of SP)	75%	-1.875	PASSED

Leak rate @75% is 0.0267 CFH, (12.6 CCM), (6.62256 M³/Year)

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Thank you for listening

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