

I - V I G I L A N T

i-Vigilant Technologies Limited

iVJob22008-RPT-002 (SMER)

Assessment of Error Due to Incorrect Orientation of Orifice Plate

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**DOCUMENT REVISIONS**

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HOLDS

Hold	Description
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1 Executive Summary

A summary of the Measurement Error Report (MER) is provided below in Table 1. The measurement error on an annual basis over the MER period is presented in Table 2.

Table 1: Summary of Measurement Error

Site Name:	Alrewas EM MTD
DN Reference:	MER/CAD/204/21
Measurement Error Notification:	EM009
Meter Type:	Orifice Meter
LDZ:	EM
Start Date of Measurement Error:	23/05/2019
End Date of Measurement Error:	23/02/2021
Throughput during Period – Standard Volume (sm3):	1,319,252,002
Throughput during Period – Energy (kWh):	14,395,996,944
Over or Under Measurement:	Under measurement
Correction – Standard Volume, sm3 / (%):	71,113,997 (5.4%)
Correction – Energy, kWh (%):	776,099,094 (5.4%)
Approximate value of correction at 50 p/them	£13,240,803
Cause of Measurement Error:	
<p>During an annual validation conducted in 23rd May 2019, the orifice place was changed and the replacement plate installed in the reverse orientation. During the next validation in 20th May 2020 the plate was changed again and the replacement also installed in the reverse orientation. The orifice was installed in the correct orientation on the 23rd February 2021</p> <p>Both orifice plates had bevels and therefore an under measurement over the period occurred.</p>	
Method used to determine correction:	
<p>The Measurement Error has been determined from a combination of Computational Fluid Dynamics (CFD) and site testing. The CFD used two types of simulation models (CFX and Fluent). Both orifice plates have been simulated at 3 flow rates in the forward and reverse orientations. The forward orientation simulation has been compared/verified against ISO 5167.</p> <p>The site testing used a clamp-on Ultrasonic Flow Meter (USM) installed upstream and in series with the orifice plate. Tests were done with the orifice plates in the correct orientation and with each plate installed in the reverse orientation.</p> <p>The MER has been based on the flow tests results. The CFD results were very similar to the flow test results and confirm that there is no significant Reynolds number impact over the flow range seen.</p>	

Table 2: MER by Year

Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
2019	3,106,378,611	284,397,965	39.31	1.0606	3,297,695,846	301,913,523	191,317,235	17,515,558
2020	8,084,646,944	739,806,722	39.35	1.0515	8,524,564,097	780,069,023	439,917,153	40,262,301
2021	3,204,971,389	295,047,315	39.04	1.0452	3,349,836,096	308,383,454	144,864,707	13,336,139
Grand Total	14,395,996,944	1,319,252,002	39.31	1.0541	15,172,096,039	1,390,365,999	776,099,094	71,113,997



2 Introduction

Cadent identified a measurement error at the Alrewas site caused by the incorrect orientation of the orifice plates. Following an initial investigation by an Independent Technical Expert (ITE), i-Vigilant has been appointed as a second ITE to undertake a second separate investigation.

The investigation has been undertaken in two parts:

- **Part 1: CFD**
The Measurement Error has been determined using Computational Fluid Dynamics (CFD). The CFD has been undertaken using two types of simulation models, CFX and Fluent. Both orifice plates have been simulated at 3 flow rates in the forward and reverse orientations. The forward orientation simulation has been compared/verified against ISO 5167.
- **Part 2: Flow Testing**
Flow testing has also been carried out. The site testing used a clamp-on Ultrasonic Flow Meter (USM) installed upstream and in series with the orifice plate. Tests were done with the orifice plates in the correct orientation to establish a reference for the USM and with each plate installed in the reverse orientation.

The following documents may be read in conjunction with this Measurement Error Report (MER) to provide further details as required:

Table 3: Supporting Documents

Document Reference	Description / Details
iVJob22008-RPT-001 CFD Basis	Document describing the basis for the CFD analysis.
iVJob22008-MS-001 Site Testing	High level method statement for site tests.
MSS-PM-3307572-C-RPT-01	Detailed CFD Analysis Report
iVJob22008-RPT-002 CFD Summary	High level Summary of CFD report
iVJob22008-SVR-001 Site Visit Report	Site visit report and results
iVJob22008-RPT-002 SMER	Measurement Error Report



3 Measurement Error by Month

Table 4 below presents a summary of the measurement error by month. The full measurement error reported for each day is present in Appendix 1.

Orifice 295/5 was installed in the incorrect orientation on the 23rd May 2019. It has been assumed that all the flow reported on the day ending 05:00, 23rd May and subsequent days requires correction.

Orifice ARLE5036 was installed on the 20th May 2020. It has been assumed that all the flow reported on the day ending 05:00, 20th May and subsequent days until the 23rd Feb 2021 was metered by this plate.

Table 4: MER by Month

Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
2019	3,106,378,611	284,397,965	39.31	1.0606	3,297,695,846	301,913,523	191,317,235	17,515,558
May	40,545,278	3,717,809	39.19	1.0427	42,700,596	3,915,401	2,155,318	197,592
Jun	172,681,111	15,930,031	39.15	1.0617	183,335,536	16,912,914	10,654,425	982,883
Jul	0	0	38.96	1.0617	0	0	0	0
Aug	269,444	24,938	39.36	1.0617	286,069	26,477	16,625	1,539
Sep	0	0	39.79	1.0617	0	0	0	0
Oct	0	0	39.33	1.0617	0	0	0	0
Nov	1,365,754,444	124,790,457	39.39	1.0617	1,450,021,494	132,490,028	84,267,049	7,699,571
Dec	1,527,128,333	139,934,730	39.26	1.0617	1,621,352,152	148,568,703	94,223,818	8,633,973
2020	8,084,646,944	739,806,722	39.35	1.0515	8,524,564,097	780,069,023	439,917,153	40,262,301
Jan	1,495,010,000	137,139,692	39.27	1.0617	1,587,252,117	145,601,211	92,242,117	8,461,519
Feb	1,482,268,056	135,517,531	39.33	1.0617	1,573,723,995	143,878,963	91,455,939	8,361,432
Mar	1,315,665,833	120,656,064	39.24	1.0617	1,396,842,415	128,100,543	81,176,582	7,444,479
Apr	218,036,667	19,872,658	39.27	1.0617	231,489,529	21,098,801	13,452,862	1,226,143
May	27,917,222	2,556,048	39.31	1.0553	29,239,012	2,677,050	1,321,790	121,002
Jun	0	9	39.31	1.0452	0	9	0	0
Jul	69,590,000	6,384,362	39.35	1.0452	72,735,468	6,672,935	3,145,468	288,573
Aug	7,500	702	39.39	1.0452	7,839	734	339	32
Sep	39,199,722	3,574,855	39.53	1.0452	40,971,550	3,736,438	1,771,827	161,583
Oct	694,341,389	63,370,704	39.32	1.0452	725,725,620	66,235,060	31,384,231	2,864,356
Nov	1,155,199,722	105,305,236	39.50	1.0452	1,207,414,750	110,065,033	52,215,027	4,759,797
Dec	1,587,410,833	145,428,861	39.35	1.0452	1,659,161,803	152,002,246	71,750,970	6,573,385
2021	3,204,971,389	295,047,315	39.04	1.0452	3,349,836,096	308,383,454	144,864,707	13,336,139
Jan	1,890,381,111	174,345,287	38.93	1.0452	1,975,826,337	182,225,694	85,445,226	7,880,407
Feb	1,314,590,278	120,702,028	39.19	1.0452	1,374,009,758	126,157,760	59,419,481	5,455,732
Grand Total	14,395,996,944	1,319,252,002	39.31	1.0541	15,172,096,039	1,390,365,999	776,099,094	71,113,997



4 Input Data

4.1 Input Data Format

All data used in the MER has been taken from the Z03 files recorded by the DANINT system (a suite of programs used at natural gas offtake sites for recording calorific value and other data for the gas site). Z03 files are comma separated variable text files with each column defined as per Table 5.

Table 5: Input File Format

Record Source, Timestamp and Status	File Line Number
	Analysis Time (hh:mm)
	Analysis Date (dd/mm/yyyy)
	Alarm/Flag
Gas Quality Properties from CVDD Pseudo Quality from GPDD	Calorific Value (Dry) CV, dry (MJ/m ³)
	Calorific Value (Wet) CV, wet (MJ/m ³)
	Relative Density RD
	Compression Factor Z
	Wobbe Number WN (MJ/m ³)
	Unnormalized (Measured) Component Total (mol.%)
	Hexane C6+ (mol.%)
	Propane C3 (mol.%)
	Iso-Butane iC4 (mol.%)
	N-Butane nC4 (mol.%)
	Neo-Pentane neoC5 (mol.%)
	Iso-Pentane iC5 (mol.%)
	N-Pentane nC5 (mol.%)
	Nitrogen N2 (mol.%)
	Methane CH4 (mol.%)
	Carbon Dioxide CO2 (mol.%)
Gas Properties from Tracker	Ethane E2 (mol.%)
	Tracker Relative Density RD, Tracker
Measuring Station Metering System Data	Tracker Calorific Value CV, Tracker (MJ/m ³)
	Instantaneous Net Volume Flowrate from Meter #1 (sm ³ /h) Flow Parameter Group \$1
	Instantaneous Net Volume Flowrate from Meter #2 (sm ³ /h) Flow Parameter Group \$2
	Instantaneous Net Volume Totaliser (sm ³) Flow Parameter Group \$3
	Instantaneous Energy Totaliser (GJ) Flow Parameter Group \$5
	Instantaneous Net Volume (sm ³ /h) Flowrate Flow Parameter Group \$6
	Instantaneous Energy (TJ/d) Flowrate Flow Parameter Group \$7
	Previous Day's Net Volume Totaliser (sm ³) Flow Parameter Group \$8
CVDD Support Gases Sample Gas Pressure and Temperature Data	Previous Day's Energy Totaliser (GJ) Flow Parameter Group \$10
	Calibration Gas Pressure (bar.g)
	Calibration Gas Temperature (°C)
	Test Gas Pressure (bar.g)
	Test Gas Temperature (°C)
	Carrier Gas 1 Pressure (bar.g)
	Carrier Gas 2 Pressure (bar.g)
	Sample Gas Pressure (bar.g)
	Sample Gas Temperature (°C)

A data file is created each day with a sample frequency of approximately 7 minutes (driven by the GC cycle time). All input data has been taken directly from this datafile without modification. 650 data files have been used in the MER.

The data highlighted in grey in Table 5 have been used within the MER. The Previous Day's Net Volume Totaliser and the Previous Day's Energy Totaliser have been used to establish the reported daily totals.



4.2 Input Data Quality Check

The eternal non-resettable totals have been used as a quality check to ensure the daily totals match the non-resettable totals and to highlight any missing data. The daily total has been calculated by subtracting the non-resettable totaliser value at the start of each day from the value of the day before. This total has then been compared to the reported daily total in the files. These two figures should be the same value, however, because the first time stamp in each daily file can be up to 7-14 minutes different from the day before the differenced flow totals will be slightly different. Figure 1 shows a plot of the difference between the reported daily totals for the standard volume and the daily total estimated from the differenced non-resettable totalise over the MER period. If the differenced total is out by 7 minutes in a day it will cause a difference of 0.5%, which for a typical flow of 175,000sm³/h is 20,000sm³/hr. It can be seen that the figures match within the expected value for all but a couple of days.

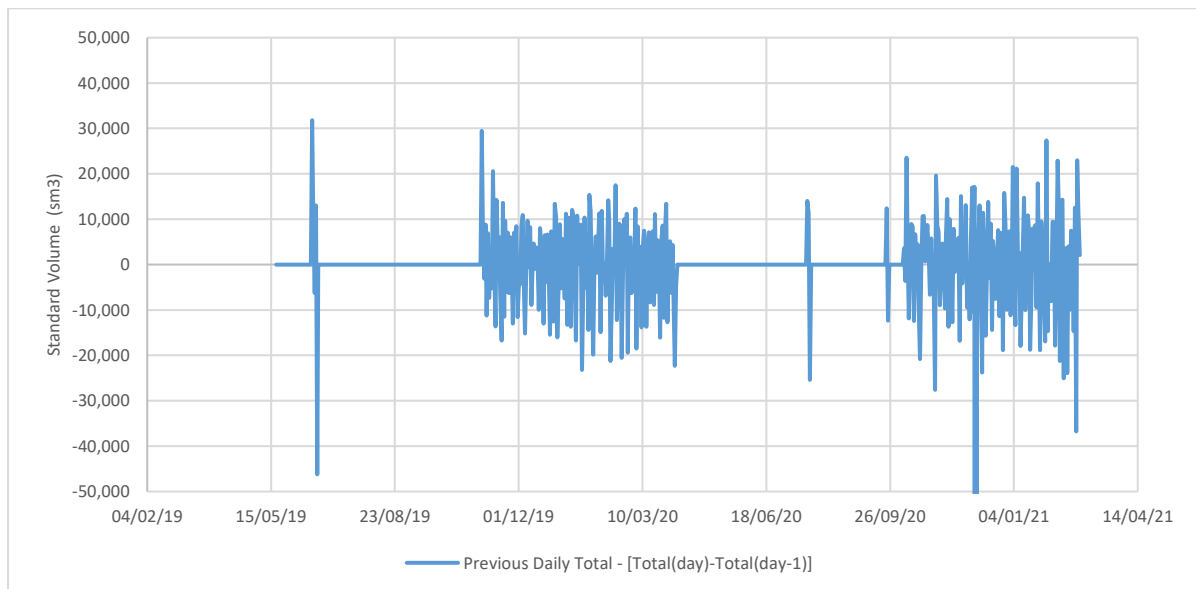


Figure 1: Daily Reported Totals During MER Period – Standard Volume

All issues identified from the quality check are summarised in Table 6. Where there is missing data files there has been no flow, with the exception of item 5, where it appears that the supplied data is corrupt. The data for the 22nd May has been reconstructed using the eternal total from the 23rd and the reported previous day total.

Table 6: Data Quality Issues

Item	Filename	Date	Status
1	H7008.10190609.Z03	9 th June 2019	File missing: No Flow
2	H7008.10190610.Z03	10 th June 2019	File missing: No Flow
3	H7008.10191015.Z03	15 th October 2019	File missing: No Flow
4	H7008.10191016.Z03	16 th October 2019	File missing: No Flow
5	H7008.10200522.Z03	22 st May 2020	Data missing: File Contains NaNs



5 Correction Methodology

The mass flow rate through an orifice plate can be determined by ISO5167 part 2. The mass flow equation is given,

$$q_m = \frac{C}{\sqrt{1-\beta^4}} \frac{\pi d^2}{4} \varepsilon \sqrt{2\Delta P \rho}$$

Where,

- q_m is the mass flow rate (kg/s)
- C is the discharge coefficient (dimensionless)
- β is the beta ratio – ratio of orifice diameter to pipe diameter (dimensionless)
- ε is the expansibility correction (dimensionless)
- d is orifice diameter (m)
- ΔP is the differential pressure across the orifice (Pa)
- ρ is the density of the fluid in the plane of the upstream tappings (kg/m³)

5.1 Correction Factor - CFD

It will be assumed that the same flow equation will be valid for both the forward and reverse orientations, but a given orifice plate will have a different coefficient of discharge in the reverse orientation. The new discharge coefficient can be established from CFD by re-arranging the above equation,

$$C_r \varepsilon_r = \frac{4q_m \sqrt{1-\beta^4}}{\pi d^2 \sqrt{2\Delta P_r \rho}}$$

Where,

ΔP_r is the pressure drop across the orifice place in the reverse orientation.

The flow rate established during the MER period with the orifice plate in the reverse orientation, q_r is,

$$q_r = \frac{C}{\sqrt{1-\beta^4}} \frac{\pi d^2}{4} \varepsilon \sqrt{2\Delta P_r \rho}$$

The correction for the mass flow rate would therefore be,

$$q_m = q_r \frac{C_r \varepsilon_r}{C \varepsilon}$$

The density, standard density and calorific value has not been impacted by the orifice being installed on the reverse orientation and therefore the same correction applies to both the standard volume and energy flow rates.

All metrology details for the orifice plates and the conditions used for the CFD analysis are provided in the document 'iVJob22008-RPT-001 CFD Basis'



5.2 Correction Factor - Flow Testing

The DANINT system logs the totaliser values from the flow computer in terms of Standard Volume and Energy. The ultrasonic flow meter (USM) measures fluid velocity and determines the actual volume flow rate from a knowledge of the pipe diameter. The Standard Volume Flow can be determined from the Actual Volume Flow by multiplying it by the ratio of the flowing to standard gas density,

$$Q_{su,usm} = Q_{lu,usm} \frac{\rho_l}{\rho_s}$$

Where,

$Q_{su,usm}$ is the standard volumetric flow rate (m³/s) measured by the USM

$Q_{lu,usm}$ is volumetric flow rate at operating conditions determined by the USM (m³/s)

ρ_l is the gas density at operating conditions (kg/m³)

ρ_s is the gas density at standard conditions (kg/m³)

Based on testing in the forward direction a meter factor for the USM has been determined,

$$MF = \frac{Q_{s,o}}{Q_{su,usm}}$$

$Q_{s,o}$ is the standard volumetric flow rate (m³/s) measured by the orifice meter

$Q_{su,usm}$ is the standard volumetric flow rate (m³/s) measured by the USM

For the tests in the reverse orientation, the standard volumetric flow rate will be determined,

$$Q_{s,usm} = MF \times Q_{su,usm}$$

$Q_{s,usm}$ is the meter factor corrected standard volumetric flow rate (m³/s).

It will be assumed that the operating conditions at the USM is the same as that of the orifice and so the same line density will be used.

5.2.1 Flow Testing Stability

During the flow tests the flow rate was maintained as constant as is practicable. The DANINT system logs data at an interval of approximately 7 minutes and during each test the uncertainty of the average of the flow rate was calculated to ensure a satisfactory number of points were acquired. The average of the instantaneous standard volume was also compared with the average flow calculated from the non-resettable totaliser.

For a statistically stationary process, the standard deviation of a set of n readings of a variable x , is given,

$$s(x) = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2}$$

The standard deviation of the average is provided by,

$$s(\bar{x}) = \frac{s(x)}{\sqrt{n}}$$



The associated uncertainty of the average can be calculated using the student t statistic,

$$U(\bar{x}) = T(\%, n)s(\bar{x})$$

Where $T(\%, n)$ is the student t statistic for n degrees of freedom and confidence interval given by %. Typically 95% is used.

To help ensure sufficient data has been acquired, during each flow test the Z03 files were visually reviewed and the data manually entered in to excel at regular intervals and used to calculate,

- The average standard volume flow rate from the instantaneous value recorded in the V03 file.
- The uncertainty of the mean of the standard volume flow rate
- The average standard volume flow rate from the difference between the eternal totaliser at the start of the test to the totaliser at the latest sample
- The difference between the average instantaneous standard volume flow rate and the average determined from the difference of the non-resettable totaliser.

At the end of each test the instantaneous standard volume flow rate from the V03 was compared with the rate established from the change in the totaliser and the value calculated from the Differential Pressure, Pressure and Temperature from the V03 and the density from the composition stored in the Z03 file. This allowed a cross check between the Z03 and V03 files and ensures that the flow rate is sensible and the flow computer has been updated correctly.

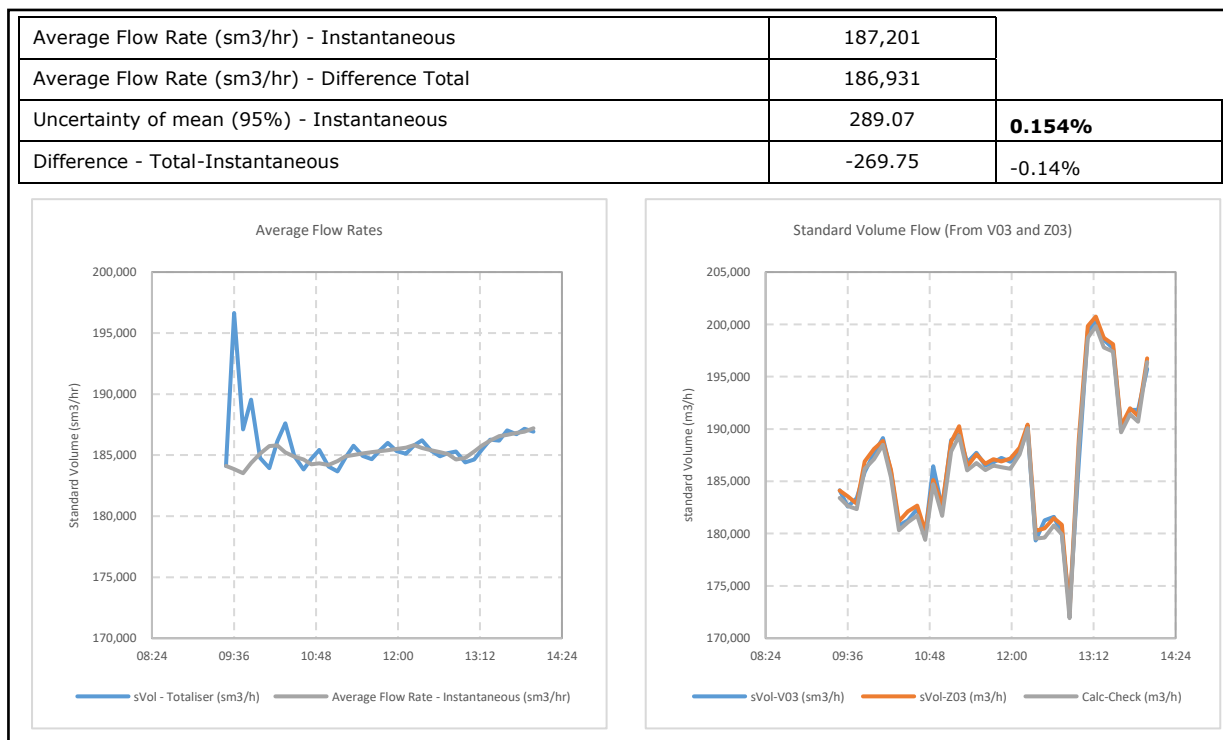


Figure 2: Flow Rate Stability and Average Check (Example)



6 CFD Result Summary

6.1 Basis For CFD

The basis for the CFD work is presented in Table 7. This table presents the orifice plate details and the flow conditions simulated. CFD was run at three flow rates and with each plate in the forward and reverse orientation.

Table 7: Basis for CFD Modelling

Parameter	295/5	ALRE5036
Orifice Plate Bore Diameter 'd' corrected to Typical Flowing Temperature of 8.5 °C, mm	309.9425	309.94476
Orifice Plate Thickness 'E', mm	9.2370	9.2873
Orifice Plate Thickness 'e', mm	7.015	7.450
b=E-e	2.222	1.8373
b/d	0.007	0.006
Angle of Bevel, °	44.50	44.00
Beta Ratio	0.71695	0.71696
Upstream Diameter 'D' corrected to Typical Flowing Temperature of 8.5 °C, mm	432.3053	
Inlet Cross-sectional Area, mm ²	146781.39	
Typical Flowing Pressure, barg	56	
Typical Flow, Sm ³ /h; kg/h; kg/s	175,000; 131,659.50; 36.5720833	
Typical Velocity, m/s	4.9502	
Typical Reynolds Number	8.95E+06	
Lo Flow, Sm ³ /h; kg/h; kg/s	115,000; 86,519.10; 24.0330833	
Lo Velocity, m/s	3.2530	
Lo Reynolds Number	5.88E+06	
Hi Flow, Sm ³ /h; kg/h; kg/s	235,000; 176,799.90; 49.1110833	
Hi Velocity, m/s	6.6474	
Hi Reynolds Number	12.01E+06	
Gas Molecular Weight, kg/kmol	17.7472	
Process Compressibility Factor, dimensionless	0.85843	
Process Density at 8.5 °C and 56 barg, kg/m ³	50.3333	
Dynamic Viscosity at 8.5 °C and 56 barg, cP	0.01204	

Two different applications were used to perform the CFD analysis, Ansys Fluent and Ansys CFX. Full details of the methodology and results of the CFD undertaken are available in MSS-PM-3307572-C-RPT-01.



The non-structured hexahedral mesh used for the simulation around the orifice plate is shown in Figure 3. The mesh consisted of 500,000 elements.

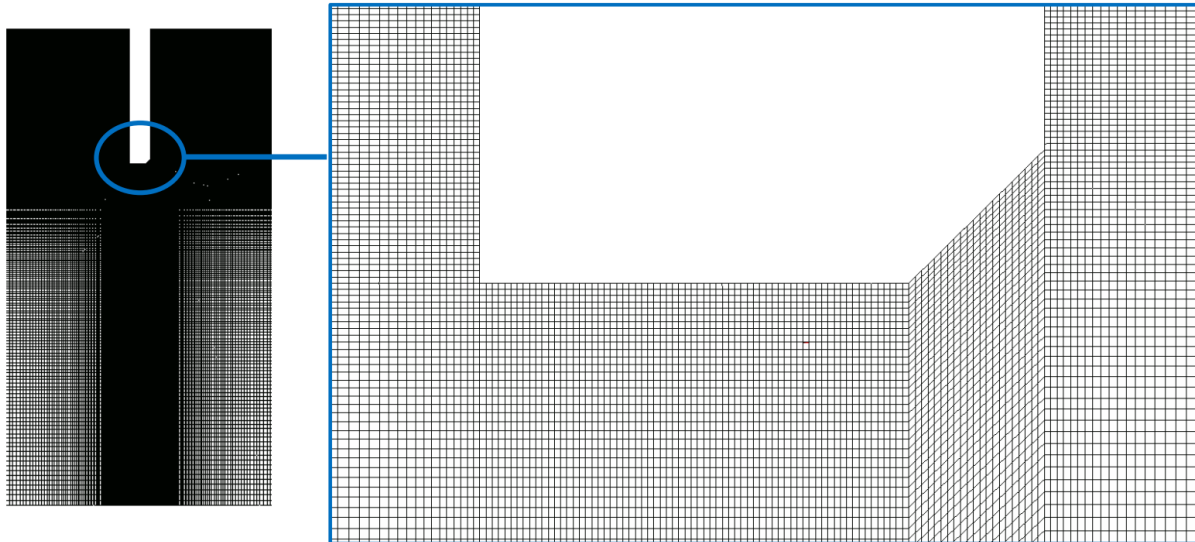


Figure 3: Mesh Used for CFD Analysis

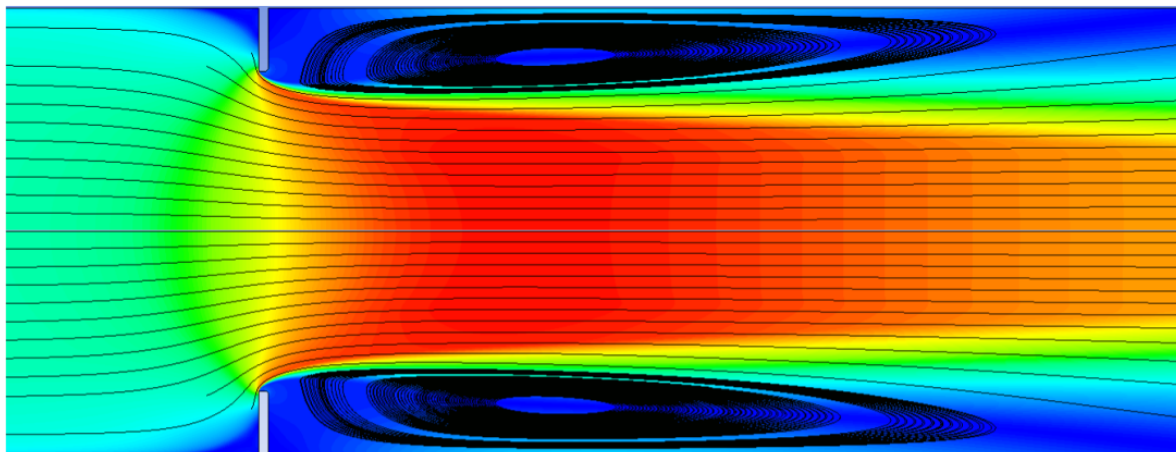


Figure 4: Velocity Field and Flow Lines for Orifice Plate in Forward Orientation

6.2 CFD Result – Plate 295/5

Table 8 shows the CFD results for the 3 flow cases, forward and reverse for plate 295/5.

Table 8: CFD Analysis Results – Plate 295/5

Volume Flow (sm ³ /h)	CFD Solver	CFD Forward <i>C_ε</i>	ISO 5167 <i>C_ε</i>	CFD-5167 Forward (%)	CFD Reverse <i>C_ε</i>	CFD REV-FWD (%)	Correction
115,000	CFX	0.5965	0.5978	-0.23	0.6305	5.7	1.057
	Fluent	0.5962	0.5978	-0.27	0.6257	4.95	1.049
175,000	CFX	0.5951	0.5973	-0.37	0.6283	5.58	1.056
	Fluent	0.595	0.5973	-0.38	0.6243	4.92	1.049
235,000	CFX	0.5939	0.5969	-0.5	0.6269	5.56	1.056
	Fluent	0.5942	0.5969	-0.44	0.6234	4.91	1.049
						5.27	1.0527



For all 3 simulation results in the forward orientation the difference between the CFD results and ISO5167 is within 0.5%, with the CFD predicting a slightly lower discharge coefficient.

In the reverse orientation the CFX solver provides a predicted discharge coefficient slightly higher than the Fluent solver. The average difference between the forward and reverse CFD models is 5.27%.

6.3 CFD Result – Plate ARLE5036

Table 9 shows the CFD results for the 3 flow cases, forward and reverse for plate ARLE5036.

Table 9: CFD Analysis Results – Plate ALRE5036

Volume Flow (sm ³ /h)	CFD Solver	CFD Forward C_E	ISO 5167 C_E	CFD-5167 Forward (%)	CFD Reverse C_E	CFD REV-FWD (%)	Correction
115,000	CFX	0.5965	0.5978	-0.22	0.6213	4.15	1.042
	Fluent	0.5963	0.5978	-0.26	0.6180	3.64	1.036
175,000	CFX	0.5951	0.5973	-0.36	0.6194	4.07	1.041
	Fluent	0.5951	0.5973	-0.37	0.6166	3.62	1.036
235,000	CFX	0.5939	0.5969	-0.5	0.6179	4.04	1.040
	Fluent	0.5943	0.5969	-0.43	0.6158	3.61	1.036
						3.855	1.0386

For all 3 simulation results in the forward orientation the difference between the CFD results and ISO5167 is within 0.5%, with the CFD predicting a slightly lower discharge coefficient.

In the reverse orientation the CFX solver provides a predicted discharge coefficient slightly higher than the Fluent solver. The average difference between the forward and reverse CFD models is 3.86%.

The plates in the forward orientation provide very similar results. This would be expected because there is separation of the flow at the upstream edge and therefore the bevel or plate thickness does not impact the measurement. The difference between the plates in reverse orientation has been attributed primarily to the difference in e .



7 Flow Test Result Summary

7.1 Flow Test Overview

To establish the measurement error caused by the reverse installation of the orifice plates a clamp-on ultrasonic meter was installed upstream and in series with the orifice and both orifice plates that had been used in the reverse orientation have been flow tested in both the forward and reverse orientation. The USM was then be used to determine the measurement error when the plates are installed in reverse orientation.

This report details the results of the flow tests which were performed over a four-day period between the 16th–20th May 2022.

The tests carried out over 4 days are,

- Day 1: Clamp-on USM installation and flow testing of plate 1 (295/5) in the forward direction.
- Day 2: Installation and flow testing of plate 1 (295/5) in the reverse orientation and installation of plate 2 (ARLE5036) in the forward orientation.
- Day 3: Flow testing of plate 2 (ARLE5036) in the forward orientation.
- Day 4: Installation and flow testing of plate 2 (ARLE5036) in the reverse orientation.

A summary of the results are presented in Table 10. The test carried out on plate 295/5 in the forward orientation was used to establish a Meter Factor for the tests carried out in the reverse orientation. The second plate was tested in the forward orientation to confirm the Meter Factor and demonstrate the reproducibility of the USM.

Table 10: Flow Test Result Summary

Flow Test	Average Flow (sm3/hr)	MF / Error (%)	CFD Fluent (% Error)	CFD CFX (% Error)
1 – 295/5 Forward	153,153	0.9719 / -2.811%	-	-
2 – 295/5 Reverse	168,355	-5.814%	-4.92%	-5.58%
3 – ARLE5036 Forward	157,651	-0.025%	-	-
4 – ARLE5036 Reverse	165,326	-4.324%	-3.62%	-4.07%

The orifice 295/5 read 2.811% lower than the clamp-on USM during the first test. This was used to determine a meter factor of 0.9719 which was subsequently applied to the 3 remaining tests to establish the presented error in Table 10.

Based on the flow testing performed, plate 295/5 under measured in the reverse orientation by 5.814%. This compares to a 5.58% under measurement predicted by the CFX CFD, a difference of only 0.23%.

Based on the flow testing performed, plate ARLE5036 under measured in the reverse orientation by 4.324%. This compares to a 4.07% under measurement predicted by the CFX CFD, a difference of only 0.254%.

The difference between the plate ARLE5036 and the USM with a meter factor applied to it was only -0.025%. The demonstrated excellent reproducibility for the USM and the tests.

The sample interval for the orifice data was determined by the DANINT system and was 7-8 minutes. The difference between the mean taken from the instantaneous 7 minutely samples and the average flow rate determined from the totaliser 'snapped' at the same



interval was between 0.2-0.3%. This may be considered as the uncertainty of the average from the data recorded by the DANINT system. Bearing in mind the slow sample rate and the fact that flow had to be diverted to the Alrewas site in order to perform the tests (demand is such that flow is not normally required at this site during this time of the year) the results represent a very successful series of flow tests.

7.1.1 Clamp-on Meter Installation

A Flexim portable flowmeter was used for the site testing. The meter was a Fluxus G608 as detailed in Table 11.

Table 11: USM Meter Details

Type	Details	Serial Number
Fluxus G608	G608-A22-3N-NN-2D-II-NN-NN	06080212
Fluxus GLK Transducer	GLK1NH3	99117

The transmitters were installed with a single diametric path arrangement as shown in Figure 5.

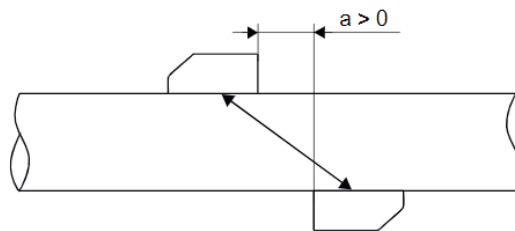


Figure 5: Transducer Orientation

The clamp-on USM was installed 2250mm or 5.2D upstream of the orifice meter (Figure 6).

The orifice has 49D of upstream straight length meaning there is approximately 44D of upstream stream length before the USM.



Figure 6: Clamp-on USM Installation



For the purpose of the testing it was assumed that the pressure, temperature and composition at the USM is as used by the orifice meter. The USM was configured based on a measurement of the pipe wall thickness and the circumference of the pipe. The settings for the USM are provided in Table 12.

Table 12: USM Configuration Parameters

Parameter	Value	Units
Pipe Wall Thickness	12.3	mm
Outer Diameter	464.73	mm
Transducer Distance	22	mm
Nominal Transducer Frequency	500,000	Hz
Fluid	Natural Gas (90% Methane)	-
Pipe Material	Carbon Steel	-
Damping	10	seconds
Data Logger Averaging	Enabled	-
Data Logger Storage Rate	30	seconds

7.1.2 Flow Test 1 - Plate 295/5 Correct Orientation

The orifice details entered in to the flow computer were taken from the latest calibration certificate (3802550005) and are presented in Table 13 below.

Table 13: Orifice Plate Metrology - 295/5 – Cert 3802550005

Calibration Certificate	Tescal: 3802550005	
Certificate Issue Date	4th April 2022	
Plate Identification	295/5	
Laboratory Temperature	20.1	DegC
Measured Bore Diameter	310.0055	mm
Nominal Pipe Diameter	432.2096	mm
Nominal Beta Ratio	0.7173	-
Plate Thickness 'E'	9.28	mm
Thickness 'e'	6.98	mm
Angle of Bevel	44	Degrees

(Note the CFD was based on an earlier calibration certificate).

Figure 7 shows the installed orifice orientation. The orifice is installed in the correct orientation with the flow from left to right and the bevel on the downstream side.



Figure 7: Flow Test 1 - Installation of plate 1 (295/5)

The flow test commenced at 08:00 with a throughput of approximately 160,000sm³/h and was completed by 12:00.

A plot of the flow rate over the period is presented in Figure 8. This plot shows a number of trends. The blue trend is the flow rate established from the totaliser from the Z0x file. The grey trend is the average flow rate established by calculating the average flow rate for all instantaneous readings from the Z0x file from the start of the test to the time it is plotted.

The orange trend are the instantaneous readings taken from the Z0x file. The yellow trend is the Meter Factor corrected reading from the USM.

It can be seen from Figure 8 that it was not possible to maintain a constant flow rate, there was a significant dip in the flow rate at approximately 09:00 and the flow to the station ceased momentarily at just after 11:00.

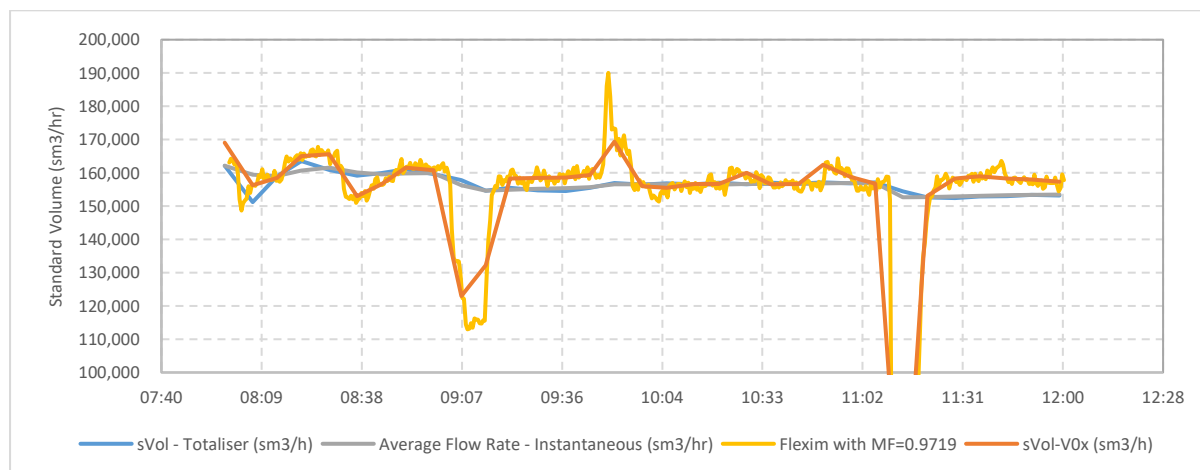


Figure 8: Flow Test 1 – USM and Orifice Flow Rates



The average flow rate has been calculated based on the totaliser and the instantaneous measured flow rates. The difference between these two figures is 0.23%. Based on the fluctuating flow rates and the sample frequency, this is considered to be a satisfactory resolution for the average flow rate for the test.

Table 14: Flow Test 1 – Average Flow Rates and Meter Factor

Description	Value	Unit
Orifice: Average Flow Rate (sm3/hr) - Instantaneous	153,504	sm3/hr
Orifice: Average Flow Rate (sm3/hr) - Difference Total	153,153	sm3/hr
Orifice: Difference - Total-Instantaneous	-351.26	sm3/hr
Orifice: Difference - Total-Instantaneous	-0.23	%
USM: Average Flow Rate (sm3/hr)	157,583	sm3/hr
Difference between Orifice and USM	-2.811	%
USM Meter Factor	0.9719	

Table 14 shows the average flow rates for the orifice and USM over the test period. The difference between the USM and Orifice was 2.811%, which relates to a Meter Factor of 0.9719.

Figure 9 shows the logged CV and Density from the Z0x file and the calculated values using ISO6976 and AGA8 calculations within excel based on the composition returned in the Z0x file. All values are coincident providing confidence in the logged data and the flow computer configuration.

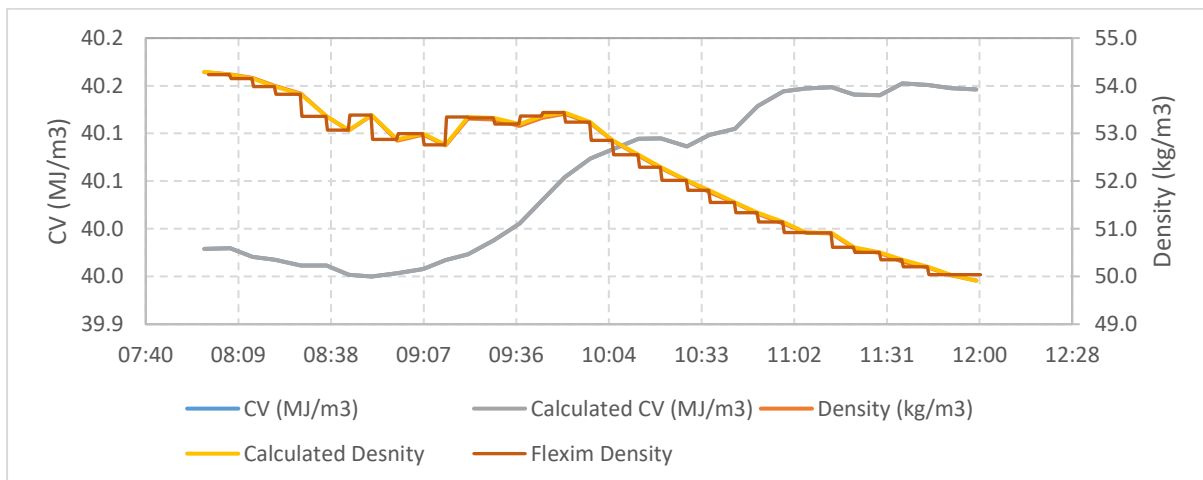


Figure 9: Flow Test 1 – CV and Density Checks

Also on the chart is the density used in the to establish the mass flow from the USM. The density has been calculated based on the pressure and temperature at the orifice. The stair case has been created because the USM meter stores data at a much higher frequency than the orifice. The density has been assumed to be constant between the orifice readings.



7.1.3 Flow Test 2 - Plate 295/5 Reverse Orientation

The orifice plate was removed and installed in the reverse orientation. Figure 10 and Figure 11 show the orifice orientation. The orifice is installed in the reverse orientation with the flow from left to right and the bevel on the upstream side and the sharp edge on the downstream side.



Figure 10: Flow Test 2 - Plate 1 (295/5) - Sharp Edge Downstream



Figure 11: Flow Test 2 - Plate 1 (295/5) – Bevel Upstream

Flow was available from 08:00, however the flow test commenced at 09:00 with an indicated throughput of approximately 160,000sm³/h. Flow was available up until 13:00, however the site was informed of a compressor trip upstream at 11:20 and the flow did drop significantly before recovering. The flow between 09:00 and 12:00 was stable and has been selected as the period for this test.

A plot of the flow rate over the period is presented in Figure 12. This plot shows a number of trends. The blue trend is the flow rate established from the totaliser from the Z0x file. The grey trend is the average flow rate established by calculating the average flow rate for all instantaneous readings from the Z0x file from the start of the test to the time it is plotted.



The orange trend shows the instantaneous readings taken from the Z0x file. The yellow trend is the Meter Factor corrected reading from the USM.

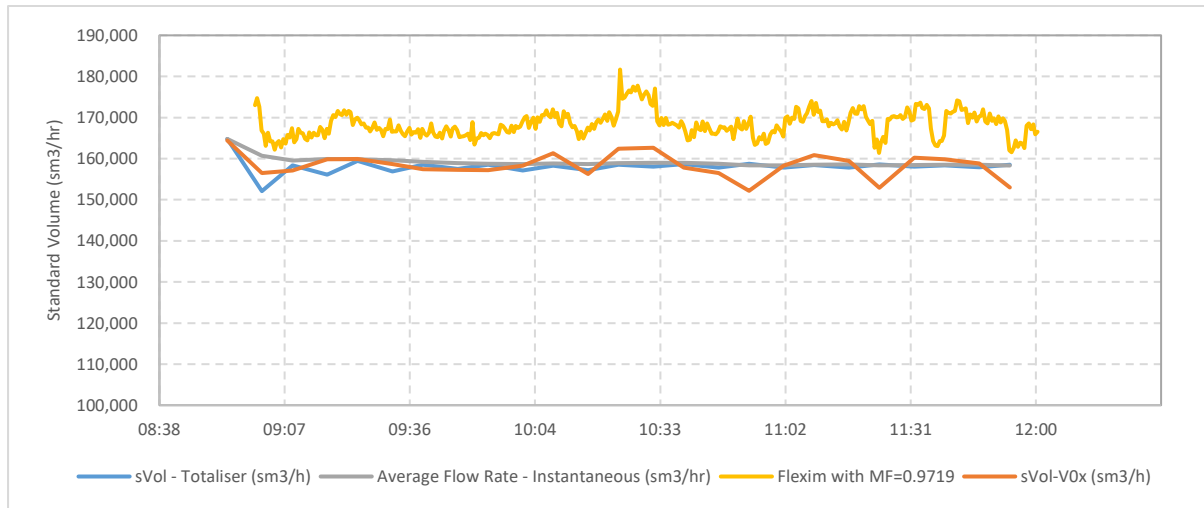


Figure 12: Flow Test 2 – USM and Orifice Flow Rates

The average flow rate has been calculated based on the totaliser and the instantaneous measured flow rates. The difference between these two figures is 0.14%. This is considered to be a satisfactory resolution for the average flow rate for the test.

Table 15: Flow Test 2 – Average Flow Rates and Meter Factor

Description	Value	Unit
Orifice: Average Flow Rate (sm3/hr) - Instantaneous	158,325	sm3/hr
Orifice: Average Flow Rate (sm3/hr) - Difference Total	158,548	sm3/hr
Orifice: Difference - Total-Instantaneous	223.34	sm3/hr
Orifice: Difference - Total-Instantaneous	0.14%	%
USM: Average Flow Rate (sm3/hr) (Meter Factor Applied)	168,355	sm3/hr
Difference between Orifice and USM	-5.814%	%

Table 15 shows the average flow rates for the orifice and Meter Factor corrected USM over the test period. The difference between the USM and Orifice was -5.814%.

The orange trend in Figure 12 is the USM instantaneous reading after correction by the meter factor. It can be seen that the Orifice is persistently reading lower than the meter factor corrected USM. The difference is -5.814%



using ISO6976 and AGA8 calculations within excel based on the composition returned in the Z0x file. All values are coincident providing confidence in the logged data and the flow computer configuration.

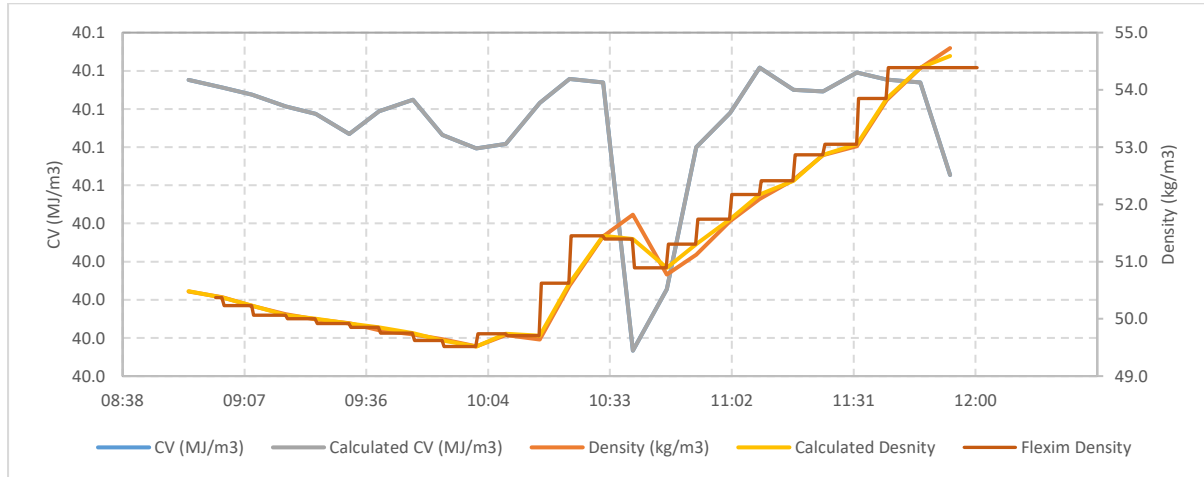


Figure 13: Flow Test 2 – CV and Density Checks

Also on the chart is the density used in the to establish the mass flow from the USM. The density has been calculated based on the pressure and temperature at the orifice. The stair case has been created because the USM meter stores data at a much higher frequency than the orifice. The density has been assumed to be constant between the orifice readings.

7.1.4 Flow Test 3 - Plate ARLE5036 Correct Orientation

The orifice details entered into the flow computer were taken from the latest calibration certificate (BA7932) and are presented in Table 16 below.

Table 16: Orifice Plate Metrology – ARLE5036 – Cert BA7932

Calibration Certificate	DNV GL: BA7932	
Certificate Issue Date	13th May 2021	
Plate Identification	BA7932	
Laboratory Temperature	20.8	DegC
Measured Bore Diameter	309.9834	mm
Nominal Pipe Diameter	432.2096	mm
Nominal Beta Ratio	0.717206	-

(Note the CFD was based on an earlier calibration certificate).

Photographs of the orifice plate installation are provided in Figure 14. The orifice is installed in the correct orientation with the flow from left to right and the bevel on the downstream side.



Figure 14: Flow Test 3 - Installation of plate 2 (ARLE5036)

Flow through the station started at 07:00 and the flow test commenced at 07:30 once the flow had stabilised at a throughput of approximately 160,000sm³/h and was completed by 11:10. The flow was stable throughout the flow test period.

A plot of the flow rate over the period is presented in Figure 15. This plot shows a number of trends. The blue trend is the flow rate established from the totaliser from the Z0x file. The grey trend is the average flow rate established by calculating the average flow rate for all instantaneous readings from the Z0x file from the start of the test to the time it is plotted.

The orange trend are the instantaneous readings taken from the Z0x file. The yellow trend is the Meter Factor corrected reading from the USM.

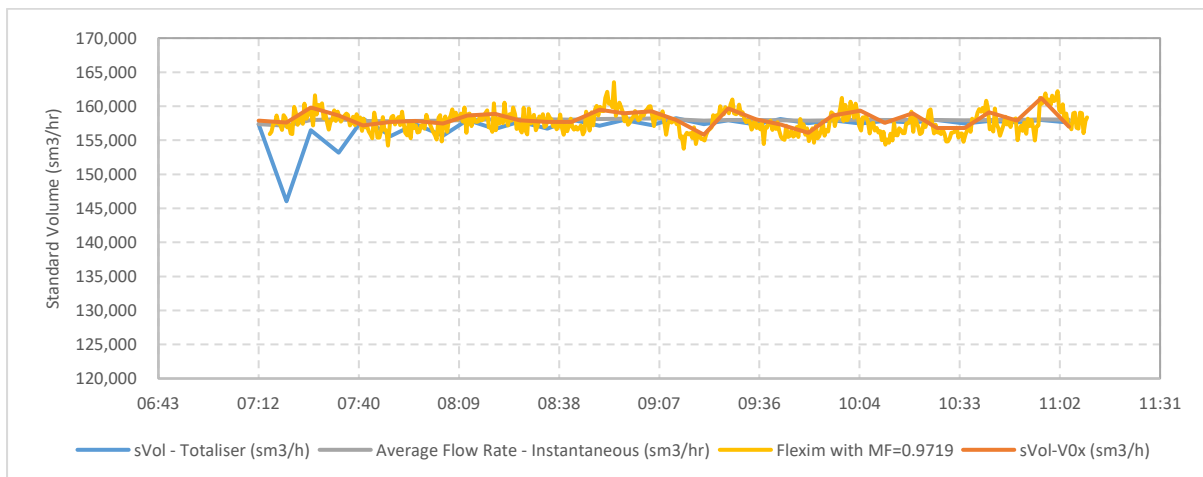


Figure 15: Flow Test 3 – USM and Orifice Flow Rates



The average flow rate has been calculated based on the totaliser and the instantaneous measured flow rates. The difference between these two figures is -0.27, this is considered to be a satisfactory resolution for the average flow rate for the test based on the sample interval and test duration.

Table 17: Flow Test 3 – Average Flow Rates and Meter Factor

Description	Value	Unit
Orifice: Average Flow Rate (sm3/hr) - Instantaneous	158,039	sm3/hr
Orifice: Average Flow Rate (sm3/hr) - Difference Total	157,612	sm3/hr
Orifice: Difference - Total-Instantaneous	-427.58	sm3/hr
Orifice: Difference - Total-Instantaneous	-0.27	%
USM: Average Flow Rate (sm3/hr)	157,651	sm3/hr
Difference between Orifice and USM	-0.025	%
USM Meter Factor in use (from test 1)	0.9719	

Table 17 shows the average flow rates for the orifice and USM over the test period. The difference between the USM and Orifice was -0.025%, which demonstrates excellent reproducibility from the first flow test.

The orange trend in Figure 15 is the USM instantaneous reading after correction by the meter factor. It can be seen that the USM and Orifice are in very close agreement after the application of the meter factor.

Figure 16 shows the logged CV and Density from the Z0x file and the calculated values using ISO6976 and AGA8 calculations within excel based on the composition returned in the Z0x file. All values are coincident providing confidence in the logged data and the flow computer configuration.

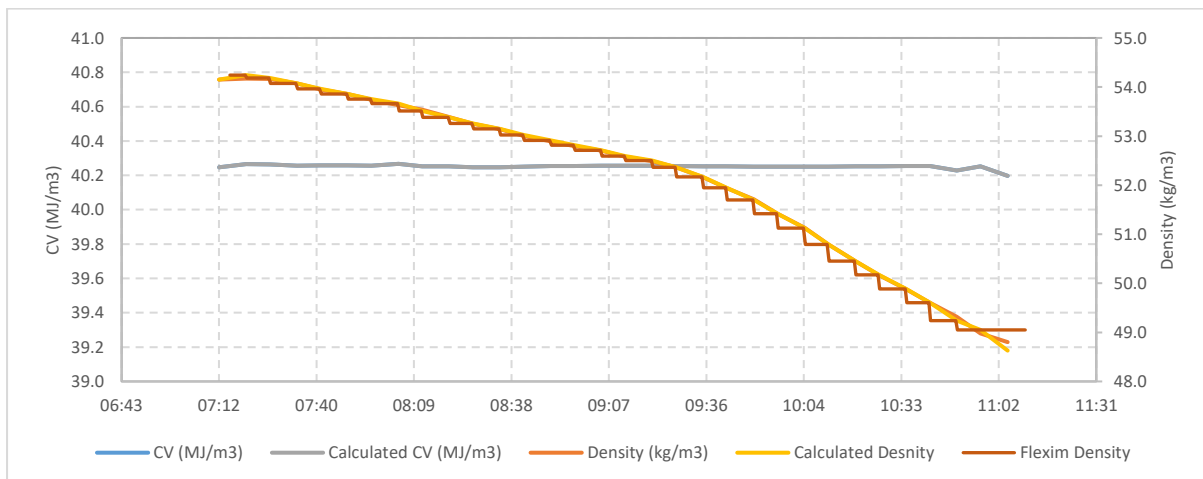


Figure 16: Flow Test 3 – CV and Density Checks

Also on the chart is the density used in the to establish the mass flow from the USM. The density has been calculated based on the pressure and temperature at the orifice. The stair case has been created because the USM meter stores data at a much higher frequency than the orifice. The density has been assumed to be constant between the orifice readings.



7.1.5 Flow Test 4 - Plate ARLE5036 Reverse Orientation

The orifice details entered in to the flow computer are the same as those for test 3 and are presented in Table 16.

The orifice plate was removed and installed in the reverse orientation. Figure 17 and Figure 18 show the orifice orientation. The orifice is installed in the reverse orientation with the flow from left to right and the bevel on the upstream side and the sharp edge on the downstream side.



Figure 17: Flow Test 4 - Plate 2 (ARLE5036) - Sharp Edge Downstream



Figure 18: Flow Test 4 - Plate 2 (ARLE5036) – Bevel Upstream

Flow was available from 08:00, and the flow test commenced at 08:15 with an indicated throughput of approximately 160,000sm³/h. Flow was available up until 12:15. The flow between 08:15 and 12:15 was stable and has been selected as the period for this test.



A plot of the flow rate over the period is presented in Figure 19. This plot shows a number of trends. The blue trend is the flow rate established from the totaliser from the Z0x file. The grey trend is the average flow rate established by calculating the average flow rate for all instantaneous readings from the Z0x file from the start of the test to the time it is plotted.

The orange trend shows the instantaneous readings taken from the Z0x file. The yellow trend is the Meter Factor corrected reading from the USM.

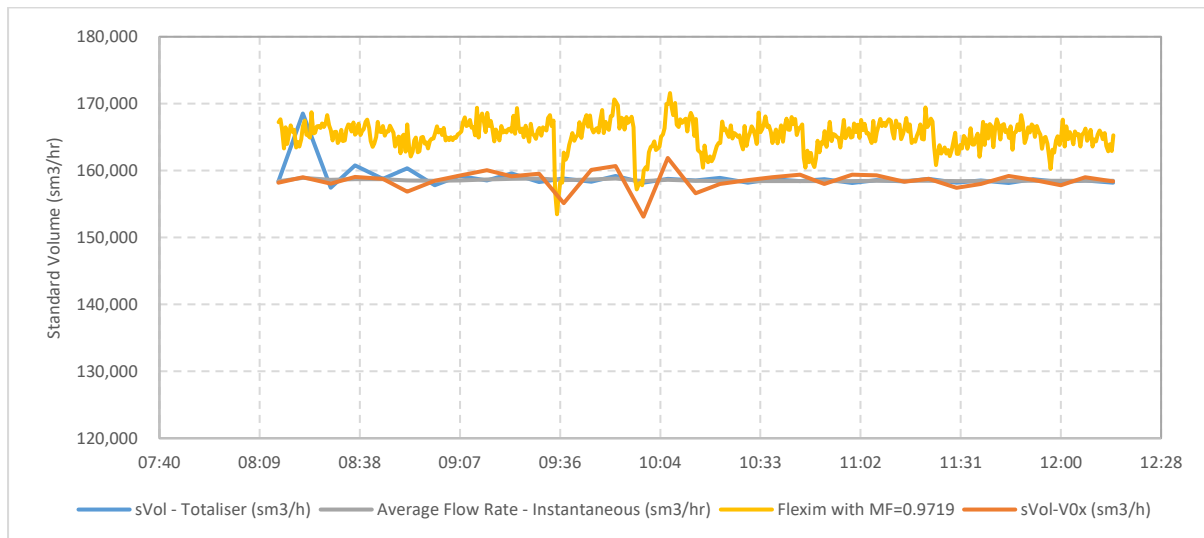


Figure 19: Flow Test 4 – USM and Orifice Flow Rates

The average flow rate has been calculated based on the totaliser and the instantaneous measured flow rates. The difference between these two figures is -0.2%. This is considered to be a satisfactory resolution for the average flow rate for the test based on the duration and sample interval.

Table 18: Flow Test 4 – Average Flow Rates and Meter Factor

Description	Value	Unit
Orifice: Average Flow Rate (sm3/hr) - Instantaneous	158,487	sm3/hr
Orifice: Average Flow Rate (sm3/hr) - Difference Total	158,178	sm3/hr
Orifice: Difference - Total-Instantaneous	-309.82	sm3/hr
Orifice: Difference - Total-Instantaneous	-0.2%	%
USM: Average Flow Rate (sm3/hr) (Meter Factor Applied)	165,326	sm3/hr
Difference between Orifice and USM	-4.324%	%

Table 18 shows the average flow rates for the orifice and Meter Factor corrected USM over the test period. The difference between the USM and Orifice was -4.324%.

The orange trend in Figure 19 is the USM instantaneous reading after correction by the meter factor. It can be seen that the Orifice is persistently reading lower than the meter factor corrected USM. The difference is -4.324%



Figure 20 shows the logged CV and Density from the Z0x file and the calculated values using ISO6976 and AGA8 calculations within excel based on the composition returned in the Z0x file. All values are coincident providing confidence in the logged data and the flow computer configuration.

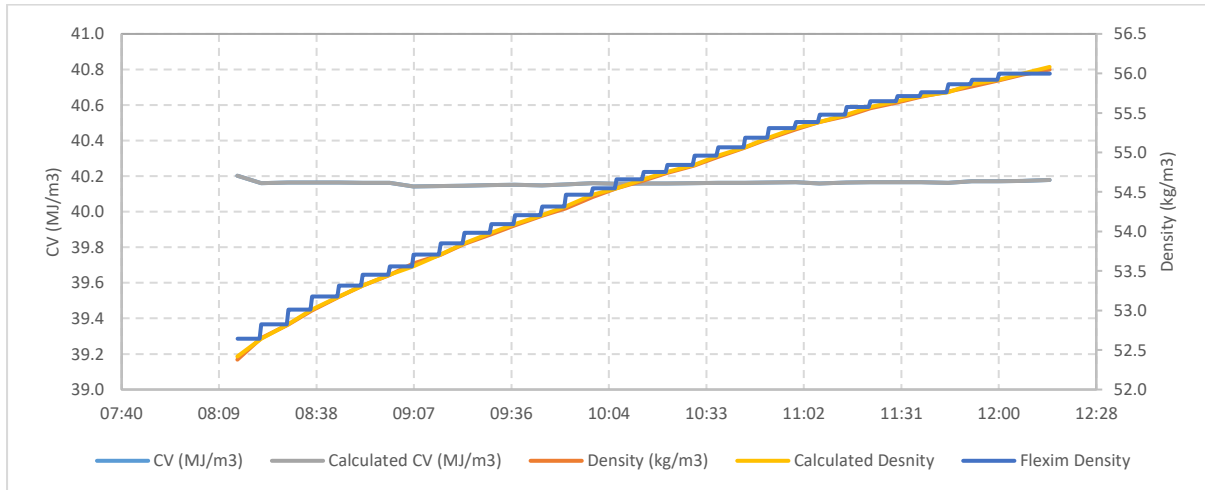


Figure 20: Flow Test 4 – CV and Density Checks

Also on the chart is the density used in the to establish the mass flow from the USM. The density has been calculated based on the pressure and temperature at the orifice. The stair case has been created because the USM meter stores data at a much higher frequency than the orifice. The density has been assumed to be constant between the orifice readings.



8 Determination of Correction Factor

The CFD results for plate 295/5 in the forward orientation are presented in Table 19 and Figure 21. Both CFX and Fluent provide very similar results which are within 0.5% of ISO 5167. Results for both plates were very similar.

Table 19: CFD Results – Forward Orientation (Plate 295/5)

Standard Volume Flow (sm ³ /hr)	5167 Ce	CFX Ce	Fluent Ce
115,000	0.5978	0.5965	0.5962
175,000	0.5973	0.5951	0.595
235,000	0.5969	0.5939	0.5942

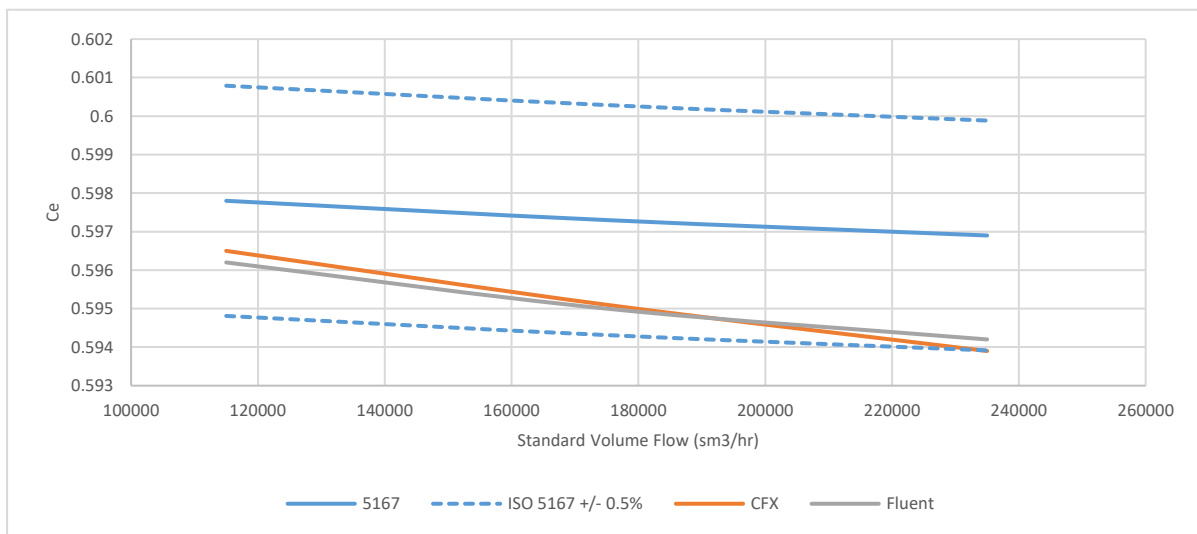


Figure 21: CFD Results – Forward Orientation (Plate 295/5)

The measurement error for both plates installed in the reverse orientation is presented in Figure 22 and Table 20

Table 20: CFD Results – Reverse Orientation

Standard Volume Flow (sm ³ /hr)	CFX (295/5)	Fluent (295/5)	CFX (ALRE5036)	Fluent (ARLE 5036)
115,000	-5.70%	-4.95%	-4.158%	-3.66%
175,000	-5.58%	-4.92%	-4.083%	-3.63%
235,000	-5.56%	-4.91%	-4.041%	-3.64%

Both CFD packages give a smaller measurement error for plate ARLE5036 than for plate 295/5. Fluent gives a smaller error than CFX.

Figure 21 presents a chart of the measurement error predicted by both CFD methodologies for both orifice plates installed in the reverse orientation. Also plotted in this chart are the flow test results for the plates in reverse orientation.

The flow test results are very close to the CFX CFD simulation results. Based on the flow testing performed, plate 295/5 under measured in the reverse orientation by 5.814%. This compares to a 5.58% under measurement predicted by the CFX CFD, a difference of only 0.23%.



Based on the flow testing performed, plate ARLE5036 under measured in the reverse orientation by 4.324%. This compares to a 4.07% under measurement predicted by the CFX CFD, a difference of only 0.254%.

The difference between the CFX and fluent results is 0.65% for plate 295/5 and 0.45% for plate ARLE5036.

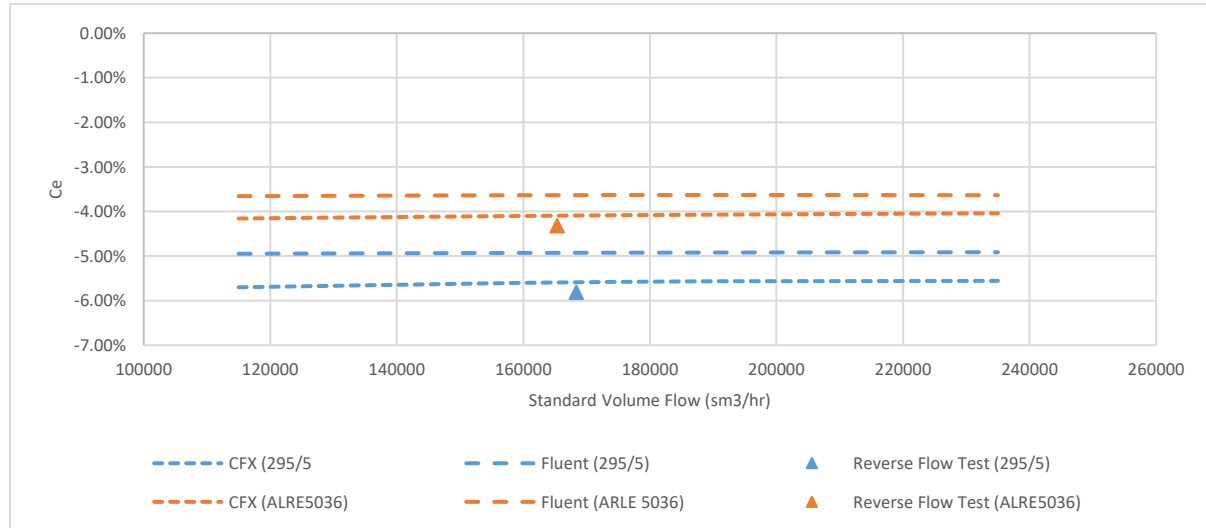


Figure 22: CFD Results – Reverse Orientation

Based on the above results the flow correction has been based on the flow test results.

- The difference between the flow test results in the forward orientation for both plates was 0.025%. This demonstrated excellent reproducibility for the flow tests.
- The difference between the average flow rate from the flow tests calculated from the average of the instantaneous samples and the difference of the totaliser values was within 0.25%. This demonstrated a satisfactory averaging methodology for the flow tests and indicate the likely range of values between which the true value for the measurement error would be.
- The uncertainty of the flow tests is less than the spread of the results from the CFD calculation which would indicate that the flow tests provide a more reliable figure than the CFD results.
- The predicted measurement error from the CFD is relatively flat across the flow range simulated indicating negligible Reynolds number influence. A constant measurement error will therefore be applied across the full range of flow rates.

The measurement error / correction applied is presented in Table 21.

Table 21: Applied Measurement Error / Correction

Orifice Plate	Measurement Error	Correction Applied
295/5	-5.814%	1.0617
ARLE5036	-4.324	1.0452



Appendix 1 Full MER by Day

Table 22: Full MER by Day

Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
2019	3,106,378,611	284,397,965	39.31	1.0606	3,297,695,846	301,913,523	191,317,235	17,515,558
May	40,545,278	3,717,809	39.19	1.0427	42,700,596	3,915,401	2,155,318	197,592
19-May	0	0	38.74	1.0000	0	0	0	0
20-May	0	0	38.76	1.0000	0	0	0	0
21-May	2,690,000	247,315	39.26	1.0000	2,690,000	247,315	0	0
22-May	2,923,056	268,025	39.27	1.0000	2,923,056	268,025	0	0
23-May	9,573,889	877,300	39.27	1.0617	10,164,598	931,429	590,709	54,129
24-May	2,671,389	244,846	39.29	1.0617	2,836,214	259,953	164,825	15,107
25-May	1,110,278	101,728	39.27	1.0617	1,178,782	108,005	68,504	6,277
26-May	0	0	39.27	1.0617	0	0	0	0
27-May	0	0	39.27	1.0617	0	0	0	0
28-May	0	0	39.27	1.0617	0	0	0	0
29-May	3,199,167	293,281	39.28	1.0617	3,396,555	311,376	197,389	18,095
30-May	1,667	146	39.26	1.0617	1,770	155	103	9
31-May	18,375,833	1,685,168	39.30	1.0617	19,509,622	1,789,143	1,133,789	103,975
Jun	172,681,111	15,930,031	39.15	1.0617	183,335,536	16,912,914	10,654,425	982,883
01-Jun	0	0	39.30	1.0617	0	0	0	0
02-Jun	0	0	39.30	1.0617	0	0	0	0
03-Jun	0	0	39.30	1.0617	0	0	0	0
04-Jun	0	0	39.20	1.0617	0	0	0	0
05-Jun	0	0	39.34	1.0617	0	0	0	0
06-Jun	0	0	39.03	1.0617	0	0	0	0
07-Jun	0	0	39.19	1.0617	0	0	0	0
08-Jun	0	0	38.95	1.0617	0	0	0	0
11-Jun	0	0	39.26	1.0617	0	0	0	0
12-Jun	0	0	39.29	1.0617	0	0	0	0
13-Jun	0	0	39.35	1.0617	0	0	0	0
14-Jun	3,333	301	39.28	1.0617	3,539	320	206	19
15-Jun	0	0	39.26	1.0617	0	0	0	0
16-Jun	0	0	39.31	1.0617	0	0	0	0
17-Jun	29,135,833	2,667,373	39.25	1.0617	30,933,514	2,831,950	1,797,681	164,577
18-Jun	41,139,722	3,779,740	38.87	1.0617	43,678,043	4,012,950	2,538,321	233,210
19-Jun	39,330,833	3,645,990	38.91	1.0617	41,757,546	3,870,948	2,426,712	224,958
20-Jun	42,841,111	3,961,984	39.02	1.0617	45,484,408	4,206,438	2,643,297	244,454
21-Jun	20,230,278	1,874,643	39.19	1.0617	21,478,486	1,990,308	1,248,208	115,665
22-Jun	0	0	39.20	1.0617	0	0	0	0
23-Jun	0	0	39.12	1.0617	0	0	0	0
24-Jun	0	0	39.11	1.0617	0	0	0	0
25-Jun	0	0	39.33	1.0617	0	0	0	0
26-Jun	0	0	38.95	1.0617	0	0	0	0
27-Jun	0	0	39.36	1.0617	0	0	0	0
28-Jun	0	0	38.75	1.0617	0	0	0	0
29-Jun	0	0	38.92	1.0617	0	0	0	0
30-Jun	0	0	38.80	1.0617	0	0	0	0
Jul	0	0	38.96	1.0617	0	0	0	0
01-Jul	0	0	38.78	1.0617	0	0	0	0
02-Jul	0	0	38.88	1.0617	0	0	0	0



iVJob22008-RPT-002 (SMER)



iVJob22008-RPT-002-F01

24/05/2022

Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
03-Jul	0	0	39.13	1.0617	0	0	0	0
04-Jul	0	0	39.22	1.0617	0	0	0	0
05-Jul	0	0	38.94	1.0617	0	0	0	0
06-Jul	0	0	38.68	1.0617	0	0	0	0
07-Jul	0	0	38.62	1.0617	0	0	0	0
08-Jul	0	0	39.82	1.0617	0	0	0	0
09-Jul	0	0	39.09	1.0617	0	0	0	0
10-Jul	0	0	38.97	1.0617	0	0	0	0
11-Jul	0	0	38.88	1.0617	0	0	0	0
12-Jul	0	0	39.00	1.0617	0	0	0	0
13-Jul	0	0	39.08	1.0617	0	0	0	0
14-Jul	0	0	39.05	1.0617	0	0	0	0
15-Jul	0	0	39.54	1.0617	0	0	0	0
16-Jul	0	0	38.86	1.0617	0	0	0	0
17-Jul	0	0	38.74	1.0617	0	0	0	0
18-Jul	0	0	38.71	1.0617	0	0	0	0
19-Jul	0	0	38.68	1.0617	0	0	0	0
20-Jul	0	0	38.73	1.0617	0	0	0	0
21-Jul	0	0	38.77	1.0617	0	0	0	0
22-Jul	0	0	38.72	1.0617	0	0	0	0
23-Jul	0	0	39.42	1.0617	0	0	0	0
24-Jul	0	0	38.97	1.0617	0	0	0	0
25-Jul	0	0	38.78	1.0617	0	0	0	0
26-Jul	0	0	38.82	1.0617	0	0	0	0
27-Jul	0	0	38.97	1.0617	0	0	0	0
28-Jul	0	0	39.13	1.0617	0	0	0	0
29-Jul	0	0	39.02	1.0617	0	0	0	0
30-Jul	0	0	38.77	1.0617	0	0	0	0
31-Jul	0	0	38.98	1.0617	0	0	0	0
Aug	269,444	24,938	39.36	1.0617	286,069	26,477	16,625	1,539
01-Aug	0	0	38.98	1.0617	0	0	0	0
02-Aug	0	0	38.95	1.0617	0	0	0	0
03-Aug	0	0	39.00	1.0617	0	0	0	0
04-Aug	0	0	38.87	1.0617	0	0	0	0
05-Aug	0	0	39.22	1.0617	0	0	0	0
06-Aug	0	0	38.89	1.0617	0	0	0	0
07-Aug	0	0	38.72	1.0617	0	0	0	0
08-Aug	0	0	38.55	1.0617	0	0	0	0
09-Aug	0	0	38.73	1.0617	0	0	0	0
10-Aug	0	0	38.72	1.0617	0	0	0	0
11-Aug	0	0	38.76	1.0617	0	0	0	0
12-Aug	0	0	39.17	1.0617	0	0	0	0
13-Aug	0	0	38.85	1.0617	0	0	0	0
14-Aug	250,556	23,244	39.25	1.0617	266,015	24,678	15,459	1,434
15-Aug	0	0	39.22	1.0617	0	0	0	0
16-Aug	0	0	39.31	1.0617	0	0	0	0
17-Aug	0	0	39.35	1.0617	0	0	0	0
18-Aug	0	0	39.33	1.0617	0	0	0	0
19-Aug	278	32	39.92	1.0617	295	34	17	2



iVJob22008-RPT-002 (SMER)



iVJob22008-RPT-002-F01

24/05/2022

Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
20-Aug	1,389	114	40.02	1.0617	1,475	121	86	7
21-Aug	0	0	39.87	1.0617	0	0	0	0
22-Aug	833	86	39.81	1.0617	885	91	51	5
23-Aug	833	70	39.92	1.0617	885	74	51	4
24-Aug	556	34	39.62	1.0617	590	36	34	2
25-Aug	0	0	39.71	1.0617	0	0	0	0
26-Aug	7,778	722	39.85	1.0617	8,258	767	480	45
27-Aug	5,833	520	39.75	1.0617	6,193	552	360	32
28-Aug	1,389	116	39.86	1.0617	1,475	123	86	7
29-Aug	0	0	39.99	1.0617	0	0	0	0
30-Aug	0	0	40.13	1.0617	0	0	0	0
31-Aug	0	0	39.90	1.0617	0	0	0	0
Sep	0	0	39.79	1.0617	0	0	0	0
01-Sep	0	0	39.76	1.0617	0	0	0	0
02-Sep	0	0	39.82	1.0617	0	0	0	0
03-Sep	0	0	39.87	1.0617	0	0	0	0
04-Sep	0	0	39.85	1.0617	0	0	0	0
05-Sep	0	0	39.83	1.0617	0	0	0	0
06-Sep	0	0	39.72	1.0617	0	0	0	0
07-Sep	0	0	40.04	1.0617	0	0	0	0
08-Sep	0	0	40.01	1.0617	0	0	0	0
09-Sep	0	0	40.18	1.0617	0	0	0	0
10-Sep	0	0	40.08	1.0617	0	0	0	0
11-Sep	0	0	39.49	1.0617	0	0	0	0
12-Sep	0	0	39.91	1.0617	0	0	0	0
13-Sep	0	0	39.92	1.0617	0	0	0	0
14-Sep	0	0	39.72	1.0617	0	0	0	0
15-Sep	0	0	39.49	1.0617	0	0	0	0
16-Sep	0	0	39.92	1.0617	0	0	0	0
17-Sep	0	0	39.87	1.0617	0	0	0	0
18-Sep	0	0	39.51	1.0617	0	0	0	0
19-Sep	0	0	39.99	1.0617	0	0	0	0
20-Sep	0	0	39.51	1.0617	0	0	0	0
21-Sep	0	0	39.71	1.0617	0	0	0	0
22-Sep	0	0	39.76	1.0617	0	0	0	0
23-Sep	0	0	39.83	1.0617	0	0	0	0
24-Sep	0	0	39.74	1.0617	0	0	0	0
25-Sep	0	0	39.57	1.0617	0	0	0	0
26-Sep	0	0	39.64	1.0617	0	0	0	0
27-Sep	0	0	39.73	1.0617	0	0	0	0
28-Sep	0	0	39.91	1.0617	0	0	0	0
29-Sep	0	0	39.94	1.0617	0	0	0	0
30-Sep	0	0	39.36	1.0617	0	0	0	0
Oct	0	0	39.33	1.0617	0	0	0	0
01-Oct	0	0	39.31	1.0617	0	0	0	0
02-Oct	0	0	39.31	1.0617	0	0	0	0
03-Oct	0	0	39.31	1.0617	0	0	0	0
04-Oct	0	0	39.29	1.0617	0	0	0	0
05-Oct	0	0	39.33	1.0617	0	0	0	0



iVJob22008-RPT-002 (SMER)



iVJob22008-RPT-002-F01

24/05/2022

Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
06-Oct	0	0	39.33	1.0617	0	0	0	0
07-Oct	0	0	39.29	1.0617	0	0	0	0
08-Oct	0	0	39.30	1.0617	0	0	0	0
09-Oct	0	0	39.36	1.0617	0	0	0	0
10-Oct	0	0	39.28	1.0617	0	0	0	0
11-Oct	0	0	39.29	1.0617	0	0	0	0
12-Oct	0	0	39.35	1.0617	0	0	0	0
13-Oct	0	0	39.36	1.0617	0	0	0	0
14-Oct	0	0	39.34	1.0617	0	0	0	0
17-Oct	0	0	39.48	1.0617	0	0	0	0
18-Oct	0	0	39.35	1.0617	0	0	0	0
19-Oct	0	0	39.27	1.0617	0	0	0	0
20-Oct	0	0	39.29	1.0617	0	0	0	0
21-Oct	0	0	39.29	1.0617	0	0	0	0
22-Oct	0	0	39.32	1.0617	0	0	0	0
23-Oct	0	0	39.47	1.0617	0	0	0	0
24-Oct	0	0	39.25	1.0617	0	0	0	0
25-Oct	0	0	39.21	1.0617	0	0	0	0
26-Oct	0	0	39.22	1.0617	0	0	0	0
27-Oct	0	0	39.55	1.0617	0	0	0	0
28-Oct	0	0	39.52	1.0617	0	0	0	0
29-Oct	0	0	39.22	1.0617	0	0	0	0
30-Oct	0	0	39.28	1.0617	0	0	0	0
31-Oct	0	0	39.32	1.0617	0	0	0	0
Nov	1,365,754,444	124,790,457	39.39	1.0617	1,450,021,494	132,490,028	84,267,049	7,699,571
01-Nov	21,777,778	2,001,931	39.17	1.0617	23,121,467	2,125,450	1,343,689	123,519
02-Nov	37,248,333	3,422,023	39.19	1.0617	39,546,556	3,633,162	2,298,222	211,139
03-Nov	37,796,667	3,468,672	39.24	1.0617	40,128,721	3,682,689	2,332,054	214,017
04-Nov	39,236,667	3,600,066	39.19	1.0617	41,657,569	3,822,190	2,420,902	222,124
05-Nov	37,828,611	3,477,613	39.15	1.0617	40,162,636	3,692,182	2,334,025	214,569
06-Nov	42,122,222	3,843,756	39.26	1.0617	44,721,163	4,080,916	2,598,941	237,160
07-Nov	49,903,611	4,572,790	39.28	1.0617	52,982,664	4,854,931	3,079,053	282,141
08-Nov	46,448,056	4,257,456	39.26	1.0617	49,313,901	4,520,141	2,865,845	262,685
09-Nov	42,676,667	3,905,040	39.21	1.0617	45,309,817	4,145,981	2,633,150	240,941
10-Nov	48,404,722	4,409,245	39.76	1.0617	51,391,294	4,681,295	2,986,571	272,050
11-Nov	42,000,278	3,812,934	39.47	1.0617	44,591,695	4,048,192	2,591,417	235,258
12-Nov	44,597,500	4,071,967	39.03	1.0617	47,349,166	4,323,207	2,751,666	251,240
13-Nov	49,730,000	4,548,455	39.63	1.0617	52,798,341	4,829,095	3,068,341	280,640
14-Nov	48,798,056	4,468,470	39.10	1.0617	51,808,896	4,744,175	3,010,840	275,705
15-Nov	57,374,444	5,268,707	39.01	1.0617	60,914,448	5,593,786	3,540,003	325,079
16-Nov	52,534,444	4,800,699	39.56	1.0617	55,775,820	5,096,902	3,241,375	296,203
17-Nov	45,939,722	4,166,022	39.72	1.0617	48,774,203	4,423,066	2,834,481	257,044
18-Nov	43,613,611	3,996,918	39.50	1.0617	46,304,571	4,243,528	2,690,960	246,610
19-Nov	51,871,111	4,700,253	39.57	1.0617	55,071,559	4,990,259	3,200,448	290,006
20-Nov	59,951,667	5,468,136	39.45	1.0617	63,650,685	5,805,520	3,699,018	337,384
21-Nov	54,321,111	4,957,052	39.45	1.0617	57,672,724	5,262,902	3,351,613	305,850
22-Nov	56,921,944	5,194,536	39.44	1.0617	60,434,028	5,515,039	3,512,084	320,503
23-Nov	46,560,833	4,248,322	39.39	1.0617	49,433,637	4,510,443	2,872,803	262,121
24-Nov	42,536,944	3,897,990	39.96	1.0617	45,161,474	4,138,496	2,624,529	240,506



iVJob22008-RPT-002 (SMER)



iVJob22008-RPT-002-F01

24/05/2022

Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
25-Nov	41,315,000	3,734,958	39.93	1.0617	43,864,136	3,965,405	2,549,136	230,447
26-Nov	45,400,278	4,133,017	39.56	1.0617	48,201,475	4,388,024	2,801,197	255,007
27-Nov	41,452,222	3,782,917	39.18	1.0617	44,009,824	4,016,323	2,557,602	233,406
28-Nov	40,715,833	3,725,185	39.23	1.0617	43,228,000	3,955,029	2,512,167	229,844
29-Nov	44,877,500	4,113,786	39.37	1.0617	47,646,442	4,367,607	2,768,942	253,821
30-Nov	51,798,611	4,741,541	39.31	1.0617	54,994,585	5,034,094	3,195,974	292,553
Dec	1,527,128,333	139,934,730	39.26	1.0617	1,621,352,152	148,568,703	94,223,818	8,633,973
01-Dec	53,109,722	4,866,920	39.39	1.0617	56,386,592	5,167,209	3,276,870	300,289
02-Dec	51,757,500	4,726,697	39.25	1.0617	54,950,938	5,018,334	3,193,438	291,637
03-Dec	55,124,167	5,058,917	39.20	1.0617	58,525,328	5,371,052	3,401,161	312,135
04-Dec	50,322,778	4,615,395	39.29	1.0617	53,427,693	4,900,165	3,104,915	284,770
05-Dec	54,777,222	5,023,477	39.24	1.0617	58,156,977	5,333,426	3,379,755	309,949
06-Dec	50,847,500	4,663,083	39.25	1.0617	53,984,791	4,950,795	3,137,291	287,712
07-Dec	41,503,611	3,812,310	39.25	1.0617	44,064,384	4,047,530	2,560,773	235,220
08-Dec	41,360,833	3,764,203	39.89	1.0617	43,912,797	3,996,454	2,551,963	232,251
09-Dec	44,267,222	4,040,833	39.91	1.0617	46,998,510	4,290,152	2,731,288	249,319
10-Dec	58,934,722	5,341,668	39.51	1.0617	62,570,995	5,671,249	3,636,272	329,581
11-Dec	57,222,222	5,199,632	39.37	1.0617	60,752,833	5,520,449	3,530,611	320,817
12-Dec	54,493,333	4,952,107	39.71	1.0617	57,855,572	5,257,652	3,362,239	305,545
13-Dec	55,199,444	5,015,768	39.58	1.0617	58,605,250	5,325,241	3,405,806	309,473
14-Dec	54,300,000	4,954,958	39.26	1.0617	57,650,310	5,260,679	3,350,310	305,721
15-Dec	54,728,889	5,028,500	39.56	1.0617	58,105,661	5,338,758	3,376,772	310,258
16-Dec	53,582,222	4,901,019	39.45	1.0617	56,888,245	5,203,412	3,306,023	302,393
17-Dec	59,598,333	5,443,429	38.63	1.0617	63,275,551	5,779,289	3,677,217	335,860
18-Dec	57,653,056	5,315,271	39.06	1.0617	61,210,249	5,643,223	3,557,194	327,952
19-Dec	57,567,778	5,324,118	38.93	1.0617	61,119,710	5,652,616	3,551,932	328,498
20-Dec	48,271,111	4,469,561	38.85	1.0617	51,249,439	4,745,333	2,978,328	275,772
21-Dec	47,668,056	4,404,132	38.89	1.0617	50,609,175	4,675,867	2,941,119	271,735
22-Dec	45,466,944	4,197,334	39.62	1.0617	48,272,255	4,456,310	2,805,310	258,976
23-Dec	41,315,278	3,825,534	38.76	1.0617	43,864,430	4,061,569	2,549,153	236,035
24-Dec	44,829,444	4,158,506	38.70	1.0617	47,595,421	4,415,086	2,765,977	256,580
25-Dec	39,901,111	3,683,409	38.75	1.0617	42,363,010	3,910,675	2,461,899	227,266
26-Dec	39,512,778	3,644,875	38.65	1.0617	41,950,716	3,869,764	2,437,938	224,889
27-Dec	45,025,833	4,101,824	39.84	1.0617	47,803,927	4,354,907	2,778,094	253,083
28-Dec	43,401,667	3,950,009	39.04	1.0617	46,079,550	4,193,725	2,677,883	243,716
29-Dec	36,549,167	3,348,575	39.08	1.0617	38,804,250	3,555,182	2,255,084	206,607
30-Dec	43,442,778	3,963,993	39.58	1.0617	46,123,197	4,208,571	2,680,419	244,578
31-Dec	45,393,611	4,138,673	39.50	1.0617	48,194,397	4,394,029	2,800,786	255,356
2020	8,084,646,944	739,806,722	39.35	1.0515	8,524,564,097	780,069,023	439,917,153	40,262,301
Jan	1,495,010,000	137,139,692	39.27	1.0617	1,587,252,117	145,601,211	92,242,117	8,461,519
01-Jan	47,634,722	4,334,957	39.30	1.0617	50,573,785	4,602,424	2,939,062	267,467
02-Jan	43,354,444	3,979,830	38.84	1.0617	46,029,414	4,225,386	2,674,969	245,556
03-Jan	44,443,333	4,119,161	38.87	1.0617	47,185,487	4,373,313	2,742,154	254,152
04-Jan	43,854,444	4,057,342	38.90	1.0617	46,560,264	4,307,680	2,705,819	250,338
05-Jan	41,378,611	3,814,186	39.63	1.0617	43,931,671	4,049,521	2,553,060	235,335
06-Jan	38,515,000	3,507,409	39.50	1.0617	40,891,376	3,723,816	2,376,376	216,407
07-Jan	44,483,056	4,060,200	39.62	1.0617	47,227,660	4,310,714	2,744,605	250,514
08-Jan	46,916,667	4,323,272	38.92	1.0617	49,811,425	4,590,018	2,894,758	266,746
09-Jan	41,171,389	3,810,867	38.91	1.0617	43,711,664	4,045,997	2,540,275	235,130



iVJob22008-RPT-002 (SMER)



iVJob22008-RPT-002-F01

24/05/2022

Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
10-Jan	43,811,111	4,033,687	39.11	1.0617	46,514,257	4,282,565	2,703,146	248,878
11-Jan	51,064,444	4,696,971	39.12	1.0617	54,215,121	4,986,774	3,150,676	289,803
12-Jan	43,450,833	3,970,429	39.59	1.0617	46,131,750	4,215,404	2,680,916	244,975
13-Jan	39,982,500	3,631,847	39.74	1.0617	42,449,420	3,855,932	2,466,920	224,085
14-Jan	52,278,611	4,755,304	39.31	1.0617	55,504,201	5,048,706	3,225,590	293,402
15-Jan	51,282,222	4,668,079	39.74	1.0617	54,446,335	4,956,099	3,164,113	288,020
16-Jan	49,148,889	4,502,350	39.52	1.0617	52,181,375	4,780,145	3,032,486	277,795
17-Jan	51,593,056	4,670,433	39.43	1.0617	54,776,347	4,958,599	3,183,292	288,166
18-Jan	50,796,667	4,659,343	39.24	1.0617	53,930,821	4,946,824	3,134,154	287,481
19-Jan	53,162,778	4,903,436	38.97	1.0617	56,442,921	5,205,978	3,280,143	302,542
20-Jan	54,164,722	4,994,048	39.04	1.0617	57,506,686	5,302,181	3,341,963	308,133
21-Jan	57,548,333	5,306,808	39.13	1.0617	61,099,066	5,634,238	3,550,732	327,430
22-Jan	56,678,611	5,215,033	39.13	1.0617	60,175,681	5,536,801	3,497,070	321,768
23-Jan	52,130,000	4,792,331	39.15	1.0617	55,346,421	5,088,018	3,216,421	295,687
24-Jan	47,603,889	4,381,714	39.10	1.0617	50,541,049	4,652,066	2,937,160	270,352
25-Jan	48,395,000	4,466,683	39.07	1.0617	51,380,972	4,742,277	2,985,972	275,594
26-Jan	43,542,500	4,020,287	39.01	1.0617	46,229,072	4,268,339	2,686,572	248,052
27-Jan	44,909,444	4,142,469	39.06	1.0617	47,680,357	4,398,059	2,770,913	255,590
28-Jan	55,386,111	5,066,400	39.60	1.0617	58,803,434	5,378,997	3,417,323	312,597
29-Jan	56,724,722	5,167,125	39.51	1.0617	60,224,638	5,485,937	3,499,915	318,812
30-Jan	55,075,556	5,031,200	39.55	1.0617	58,473,717	5,341,625	3,398,162	310,425
31-Jan	44,528,333	4,056,491	39.63	1.0617	47,275,732	4,306,776	2,747,398	250,285
Feb	1,482,268,056	135,517,531	39.33	1.0617	1,573,723,995	143,878,963	91,455,939	8,361,432
01-Feb	40,208,333	3,652,965	39.18	1.0617	42,689,188	3,878,353	2,480,854	225,388
02-Feb	37,286,667	3,409,495	39.28	1.0617	39,587,254	3,619,861	2,300,587	210,366
03-Feb	37,950,278	3,485,498	39.05	1.0617	40,291,810	3,700,553	2,341,532	215,055
04-Feb	48,578,611	4,438,854	39.44	1.0617	51,575,911	4,712,731	2,997,300	273,877
05-Feb	53,778,056	4,922,483	39.09	1.0617	57,096,162	5,226,200	3,318,106	303,717
06-Feb	50,476,667	4,647,918	39.07	1.0617	53,591,077	4,934,695	3,114,410	286,777
07-Feb	53,924,167	4,910,211	39.66	1.0617	57,251,288	5,213,171	3,327,121	302,960
08-Feb	52,755,000	4,831,344	39.06	1.0617	56,009,984	5,129,438	3,254,984	298,094
09-Feb	42,214,167	3,891,030	39.11	1.0617	44,818,781	4,131,107	2,604,614	240,077
10-Feb	41,791,389	3,844,608	39.15	1.0617	44,369,918	4,081,820	2,578,529	237,212
11-Feb	57,440,556	5,247,260	39.35	1.0617	60,984,638	5,571,016	3,544,082	323,756
12-Feb	64,235,556	5,882,405	39.10	1.0617	68,198,889	6,245,349	3,963,334	362,944
13-Feb	60,506,111	5,558,149	39.13	1.0617	64,239,338	5,901,087	3,733,227	342,938
14-Feb	54,349,722	5,002,784	39.09	1.0617	57,703,100	5,311,456	3,353,378	308,672
15-Feb	50,390,556	4,640,289	39.11	1.0617	53,499,653	4,926,595	3,109,097	286,306
16-Feb	38,713,056	3,559,925	39.40	1.0617	41,101,651	3,779,572	2,388,596	219,647
17-Feb	43,709,444	3,991,754	39.46	1.0617	46,406,317	4,238,045	2,696,873	246,291
18-Feb	56,274,444	5,108,558	39.63	1.0617	59,746,578	5,423,756	3,472,133	315,198
19-Feb	58,130,556	5,286,059	39.62	1.0617	61,717,211	5,612,209	3,586,655	326,150
20-Feb	59,744,722	5,436,602	39.59	1.0617	63,430,972	5,772,040	3,686,249	335,438
21-Feb	55,074,722	5,007,666	39.64	1.0617	58,472,833	5,316,639	3,398,110	308,973
22-Feb	55,276,111	5,029,573	39.61	1.0617	58,686,647	5,339,898	3,410,536	310,325
23-Feb	45,138,333	4,117,877	39.45	1.0617	47,923,369	4,371,950	2,785,035	254,073
24-Feb	47,526,389	4,326,526	39.63	1.0617	50,458,767	4,593,473	2,932,378	266,947
25-Feb	51,076,667	4,648,972	39.47	1.0617	54,228,097	4,935,814	3,151,430	286,842
26-Feb	55,361,944	5,048,914	39.45	1.0617	58,777,776	5,360,432	3,415,832	311,518



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Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
27-Feb	58,176,389	5,298,508	39.59	1.0617	61,765,872	5,625,426	3,589,483	326,918
28-Feb	57,454,444	5,226,146	39.61	1.0617	60,999,384	5,548,599	3,544,939	322,453
29-Feb	54,725,000	5,065,158	38.48	1.0617	58,101,533	5,377,678	3,376,533	312,520
Mar	1,315,665,833	120,656,064	39.24	1.0617	1,396,842,415	128,100,543	81,176,582	7,444,479
01-Mar	43,412,778	4,053,553	38.59	1.0617	46,091,346	4,303,657	2,678,568	250,104
02-Mar	43,686,389	4,074,725	38.59	1.0617	46,381,839	4,326,136	2,695,450	251,411
03-Mar	48,103,889	4,481,952	38.64	1.0617	51,071,899	4,758,488	2,968,010	276,536
04-Mar	54,411,667	5,018,820	39.29	1.0617	57,768,867	5,328,481	3,357,200	309,661
05-Mar	51,271,667	4,730,857	39.01	1.0617	54,435,129	5,022,751	3,163,462	291,894
06-Mar	57,008,056	5,255,104	39.07	1.0617	60,525,453	5,579,344	3,517,397	324,240
07-Mar	49,839,167	4,591,736	39.06	1.0617	52,914,243	4,875,046	3,075,077	283,310
08-Mar	41,540,556	3,828,249	38.96	1.0617	44,103,608	4,064,452	2,563,052	236,203
09-Mar	40,483,611	3,733,744	39.19	1.0617	42,981,450	3,964,116	2,497,839	230,372
10-Mar	44,559,444	4,102,384	39.31	1.0617	47,308,762	4,355,501	2,749,318	253,117
11-Mar	40,224,722	3,677,364	39.74	1.0617	42,706,588	3,904,257	2,481,865	226,893
12-Mar	38,909,167	3,546,125	39.19	1.0617	41,309,862	3,764,921	2,400,696	218,796
13-Mar	46,065,000	4,220,722	39.28	1.0617	48,907,211	4,481,141	2,842,211	260,419
14-Mar	42,665,833	3,887,820	39.27	1.0617	45,298,315	4,127,698	2,632,482	239,878
15-Mar	35,755,278	3,270,647	39.40	1.0617	37,961,378	3,472,446	2,206,101	201,799
16-Mar	37,681,944	3,434,135	39.91	1.0617	40,006,920	3,646,021	2,324,976	211,886
17-Mar	38,444,722	3,497,577	39.01	1.0617	40,816,762	3,713,378	2,372,039	215,801
18-Mar	35,919,167	3,298,679	39.25	1.0617	38,135,379	3,502,207	2,216,213	203,528
19-Mar	38,848,889	3,549,266	39.22	1.0617	41,245,865	3,768,256	2,396,976	218,990
20-Mar	46,078,889	4,199,738	39.61	1.0617	48,921,956	4,458,862	2,843,067	259,124
21-Mar	42,540,833	3,878,314	38.68	1.0617	45,165,603	4,117,606	2,624,769	239,292
22-Mar	40,968,056	3,781,178	38.82	1.0617	43,495,785	4,014,477	2,527,729	233,299
23-Mar	39,236,111	3,570,791	39.27	1.0617	41,656,979	3,791,109	2,420,868	220,318
24-Mar	39,836,111	3,645,913	39.22	1.0617	42,293,999	3,870,866	2,457,888	224,953
25-Mar	36,061,111	3,298,314	39.32	1.0617	38,286,082	3,501,820	2,224,971	203,506
26-Mar	36,168,333	3,299,018	39.72	1.0617	38,399,920	3,502,567	2,231,586	203,549
27-Mar	37,430,833	3,395,281	39.71	1.0617	39,740,316	3,604,770	2,309,482	209,489
28-Mar	39,089,444	3,546,190	39.40	1.0617	41,501,263	3,764,990	2,411,819	218,800
29-Mar	39,707,778	3,615,017	39.61	1.0617	42,157,748	3,838,064	2,449,970	223,047
30-Mar	43,821,944	3,999,393	39.58	1.0617	46,525,758	4,246,156	2,703,814	246,763
31-Mar	45,894,444	4,173,458	39.60	1.0617	48,726,132	4,430,960	2,831,687	257,502
Apr	218,036,667	19,872,658	39.27	1.0617	231,489,529	21,098,801	13,452,862	1,226,143
01-Apr	42,367,500	3,854,053	39.48	1.0617	44,981,575	4,091,848	2,614,075	237,795
02-Apr	42,881,667	3,902,240	39.56	1.0617	45,527,466	4,143,008	2,645,799	240,768
03-Apr	38,495,000	3,500,965	39.42	1.0617	40,870,142	3,716,975	2,375,142	216,010
04-Apr	36,675,833	3,347,934	39.42	1.0617	38,938,732	3,554,502	2,262,899	206,568
05-Apr	36,376,111	3,321,297	39.46	1.0617	38,620,517	3,526,221	2,244,406	204,924
06-Apr	52,222	4,753	39.30	1.0617	55,444	5,046	3,222	293
07-Apr	0	0	39.29	1.0617	0	0	0	0
08-Apr	0	0	39.30	1.0617	0	0	0	0
09-Apr	0	0	39.23	1.0617	0	0	0	0
10-Apr	0	0	39.14	1.0617	0	0	0	0
11-Apr	2,222	226	39.13	1.0617	2,359	240	137	14
12-Apr	0	0	39.17	1.0617	0	0	0	0
13-Apr	2,222	184	39.14	1.0617	2,359	195	137	11



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Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
14-Apr	833	81	39.19	1.0617	885	86	51	5
15-Apr	2,778	270	39.23	1.0617	2,949	287	171	17
16-Apr	3,056	259	39.16	1.0617	3,244	275	189	16
17-Apr	0	0	39.28	1.0617	0	0	0	0
18-Apr	0	0	39.28	1.0617	0	0	0	0
19-Apr	21,170,556	1,939,766	39.29	1.0617	22,476,779	2,059,450	1,306,223	119,684
20-Apr	2,500	247	39.30	1.0617	2,654	262	154	15
21-Apr	2,778	248	39.21	1.0617	2,949	263	171	15
22-Apr	0	0	39.25	1.0617	0	0	0	0
23-Apr	0	0	39.24	1.0617	0	0	0	0
24-Apr	1,389	135	39.24	1.0617	1,475	143	86	8
25-Apr	0	0	39.28	1.0617	0	0	0	0
26-Apr	0	0	39.27	1.0617	0	0	0	0
27-Apr	0	0	39.26	1.0617	0	0	0	0
28-Apr	0	0	39.13	1.0617	0	0	0	0
29-Apr	0	0	39.25	1.0617	0	0	0	0
30-Apr	0	0	39.22	1.0617	0	0	0	0
May	27,917,222	2,556,048	39.31	1.0553	29,239,012	2,677,050	1,321,790	121,002
01-May	0	0	39.24	1.0617	0	0	0	0
02-May	0	0	39.23	1.0617	0	0	0	0
03-May	1,111	102	39.23	1.0617	1,180	108	69	6
04-May	0	0	39.48	1.0617	0	0	0	0
05-May	0	0	39.26	1.0617	0	0	0	0
06-May	0	0	39.29	1.0617	0	0	0	0
07-May	0	0	39.30	1.0617	0	0	0	0
08-May	0	0	39.26	1.0617	0	0	0	0
09-May	0	0	39.31	1.0617	0	0	0	0
10-May	0	0	39.31	1.0617	0	0	0	0
11-May	0	0	39.27	1.0617	0	0	0	0
12-May	0	0	39.28	1.0617	0	0	0	0
13-May	0	0	39.28	1.0617	0	0	0	0
14-May	0	0	39.40	1.0617	0	0	0	0
15-May	0	0	39.44	1.0617	0	0	0	0
16-May	0	0	39.44	1.0617	0	0	0	0
17-May	0	0	39.38	1.0617	0	0	0	0
18-May	0	0	39.45	1.0617	0	0	0	0
19-May	3,631,111	331,327	39.40	1.0617	3,855,151	351,770	224,040	20,443
20-May	3,938,333	360,586	39.48	1.0452	4,116,346	376,884	178,013	16,298
21-May	833,611	76,411	39.29	1.0452	871,290	79,865	37,679	3,454
22-May	4,481,389	410,552	39.30	1.0452	4,683,948	429,109	202,559	18,557
23-May	15,031,667	1,377,070	39.30	1.0452	15,711,098	1,439,314	679,431	62,244
24-May	0	0	39.32	1.0452	0	0	0	0
25-May	0	0	39.30	1.0452	0	0	0	0
26-May	0	0	39.29	1.0452	0	0	0	0
27-May	0	0	39.09	1.0452	0	0	0	0
28-May	0	0	39.31	1.0452	0	0	0	0
29-May	0	0	39.18	1.0452	0	0	0	0
30-May	0	0	39.29	1.0452	0	0	0	0
31-May	0	0	39.27	1.0452	0	0	0	0



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Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
Jun	0	9	39.31	1.0452	0	9	0	0
01-Jun	0	0	39.28	1.0452	0	0	0	0
02-Jun	0	0	39.30	1.0452	0	0	0	0
03-Jun	0	0	39.30	1.0452	0	0	0	0
04-Jun	0	0	39.70	1.0452	0	0	0	0
05-Jun	0	0	39.30	1.0452	0	0	0	0
06-Jun	0	0	39.31	1.0452	0	0	0	0
07-Jun	0	0	39.30	1.0452	0	0	0	0
08-Jun	0	0	39.27	1.0452	0	0	0	0
09-Jun	0	0	39.27	1.0452	0	0	0	0
10-Jun	0	0	38.95	1.0452	0	0	0	0
11-Jun	0	9	39.35	1.0452	0	9	0	0
12-Jun	0	0	39.41	1.0452	0	0	0	0
13-Jun	0	0	39.18	1.0452	0	0	0	0
14-Jun	0	0	39.33	1.0452	0	0	0	0
15-Jun	0	0	39.29	1.0452	0	0	0	0
16-Jun	0	0	39.36	1.0452	0	0	0	0
17-Jun	0	0	39.38	1.0452	0	0	0	0
18-Jun	0	0	39.62	1.0452	0	0	0	0
19-Jun	0	0	39.42	1.0452	0	0	0	0
20-Jun	0	0	39.44	1.0452	0	0	0	0
21-Jun	0	0	39.37	1.0452	0	0	0	0
22-Jun	0	0	39.52	1.0452	0	0	0	0
23-Jun	0	0	39.16	1.0452	0	0	0	0
24-Jun	0	0	39.21	1.0452	0	0	0	0
25-Jun	0	0	39.27	1.0452	0	0	0	0
26-Jun	0	0	39.01	1.0452	0	0	0	0
27-Jun	0	0	39.08	1.0452	0	0	0	0
28-Jun	0	0	39.29	1.0452	0	0	0	0
29-Jun	0	0	39.30	1.0452	0	0	0	0
30-Jun	0	0	39.31	1.0452	0	0	0	0
Jul	69,590,000	6,384,362	39.35	1.0452	72,735,468	6,672,935	3,145,468	288,573
01-Jul	0	0	39.28	1.0452	0	0	0	0
02-Jul	0	0	39.45	1.0452	0	0	0	0
03-Jul	0	0	39.55	1.0452	0	0	0	0
04-Jul	0	0	39.08	1.0452	0	0	0	0
05-Jul	0	0	39.40	1.0452	0	0	0	0
06-Jul	0	0	39.32	1.0452	0	0	0	0
07-Jul	0	0	39.78	1.0452	0	0	0	0
08-Jul	0	0	39.39	1.0452	0	0	0	0
09-Jul	0	0	39.29	1.0452	0	0	0	0
10-Jul	0	0	39.46	1.0452	0	0	0	0
11-Jul	0	0	39.39	1.0452	0	0	0	0
12-Jul	0	0	39.49	1.0452	0	0	0	0
13-Jul	0	0	39.43	1.0452	0	0	0	0
14-Jul	0	0	39.67	1.0452	0	0	0	0
15-Jul	0	0	39.16	1.0452	0	0	0	0
16-Jul	0	0	39.40	1.0452	0	0	0	0
17-Jul	0	0	39.39	1.0452	0	0	0	0



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Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
18-Jul	0	0	39.49	1.0452	0	0	0	0
19-Jul	0	0	39.19	1.0452	0	0	0	0
20-Jul	0	0	39.28	1.0452	0	0	0	0
21-Jul	0	0	39.49	1.0452	0	0	0	0
22-Jul	37,093,056	3,401,374	39.25	1.0452	38,769,662	3,555,116	1,676,606	153,742
23-Jul	32,496,944	2,982,988	38.99	1.0452	33,965,806	3,117,819	1,468,862	134,831
24-Jul	0	0	39.25	1.0452	0	0	0	0
25-Jul	0	0	39.11	1.0452	0	0	0	0
26-Jul	0	0	39.58	1.0452	0	0	0	0
27-Jul	0	0	39.32	1.0452	0	0	0	0
28-Jul	0	0	39.36	1.0452	0	0	0	0
29-Jul	0	0	39.17	1.0452	0	0	0	0
30-Jul	0	0	39.11	1.0452	0	0	0	0
31-Jul	0	0	39.24	1.0452	0	0	0	0
Aug	7,500	702	39.39	1.0452	7,839	734	339	32
01-Aug	0	0	39.30	1.0452	0	0	0	0
02-Aug	0	0	39.40	1.0452	0	0	0	0
03-Aug	0	0	39.51	1.0452	0	0	0	0
04-Aug	0	0	39.41	1.0452	0	0	0	0
05-Aug	0	0	39.32	1.0452	0	0	0	0
06-Aug	3,611	333	39.40	1.0452	3,774	348	163	15
07-Aug	3,889	369	39.39	1.0452	4,065	386	176	17
08-Aug	0	0	39.53	1.0452	0	0	0	0
09-Aug	0	0	39.16	1.0452	0	0	0	0
10-Aug	0	0	39.30	1.0452	0	0	0	0
11-Aug	0	0	39.25	1.0452	0	0	0	0
12-Aug	0	0	39.10	1.0452	0	0	0	0
13-Aug	0	0	39.52	1.0452	0	0	0	0
14-Aug	0	0	39.66	1.0452	0	0	0	0
15-Aug	0	0	39.82	1.0452	0	0	0	0
16-Aug	0	0	39.29	1.0452	0	0	0	0
17-Aug	0	0	39.32	1.0452	0	0	0	0
18-Aug	0	0	39.32	1.0452	0	0	0	0
19-Aug	0	0	39.38	1.0452	0	0	0	0
20-Aug	0	0	39.76	1.0452	0	0	0	0
21-Aug	0	0	39.30	1.0452	0	0	0	0
22-Aug	0	0	39.28	1.0452	0	0	0	0
23-Aug	0	0	39.29	1.0452	0	0	0	0
24-Aug	0	0	39.30	1.0452	0	0	0	0
25-Aug	0	0	39.51	1.0452	0	0	0	0
26-Aug	0	0	39.27	1.0452	0	0	0	0
27-Aug	0	0	39.25	1.0452	0	0	0	0
28-Aug	0	0	39.29	1.0452	0	0	0	0
29-Aug	0	0	39.50	1.0452	0	0	0	0
30-Aug	0	0	39.51	1.0452	0	0	0	0
31-Aug	0	0	39.51	1.0452	0	0	0	0
Sep	39,199,722	3,574,855	39.53	1.0452	40,971,550	3,736,438	1,771,827	161,583
01-Sep	0	0	39.55	1.0452	0	0	0	0
02-Sep	3,611	318	39.48	1.0452	3,774	332	163	14



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Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
03-Sep	1,111	109	39.79	1.0452	1,161	114	50	5
04-Sep	556	54	39.34	1.0452	581	56	25	2
05-Sep	0	0	39.59	1.0452	0	0	0	0
06-Sep	0	0	39.34	1.0452	0	0	0	0
07-Sep	0	0	39.36	1.0452	0	0	0	0
08-Sep	0	0	39.54	1.0452	0	0	0	0
09-Sep	0	0	39.53	1.0452	0	0	0	0
10-Sep	0	0	39.58	1.0452	0	0	0	0
11-Sep	0	0	39.59	1.0452	0	0	0	0
12-Sep	0	0	39.52	1.0452	0	0	0	0
13-Sep	0	0	39.53	1.0452	0	0	0	0
14-Sep	0	0	39.96	1.0452	0	0	0	0
15-Sep	0	0	39.51	1.0452	0	0	0	0
16-Sep	0	0	39.53	1.0452	0	0	0	0
17-Sep	0	0	39.53	1.0452	0	0	0	0
18-Sep	0	0	39.54	1.0452	0	0	0	0
19-Sep	0	0	39.32	1.0452	0	0	0	0
20-Sep	0	0	39.84	1.0452	0	0	0	0
21-Sep	0	0	39.39	1.0452	0	0	0	0
22-Sep	0	0	39.49	1.0452	0	0	0	0
23-Sep	15,833	1,426	39.40	1.0452	16,549	1,490	716	64
24-Sep	39,178,611	3,572,948	39.47	1.0452	40,949,484	3,734,445	1,770,873	161,497
25-Sep	0	0	39.51	1.0452	0	0	0	0
26-Sep	0	0	39.50	1.0452	0	0	0	0
27-Sep	0	0	39.50	1.0452	0	0	0	0
28-Sep	0	0	39.46	1.0452	0	0	0	0
29-Sep	0	0	39.50	1.0452	0	0	0	0
30-Sep	0	0	39.66	1.0452	0	0	0	0
Oct	694,341,389	63,370,704	39.32	1.0452	725,725,620	66,235,060	31,384,231	2,864,356
01-Oct	0	0	40.09	1.0452	0	0	0	0
02-Oct	0	0	39.45	1.0452	0	0	0	0
03-Oct	0	20	39.32	1.0452	0	21	0	1
04-Oct	0	0	39.13	1.0452	0	0	0	0
05-Oct	0	0	39.10	1.0452	0	0	0	0
06-Oct	0	0	39.12	1.0452	0	0	0	0
07-Oct	0	0	38.85	1.0452	0	0	0	0
08-Oct	32,730,833	3,024,039	38.98	1.0452	34,210,267	3,160,726	1,479,434	136,687
09-Oct	15,931,111	1,466,750	38.95	1.0452	16,651,197	1,533,047	720,086	66,297
10-Oct	31,423,056	2,880,543	38.98	1.0452	32,843,378	3,010,744	1,420,322	130,201
11-Oct	22,684,167	2,100,370	39.06	1.0452	23,709,491	2,195,307	1,025,324	94,937
12-Oct	22,275,278	2,034,041	39.01	1.0452	23,282,120	2,125,980	1,006,843	91,939
13-Oct	29,548,056	2,700,694	39.34	1.0452	30,883,628	2,822,765	1,335,572	122,071
14-Oct	33,411,389	3,032,218	39.13	1.0452	34,921,584	3,169,274	1,510,195	137,056
15-Oct	32,788,333	2,976,796	39.69	1.0452	34,270,366	3,111,347	1,482,033	134,551
16-Oct	33,010,833	2,992,319	39.57	1.0452	34,502,923	3,127,572	1,492,090	135,253
17-Oct	33,655,556	3,062,016	39.49	1.0452	35,176,787	3,200,419	1,521,231	138,403
18-Oct	30,578,333	2,773,299	39.72	1.0452	31,960,474	2,898,652	1,382,141	125,353
19-Oct	30,681,944	2,782,090	39.70	1.0452	32,068,768	2,907,840	1,386,824	125,750
20-Oct	31,319,167	2,845,665	39.49	1.0452	32,734,793	2,974,289	1,415,626	128,624



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Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
21-Oct	0	0	39.28	1.0452	0	0	0	0
22-Oct	0	0	39.19	1.0452	0	0	0	0
23-Oct	18,649,444	1,710,956	39.36	1.0452	19,492,399	1,788,291	842,955	77,335
24-Oct	33,334,722	3,049,056	39.24	1.0452	34,841,452	3,186,873	1,506,729	137,817
25-Oct	34,969,444	3,209,095	39.21	1.0452	36,550,063	3,354,146	1,580,619	145,051
26-Oct	31,609,444	2,898,857	39.29	1.0452	33,038,191	3,029,885	1,428,747	131,028
27-Oct	38,418,611	3,510,172	39.27	1.0452	40,155,132	3,668,832	1,736,521	158,660
28-Oct	41,871,944	3,819,356	39.53	1.0452	43,764,556	3,991,991	1,892,612	172,635
29-Oct	41,082,222	3,748,208	39.50	1.0452	42,939,139	3,917,627	1,856,916	169,419
30-Oct	43,247,222	3,925,498	39.56	1.0452	45,201,997	4,102,931	1,954,774	177,433
31-Oct	31,120,278	2,828,646	39.45	1.0452	32,526,914	2,956,501	1,406,637	127,855
Nov	1,155,199,722	105,305,236	39.50	1.0452	1,207,414,750	110,065,033	52,215,027	4,759,797
01-Nov	25,313,611	2,316,387	39.30	1.0452	26,457,786	2,421,088	1,144,175	104,701
02-Nov	22,923,611	2,102,397	39.25	1.0452	23,959,758	2,197,425	1,036,147	95,028
03-Nov	19,645,556	1,799,390	39.33	1.0452	20,533,535	1,880,722	887,979	81,332
04-Nov	38,543,333	3,519,947	39.52	1.0452	40,285,492	3,679,049	1,742,159	159,102
05-Nov	41,921,667	3,822,370	39.35	1.0452	43,816,526	3,995,141	1,894,859	172,771
06-Nov	41,664,722	3,797,936	39.51	1.0452	43,547,968	3,969,603	1,883,245	171,667
07-Nov	40,036,667	3,638,758	39.76	1.0452	41,846,324	3,803,230	1,809,657	164,472
08-Nov	37,490,278	3,398,742	39.83	1.0452	39,184,838	3,552,365	1,694,561	153,623
09-Nov	34,220,000	3,100,868	39.77	1.0452	35,766,744	3,241,027	1,546,744	140,159
10-Nov	37,493,889	3,398,883	39.21	1.0452	39,188,613	3,552,513	1,694,724	153,630
11-Nov	35,290,000	3,198,818	39.91	1.0452	36,885,108	3,343,405	1,595,108	144,587
12-Nov	46,496,111	4,198,554	39.98	1.0452	48,597,735	4,388,329	2,101,624	189,775
13-Nov	40,643,056	3,675,144	39.98	1.0452	42,480,122	3,841,261	1,837,066	166,117
14-Nov	43,011,944	3,889,412	39.88	1.0452	44,956,084	4,065,213	1,944,140	175,801
15-Nov	37,548,889	3,400,366	39.25	1.0452	39,246,099	3,554,063	1,697,210	153,697
16-Nov	37,071,667	3,399,209	39.23	1.0452	38,747,306	3,552,853	1,675,639	153,644
17-Nov	36,080,278	3,298,110	39.81	1.0452	37,711,106	3,447,185	1,630,829	149,075
18-Nov	30,725,278	2,807,998	39.77	1.0452	32,114,060	2,934,920	1,388,783	126,922
19-Nov	33,348,611	3,055,585	39.40	1.0452	34,855,968	3,193,697	1,507,357	138,112
20-Nov	47,631,389	4,339,172	39.54	1.0452	49,784,328	4,535,303	2,152,939	196,131
21-Nov	50,042,500	4,566,686	39.37	1.0452	52,304,421	4,773,100	2,261,921	206,414
22-Nov	34,128,333	3,128,608	39.54	1.0452	35,670,934	3,270,021	1,542,601	141,413
23-Nov	38,302,500	3,482,259	39.47	1.0452	40,033,773	3,639,657	1,731,273	157,398
24-Nov	51,460,000	4,709,834	39.25	1.0452	53,785,992	4,922,718	2,325,992	212,884
25-Nov	38,414,167	3,522,976	39.25	1.0452	40,150,487	3,682,215	1,736,320	159,239
26-Nov	41,448,611	3,798,535	39.49	1.0452	43,322,088	3,970,229	1,873,477	171,694
27-Nov	47,939,444	4,379,573	39.33	1.0452	50,106,307	4,577,530	2,166,863	197,957
28-Nov	44,404,444	4,052,352	39.52	1.0452	46,411,525	4,235,518	2,007,081	183,166
29-Nov	44,940,833	4,107,138	39.24	1.0452	46,972,159	4,292,781	2,031,326	185,643
30-Nov	37,018,333	3,399,229	38.97	1.0452	38,691,562	3,552,874	1,673,229	153,645
Dec	1,587,410,833	145,428,861	39.35	1.0452	1,659,161,803	152,002,246	71,750,970	6,573,385
01-Dec	43,775,278	4,031,629	39.00	1.0452	45,753,920	4,213,859	1,978,643	182,230
02-Dec	53,705,000	4,958,207	39.08	1.0452	56,132,466	5,182,318	2,427,466	224,111
03-Dec	55,958,889	5,149,202	39.18	1.0452	58,488,231	5,381,946	2,529,342	232,744
04-Dec	53,300,556	4,906,421	39.09	1.0452	55,709,741	5,128,191	2,409,185	221,770
05-Dec	54,462,500	4,997,973	39.23	1.0452	56,924,205	5,223,881	2,461,705	225,908
06-Dec	51,364,444	4,711,609	39.25	1.0452	53,686,117	4,924,574	2,321,673	212,965



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Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
07-Dec	55,603,333	5,101,637	39.23	1.0452	58,116,604	5,332,231	2,513,271	230,594
08-Dec	57,630,556	5,319,428	38.88	1.0452	60,235,457	5,559,866	2,604,901	240,438
09-Dec	56,134,444	5,166,737	39.09	1.0452	58,671,721	5,400,274	2,537,277	233,537
10-Dec	54,716,667	5,028,980	39.12	1.0452	57,189,860	5,256,290	2,473,193	227,310
11-Dec	53,043,611	4,876,134	39.17	1.0452	55,441,182	5,096,535	2,397,571	220,401
12-Dec	45,525,278	4,179,517	39.62	1.0452	47,583,020	4,368,431	2,057,743	188,914
13-Dec	43,996,389	4,027,613	39.18	1.0452	45,985,026	4,209,661	1,988,637	182,048
14-Dec	49,334,167	4,516,226	39.41	1.0452	51,564,071	4,720,359	2,229,904	204,133
15-Dec	48,066,389	4,403,527	39.45	1.0452	50,238,990	4,602,566	2,172,601	199,039
16-Dec	51,724,167	4,734,975	39.32	1.0452	54,062,099	4,948,996	2,337,932	214,021
17-Dec	53,920,556	4,927,668	39.27	1.0452	56,357,765	5,150,399	2,437,209	222,731
18-Dec	52,519,722	4,800,853	39.79	1.0452	54,893,614	5,017,852	2,373,891	216,999
19-Dec	41,713,056	3,798,711	39.50	1.0452	43,598,486	3,970,413	1,885,430	171,702
20-Dec	39,338,889	3,597,926	39.58	1.0452	41,117,007	3,760,552	1,778,118	162,626
21-Dec	49,256,389	4,494,768	39.51	1.0452	51,482,778	4,697,932	2,226,389	203,164
22-Dec	46,405,833	4,267,545	39.42	1.0452	48,503,377	4,460,438	2,097,544	192,893
23-Dec	48,252,500	4,420,330	39.33	1.0452	50,433,513	4,620,129	2,181,013	199,799
24-Dec	48,441,667	4,445,126	39.40	1.0452	50,631,230	4,646,046	2,189,563	200,920
25-Dec	52,650,278	4,797,871	39.57	1.0452	55,030,070	5,014,735	2,379,793	216,864
26-Dec	50,858,056	4,631,681	39.52	1.0452	53,156,840	4,841,033	2,298,784	209,352
27-Dec	45,716,389	4,177,435	39.38	1.0452	47,782,770	4,366,255	2,066,381	188,820
28-Dec	46,197,222	4,210,957	39.56	1.0452	48,285,337	4,401,292	2,088,114	190,335
29-Dec	59,136,944	5,385,539	39.50	1.0452	61,809,934	5,628,965	2,672,990	243,426
30-Dec	62,461,667	5,699,357	39.50	1.0452	65,284,934	5,956,968	2,823,267	257,611
31-Dec	62,200,000	5,663,279	39.65	1.0452	65,011,440	5,919,259	2,811,440	255,980
2021	3,204,971,389	295,047,315	39.04	1.0452	3,349,836,096	308,383,454	144,864,707	13,336,139
Jan	1,890,381,111	174,345,287	38.93	1.0452	1,975,826,337	182,225,694	85,445,226	7,880,407
01-Jan	61,598,889	5,608,335	39.26	1.0452	64,383,159	5,861,832	2,784,270	253,497
02-Jan	59,227,778	5,420,190	39.18	1.0452	61,904,873	5,665,183	2,677,096	244,993
03-Jan	58,740,278	5,399,241	39.11	1.0452	61,395,338	5,643,287	2,655,061	244,046
04-Jan	57,715,556	5,326,717	38.97	1.0452	60,324,299	5,567,485	2,608,743	240,768
05-Jan	60,915,000	5,618,451	39.07	1.0452	63,668,358	5,872,405	2,753,358	253,954
06-Jan	63,191,111	5,830,213	38.99	1.0452	66,047,349	6,093,739	2,856,238	263,526
07-Jan	63,798,056	5,893,396	38.90	1.0452	66,681,728	6,159,777	2,883,672	266,381
08-Jan	64,521,389	5,940,027	38.95	1.0452	67,437,756	6,208,516	2,916,367	268,489
09-Jan	64,820,000	5,941,129	38.91	1.0452	67,749,864	6,209,668	2,929,864	268,539
10-Jan	62,197,778	5,749,511	38.90	1.0452	65,009,117	6,009,389	2,811,340	259,878
11-Jan	64,076,944	5,899,464	38.87	1.0452	66,973,222	6,166,120	2,896,278	266,656
12-Jan	63,068,611	5,830,610	38.87	1.0452	65,919,312	6,094,154	2,850,701	263,544
13-Jan	62,323,333	5,774,765	38.79	1.0452	65,140,348	6,035,784	2,817,015	261,019
14-Jan	64,004,167	5,935,510	38.82	1.0452	66,897,155	6,203,795	2,892,988	268,285
15-Jan	64,303,611	5,950,965	38.95	1.0452	67,210,134	6,219,949	2,906,523	268,984
16-Jan	64,718,611	5,951,335	38.89	1.0452	67,643,892	6,220,335	2,925,281	269,000
17-Jan	60,183,611	5,572,956	38.90	1.0452	62,903,910	5,824,854	2,720,299	251,898
18-Jan	54,804,722	5,072,672	38.95	1.0452	57,281,896	5,301,957	2,477,173	229,285
19-Jan	60,613,333	5,610,510	38.84	1.0452	63,353,056	5,864,105	2,739,723	253,595
20-Jan	48,996,944	4,540,798	38.87	1.0452	51,211,606	4,746,042	2,214,662	205,244
21-Jan	45,500,556	4,209,791	38.89	1.0452	47,557,181	4,400,074	2,056,625	190,283
22-Jan	57,245,278	5,300,425	38.83	1.0452	59,832,764	5,540,004	2,587,487	239,579



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Data	Reported Energy (kWh)	Reported Volume (m3)	CV (MJ/m3)	Average of Correction Factor	Corrected Energy (kWh)	Corrected Volume (sm3)	Applied Correction - Energy (kWh)	Applied Correction - Volume (sm3)
23-Jan	62,068,611	5,720,656	38.77	1.0452	64,874,112	5,979,230	2,805,501	258,574
24-Jan	67,413,056	6,180,317	38.83	1.0452	70,460,126	6,459,667	3,047,070	279,350
25-Jan	74,520,278	6,839,996	38.79	1.0452	77,888,594	7,149,164	3,368,317	309,168
26-Jan	69,857,222	6,460,065	38.80	1.0452	73,014,769	6,752,060	3,157,546	291,995
27-Jan	71,814,167	6,624,024	38.78	1.0452	75,060,167	6,923,430	3,246,000	299,406
28-Jan	56,569,722	5,248,453	38.79	1.0452	59,126,674	5,485,683	2,556,951	237,230
29-Jan	53,904,444	4,974,091	39.19	1.0452	56,340,925	5,198,920	2,436,481	224,829
30-Jan	48,662,222	4,478,050	39.05	1.0452	50,861,755	4,680,458	2,199,532	202,408
31-Jan	59,005,833	5,442,624	39.05	1.0452	61,672,897	5,688,631	2,667,064	246,007
Feb	1,314,590,278	120,702,028	39.19	1.0452	1,374,009,758	126,157,760	59,419,481	5,455,732
01-Feb	63,560,278	5,863,509	39.06	1.0452	66,433,202	6,128,540	2,872,925	265,031
02-Feb	63,199,444	5,798,028	38.97	1.0452	66,056,059	6,060,099	2,856,615	262,071
03-Feb	56,258,056	5,189,443	38.94	1.0452	58,800,920	5,424,006	2,542,864	234,563
04-Feb	53,357,222	4,919,546	38.94	1.0452	55,768,969	5,141,909	2,411,746	222,363
05-Feb	55,311,667	5,097,733	39.09	1.0452	57,811,754	5,328,151	2,500,087	230,418
06-Feb	48,115,278	4,422,146	39.69	1.0452	50,290,088	4,622,027	2,174,811	199,881
07-Feb	52,570,000	4,820,143	38.88	1.0452	54,946,164	5,038,013	2,376,164	217,870
08-Feb	64,201,389	5,900,192	39.48	1.0452	67,103,292	6,166,881	2,901,903	266,689
09-Feb	72,562,222	6,647,652	39.04	1.0452	75,842,035	6,948,126	3,279,812	300,474
10-Feb	72,685,278	6,699,676	39.00	1.0452	75,970,652	7,002,501	3,285,375	302,825
11-Feb	76,492,222	7,029,537	38.98	1.0452	79,949,671	7,347,272	3,457,448	317,735
12-Feb	77,246,667	7,119,592	39.00	1.0452	80,738,216	7,441,398	3,491,549	321,806
13-Feb	80,359,722	7,349,506	38.98	1.0452	83,991,982	7,681,704	3,632,259	332,198
14-Feb	78,450,278	7,159,088	39.52	1.0452	81,996,230	7,482,679	3,545,953	323,591
15-Feb	71,544,722	6,537,789	39.49	1.0452	74,778,544	6,833,297	3,233,821	295,508
16-Feb	54,245,833	4,961,155	39.42	1.0452	56,697,745	5,185,399	2,451,912	224,244
17-Feb	46,301,667	4,261,961	39.12	1.0452	48,394,502	4,454,602	2,092,835	192,641
18-Feb	44,919,167	4,133,955	39.46	1.0452	46,949,513	4,320,810	2,030,346	186,855
19-Feb	49,061,389	4,499,418	39.15	1.0452	51,278,964	4,702,792	2,217,575	203,374
20-Feb	51,223,333	4,673,274	39.62	1.0452	53,538,628	4,884,506	2,315,295	211,232
21-Feb	41,606,667	3,819,280	39.21	1.0452	43,487,288	3,991,911	1,880,621	172,631
22-Feb	41,317,778	3,799,405	39.14	1.0452	43,185,341	3,971,138	1,867,564	171,733
Grand Total	14,395,996,944	1,319,252,002	39.31	1.0541	15,172,096,039	1,390,365,999	776,099,094	71,113,997