Gasglass 1002

INSTRUCTIONS MANUAL

Sparklike

Sparklike, Ltd. Särkiniementie 5, FIN-00210 Helsinki, Phone: +358 9 6923510, Fax: +358 9 68736550, Email: sparklike@sparklike.com, Web: www.sparklike.com

1 Important

This is a high voltage instrument and MUST NEVER be used near sensitive electronic devices. The instrument MUST NEVER be used in hospitals. People with heart conditions or who use pacemakers are strongly advised not to use the instrument.

The high voltage discharge should never be applied on humans or animals either directly or indirectly through conductive materials such as metals, wires or cables.

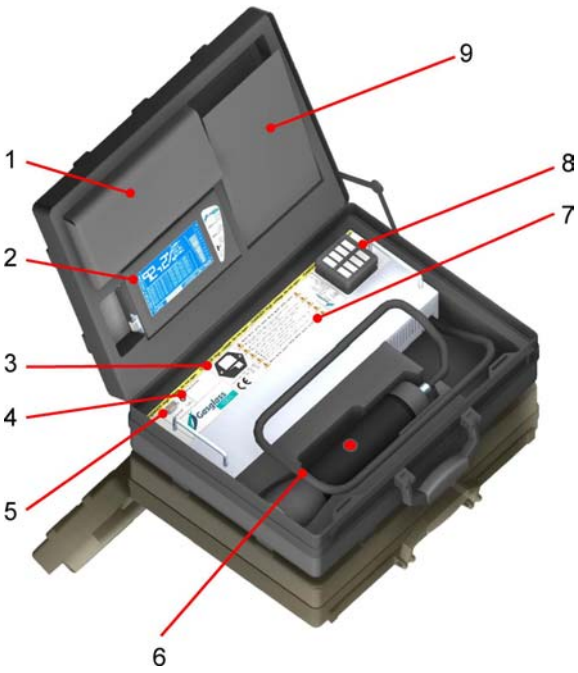
The instrument should never be used in wet or humid conditions.

The Gasglass is designed to measure the concentration of argon inside Insulated Glazing (IG) units. The calibration of the instrument assumes that the gases inside the IG-units are argon and air. Should the ratio between nitrogen (assumed 79% by volume) and oxygen (assumed 20.9% by volume) change due to diffusion, the data may not be accurate.

The Gasglass1002 is a sensitive measuring instrument and it should be handled as one. Excessive shocks may affect the operation or calibration of the device.

Always turn off the power when the device is not in use.

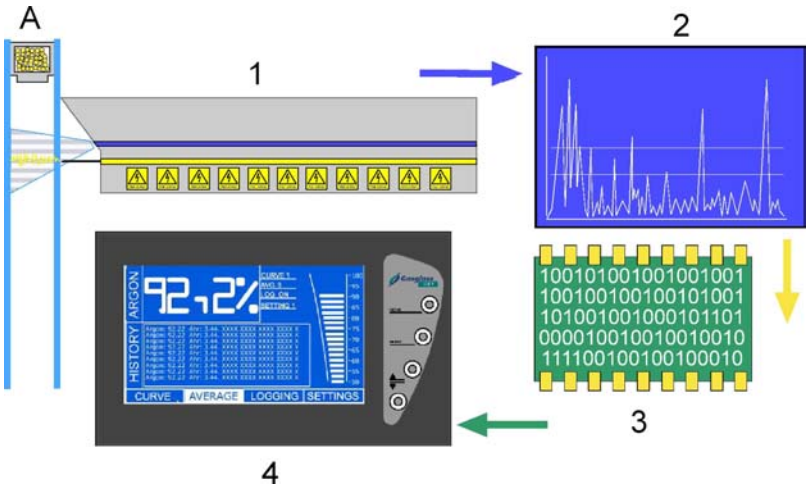
2 Gasglass Package



1. Cable Pocket
including: Power Cable, Serial Cable, LCD power Cable.
2. Sparklike LCD
3. Mains Power Socket
4. LCD Power socket
5. Serial Connector
6. Hand Unit
7. Warning Tag, READ THIS CAREFULLY
8. Fan
9. CD Pocket for CD including software and instructions

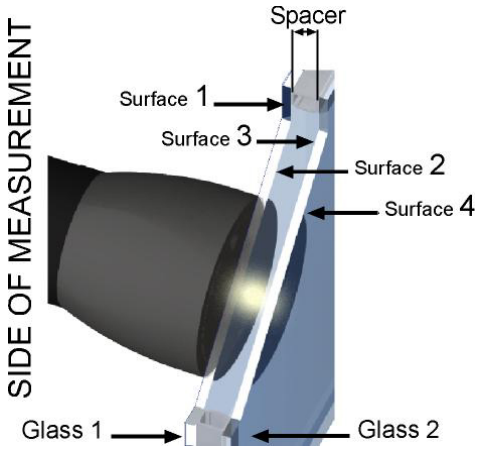
3 How does it work?

A high voltage spark is ignited inside the IG unit **(A).** This high voltage spark causes the argon atom to emit light to a spectrometer **(2)**, which measures the light. A microprocessor **(3)** interprets the information of the spectrometer and calculates an argon percent, which it outputs to a display **(4)**. The result may also be viewed directly on a PC or on a Compaq iPaq.



4 Factors when measuring

To be able to use the instrument in the best way there are some factors influencing the measurement that should be considered. The Gasglass-1002 requires two main things; LIGHT (Optics) and HIGH VOLTAGE (Electricity). If either or both of these factors are disturbed, the measurement might be affected.



4.1 High voltage

⚠ !WARNING! ⚠ HIGH VOLTAGE ⚠ !WARNING! ⚠

The measurement is made using a high voltage spark. The voltage is approx. 50 000 V but the current is very small. Coming into contact with the spark will sting a little but not harm a normal healthy person even though the instrument **MAY NOT** to be used by a person with a pacemaker or who is in poor physical health. Nor should the spark ever be pointed at any sensitive areas (eyes etc.). When measuring, the hand unit will create a spark that passes trough **Glass 1** and ignites inside the air space. Glass is an electrically insulating material, as is air. This means that the spark needs to be strong enough to jump the air gap. In addition to the other electrically insulated materials, such as laminated glass, plastic films, etc. on either side of Glass 1, this makes it even harder to ignite inside the IG. If there is a metallic coating on Glass 1, it will be impossible for the spark to get trough as the metallic film will cause the spark to stay on the surface. Argon gas is a better conductor for the spark than air. This means that the spark actually ignites easier when the fill level is higher. The other thing that helps the spark "jump" is a Low-E coating on **Glass2**, which grounds the spark.

⚠ !WARNING! ⚠ HIGH VOLTAGE ⚠ !WARNING! ⚠

4.2 Light

The measurement is dependent on a stable light signal. The light can not be measured if the total light level is too weak or too strong. The total light intensity increases with the background light level as well as with increasing argon percent when measured. If the background light is too strong, e.g. measuring against the sun or a bright lamp, the argon light will “drown” in the sunlight. If the argon concentration is very low, the signal light is very low causing the spectrometer not to see the light.

4.3 In brief - Factors to consider when measuring

Factors affecting the optics:	**Correct conditions:**
- Coloured glass - Tinted glass (minimal effect) - Strong background light (Against the sun or other source) - Dirt on glass (minimal effect)	- Stable dark background light - Hand unit NOT moved during measurement
Factors affecting the spark:	**Factors making it easier for the spark to "jump"**
- Thick glass (over 6 mm) - Plastic films on **Glass 1** (Laminated glass, coatings, etc.) - Metallic films on **Glass 1** - Metallic components in **Glass 1** - Low Argon fill - Wide spacer (over 20mm)	- High argon fills - Metallic coating on Surface 3 - Thin glass (6mm or less) - Thin air space (20mm or less)

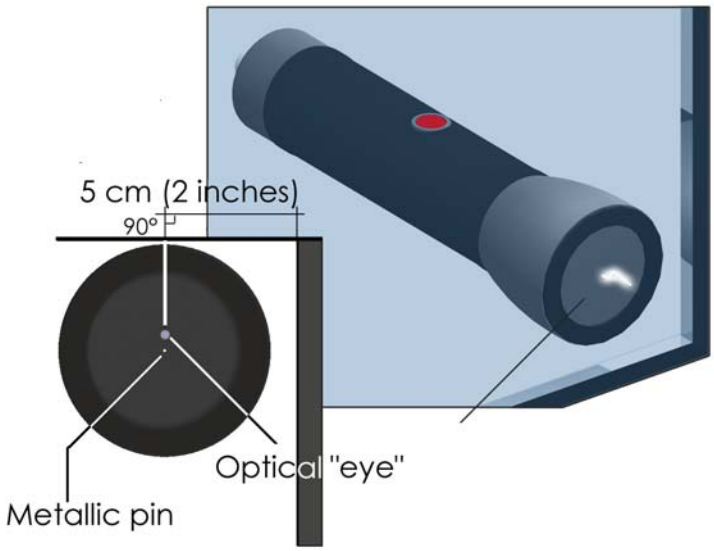
5 Measuring

As described above there are different factors that may affect the measurement result. Sparklike has done extensive research on how to obtain the best possible results when measuring with the Gasglass.

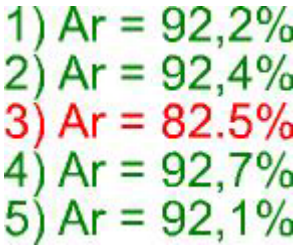
The following procedures are recommended when measuring with the Gasglass.

5.1 Measure close to the spacer

As the spacer bar of an IG unit is often metallic or contains metal, the spacer bar will help the spark to ignite. It is therefore suggested that the measurement is made close to the spacer. The centre of the hand unit should be approx. 5cm (2") from the inner side of the spacer (Approx. 10mm from the side of the hand unit). There is no difference at which height of the IG it is measured.



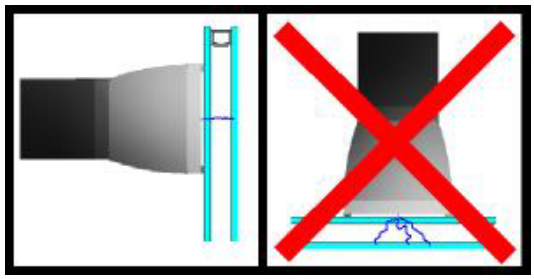
5.2 Measure several times: "Because you can"



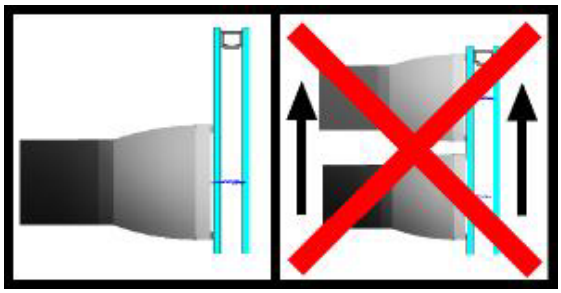
When measuring the spark will ignite inside the air space ionizing the gases, leaving the gases ionized for a small period of time. This means that the second measurement will ignite easier and producing a better result. The Gasglass can also be set to average measurements internally. Measuring more than three times on one place may cause the Low-E coating to burn changing the readout of the Gasglass. For repetitive measurements, move the hand unit slightly after two or three measurements.

5.3 Keep the IG upright

Due to the earth's magnetic field and the ionization of the gasses, the spark will try to "travel up" during the measurement. This causes the spark to act more erratically than if the IG would be laying flat down. In this way, however the Low-E is protected better from burning so it is suggested to measure the IG standing up.



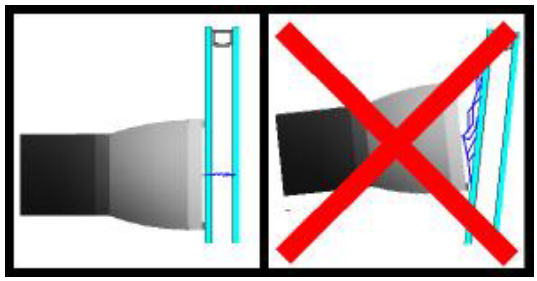
5.4 Do not move the hand unit during ONE single measurement



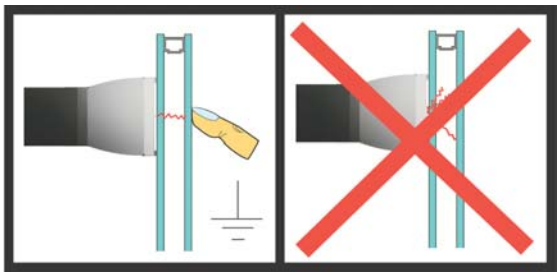
During one measurement cycle two individual measurements are being made; one background measurement and one with the spark on. If the hand unit is being moved during the measurement cycle, the background is altered and the results may not be accurate.

5.5 Keep the hand unit flush to the IG unit

If there is space between the spark electrode and the surface of the glass, a big part of the spark burst will occur outside of the IG unit. This means that the instrument is not measuring the spark inside the window but a mix of the inside gas and normal air causing the readings to be too low. The user can easily hear when the hand unit is flush to the IG.



5.6 Non Low-E IG units

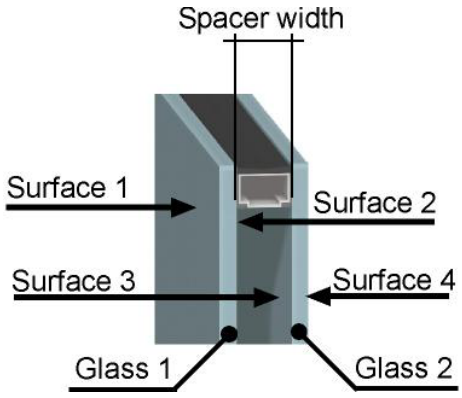


As the LoW-E coating is metallic, this will act as a ground for the spark. This grounding is being used when the instrument is calibrated. If the window has no Low-E coating, there is no ground to where the spark will ignite producing more erratic readings. These windows should be measured with either a finger on the back of the IG or some other metallic ground for the spark.

5.7 Restrictions

Following is a list of different IG types that can be measured and types that can not or are difficult to measure. Consult your local distributor or Sparklike for any special types.

Most of the restrictions are caused by the Glass 1.



A. IG with Glass 1 = Clear glass and Low E on surface 3

Surface 1	Glass 1	Surface 2	Spacer	Surface 3	Glass 2	Surface 4
none	Clear max. 6mm	none	max. 24mm	Low E	Float	N/A

B. IG with Glass 1 = Clear glass and NO Low E

Surface 1	Glass 1	Surface 2	Spacer	Surface 3	Glass 2	Surface 4
none	Clear max. 6mm	none	max. 24mm	none	max. 6mm	none

C. IG with Glass 1 = Toughened and Low E on surface 3

Surface 1	Glass 1	Surface 2	Spacer	Surface 3	Glass 2	Surface 4
none	Tgh. max. 6mm	none	max. 24mm	Low E	Float	N/A

D. IG with Glass 1 = Toughened glass and NO Low E

Surface 1	Glass 1	Surface 2	Spacer	Surface 3	Glass 2	Surface 4
none	Tgh. max. 6mm	none	max. 24mm	none	max. 6mm	none

E. IG with Glass 1 = Tinted

Same restrictions as for A. and B. but might need separate calibration

F. IG with Glass 1 = Laminated

Laminated windows themselves have more limiting factors such as film thickness, overall Glass 1 thickness etc. It is not suggested to measure laminated IG:s.

G. IG with Glass 1 = Frosted

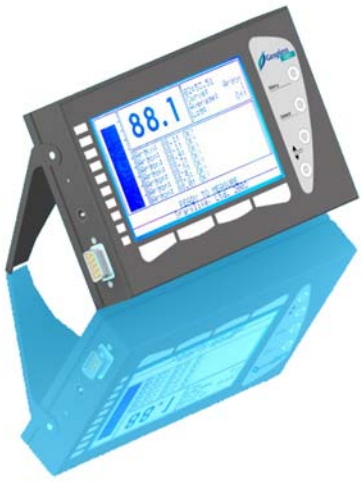
Same restrictions as for A. and B. but might need separate calibration

H. Triple glazing

Due to different layouts of a triple glazing IG, there are several layouts that are impossible to measure. Consult your distributor or Sparklike for detailed information. If Glass 1 and Glass 3 = Clear glass and Glass 2 has a Low-E coating the measurement can be done easily.

6 Using the Sparklike LCD Screen

6.1 Connecting the LCD to the Gasglass



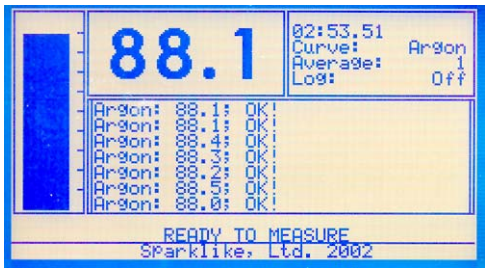
The LCD is connected to the Gasglass via two cables (Serial and Power). These cables are found in the cable pocket.

When connecting the LCD screen to the Gasglass, always connect them in the following order:

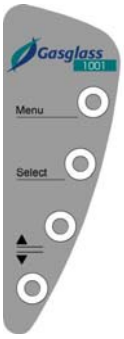
- Power off the Gasglass
- Connect the serial cable
- Connect the power cable
- Power on the Gasglass

The LCD will now initialize itself showing a blue screen with the Sparklike logo for 5 seconds. After this the Gasglass is ready for use and the screen should look as follows (without the measured data).

6.2 The buttons of the LCD display



On the right hand side of the LCD there are four buttons:



The **Menu** button will toggle between the four main menus.
The **Select** button will confirm any selection made by pressing the

▲ or
▼ in the different menus.

Pressing the Menu button will enable the menus.

6.3 The Curve menu

If the instrument is calibrated to different gas types (factory calibrated to Argon), these calibration modes can be changed by pressing ▲ or ▼ and confirming with Select. This function is normally not in use.

6.4 The Average menu

The user can set how many measurements are to be averaged (1-9) by pressing ▲ and ▼ and confirming with Select. NOTE: It is not recommended to use higher averaging than 3 because all information about individual measurements is being lost in the averaging process. NOTE: The Gasglass will spark three times in a row if the averaging is set to three.

6.5 The Log menu

The LCD can log the data measured by the Gasglass. By selecting New Log File the LCD will open a new log file, which will have a date stamp and a log file number. The log file number will be displayed in the upper right hand corner as long as data is being logged into this log file.

Off: stops the current logfile (only valid if currently logging)
New log file: creates a new log file and starts the logging of consequent measurements into the LCD memory. A maximum of around 2000 measurements can be logged.
Send logs to PC: sends all the logged data to a PC.

> **IMPORTANT:** Make sure that the connection between the Gasglass Data Center and the LCD is running before sending the data. Refer to the Datalogging section later in this manual for details.

Erase all logs: Erases all the data stored in the LCD memory. Selecting this option is verified by a dialog box.

> **IMPORTANT:** Once this option is selected, all data stored in the LCD memory is permanently lost.

Show storage space: shows how many percent of the LCD memory is available for data logging.

6.6 The Settings menu

- **Set time**: Setting the Time shown in the information box.
- **Set date**: Sets the date that is stored with the logged data.
- **Factory Settings**: If the clock for some reason is not working, this will jumpstart the clock and set the time to 0:0:0 1.1.2000. This will also restore the Gasglass to its factory settings.

6.7 Datalogging

The LCD display has an EEPROM (Electronically Erasable and Programmable Read Only Memory) that can store up to roughly 2000 measurements with the time, date, calibration curve number, error checking and Argon%.

The user can start a new log file by selecting: Logging -> New log file.
This log file will have a number and a time and date when it was created. The logs are transferred to a PC computer via the Gasglass Data Center software.

There can be a maximum of 200 logfiles in the LCD simultaneously.

7 The Gasglass Data Center software

The Gasglass Data Center software is the main communications port between the LCD display and a PC computer. This software retrieves the logged data to the computer. The Gasglass Data Center software installation can be found on the CD-Rom disc supplied with the Gasglass.

7.1 Installing

Insert the CD-Rom disc supplied with the Gasglass into the PC, open the GGDC2 folder and double click the Setup.exe icon to start the installation procedure. Follow the on-screen instructions and the software will install automatically. Please note that you may have to have Administrator rights to install software on your computer system.

7.2 Retrieving the Data from the LCD

The Gasglass Data Center software retrieves the data stored in the LCD display.

The first time the software is started the correct serial port has to be chosen. This is done from the **Connection -> Settings menu**. Choose the correct COM port and press OK. The next time you start the program, the computer will remember this setting.

Follow this sequence to retrieve the logged data:

Gasglass: Disconnect the serial cable from the Gasglass device and connect it to the PC-computer.
PC: Start the Gasglass Data Center software
PC: Choose the Connection menu and: Connect to Gasglass
LCD: go to the Log menu and toggle to Send logs to PC and press Select.

Now all the LCD data will be sent to the Gasglass Data Center software. NOTE: this might take several minutes if the LCD contains large amounts of data. Once the data is sent to the Gasglass Data Center, it can be removed from the LCD by selecting **Log->Erase all logs**.

Once the transfer is complete, the data can be moved to **Excel** or similar program for further analysis. The data can be copied from the **Transfer -> To Clipboard -> As Text** menu and by selecting Paste in **Excel** or a similar software.

The data can also be saved to the PC:s hard drive by selecting the **Transfer -> To File** menu.

8 Troubleshooting

Following is a short list of different problems or errors that can occur. Please read through this instructions manual thoroughly if you have any errors.

8.1 Errors while measuring

Normally the LCD will read: Argon: 92.3% OK. This means that the Gasglass is reading a normal Argon concentration and that the internal quality check gives an OK. NOTE: in some circumstances it may be possible to produce an OK reading while measuring in air. This is mainly due to moving the hand-unit during the measurement.
If the reading is not satisfactory to the Gasglass sensor, it will still try to calculate an Argon value but it will give an error code and an error message. The error codes are as follows:

Err-1: Too high background. There is too much backlight. Point the hand-unit somewhere else or cover the back of the window with some dark material. Generally avoid measuring against strong light.

Err-2: Too high signal. There is too much overall signal. Use the same steps as in Err-1. If the error persists, refer to your distributor on how to change to the higher mode.

Err-4: No/Weak Spark. The spark is not igniting thoroughly or the signal is very weak. This occurs mainly on very low filled windows and or very thick windows that the spark is not igniting through. Try to move the hand-unit towards the edge of the window or measure repetitive times until there is a spark.

Err-8: ???? This means that the instrument is unsure on how it is reading. The Gasglass is actually measuring several times during one measurement and if the difference between the different measurements is too high, the instrument reports the ????.

All of the errors can be combined so for instance if Err-12 occurs, both Err-8 and Err-4 has occurred.

8.2 Data Center Errors

No COM port: If the PC computer does not have a serial port, one needs to be installed. It can either be a normal serial port or a USB-Serial adaptor. These are available in normal computer stores. Install the COM port, connect the LCD to this COM port and the computer is ready.

Software does not work: If there is a problem with the software, please uninstall any existing GGDC software version and re-install it from the CD-ROM supplied with the Gasglass.

COM port occupied: If there is an error about the COM port being occupied, some other program or process is occupying the computer's COM port. Close all programs that may be connected to a COM port (such as Hyper Terminal, Cellular phone programs etc.) and retry.

No data from LCD: If no data is transferring from the LCD to the GGDC program, please check the following:

- There is logged data in the LCD
- The cables are connected properly
- The correct COM port is selected

If there still is no data from the LCD, please restart the LCD by cycling the LCD power (no data will be lost) and reconnecting to the PC. Use the correct above described procedure to extract the data from the LCD.

9 Appendix A: Gasglass Calibration

The Gasglass 1002 is factory calibrated to Argon prior to shipment. The calibration is done by measuring the following concentrations of Argon in a 4mm float – 12mm spacer – 4mm Low-E IG unit:

Argon: 97.5%	**Air: 2.5%**
Argon: 95%	**Air: 5%**
Argon: 90%	**Air: 10%**
Argon: 85%	**Air: 15%**
Argon: 80%	**Air: 20%**
Argon: 70%	**Air: 30%**
Argon: 50%	**Air: 50%**
Argon: 0%	**Air: 100%**

The original calibration data is provided with the instrument. If the Gasglass 1002 is maintained properly the calibration should not change over time. The Gasglass calibration should be tested on a regular basis. If the calibration has changed, please consult your distributor or Sparklike for information on how to change the calibration.

9.1 Accuracy of the device

The accuracy of the Gasglass is stated to be within the following specifications:

100% - 90 %	±1%
90 % - 85 %	±1.5%
85 % - 80 %	±2%
80% - 0%	Accuracy expected to be within ±5% but not guaranteed

Lowest measurable concentration is approx. 50%

The accuracy is tested to be according to the specifications at the time of shipping for a 4-12-4Low-E IG unit.

9.2 Precision of the device

The Gasglass1002 is calibrated to a 4-12-4Low-E IG. If the measured IG differs in composition from this, the readings have to be compensated in order to obtain the correct Argon value. The maximum deviation from the stated accuracy is the following:

100% - 90 %	±1%
90 % - 85 %	±1.5%
85 % - 80 %	±2%
80% - 0%	Expected to be ± 5 % but not guaranteed.

The deviation table can be used to correct the values for different types of IG units so that the readings comply with the accuracy statement.

10 Appendix B: Deviation table

The Gasglass instrument may show slightly different readings depending on the kind of IG units currently being measured. The following table is a summary of tests done on different IG types for different argon concentrations and shows the variation from the measured reading.

Use the deviation table as follows:
a. Measure your IG.
b. Select the closest match to your IG from the list.
c. Subtract the compensation value in the deviation table from your current measurement.

e.g.

IG unit with "harmonized code": 90014 is being measured and the measured Ar% is = 90,2%.

90014 has a compensation value of - 0,5% at 90% fill level

=> 90,2% - (- 0,5%) = The actual result = 89,7%

COMPENSATION VALUE				Harm.	Sunside	Coating	Coating		Coating	Coating	Inside
95 %	*90 %*	*85 %*	*80 %*	Code	Pane A	1	2	Spacer B	3	4	Pane C
-0,3	0,1	0,0	0,4	90048	3 mm float	none	none	6 mm	LowE	none	float
-1,0	-0,5	-0,7	-0,4	90049	4 mm float	none	none	6 mm	LowE	none	float
-1,2	-1,5	-0,8	-1,1	90046	5 mm float	none	none	6 mm	LowE	none	float
-1,5	-1,8	-1,9	-1,6	90047	6 mm float	none	none	6 mm	LowE	none	float
-0,9	-0,6	0,0	0,3	90044	4 mm float	none	none	8 mm	LowE	none	float
-0,9	-0,6	0,0	-0,2	90045	5 mm float	none	none	8 mm	LowE	none	float
-0,7	-0,6	-0,2	-0,4	90006	6 mm float	none	none	8 mm	LowE	none	float
-0,9	-0,5	0,0	0,4	90014	3 mm float	none	none	10 mm	LowE	none	float
-0,4	0,0	0,1	0,6	90043	4 mm float	none	none	10 mm	LowE	none	float
-0,9	-0,5	-0,2	0,7	90052	6 mm float	none	none	10 mm	LowE	none	float
-0,5	0,2	0,6	0,1	90003	3 mm float	none	none	12mm	LowE	none	float
-	-	-	-	4124L	4 mm float	none	none	12mm	LowE	none	float
-0,6	0,1	0,2	-0,2	90034	5 mm float	none	none	12mm	LowE	none	float
-0,7	-0,1	0,1	0,0	90033	6 mm float	none	none	12mm	LowE	none	float
0,1	0,8	1,6	1,5	90089	3 mm float	none	none	15mm	LowE	none	float
-0,6	0,0	-0,5	-0,1	4154L	4 mm float	none	none	15mm	LowE	none	float
-0,5	0,0	-0,3	-0,1	90039	5 mm float	none	none	15mm	LowE	none	float
-0,3	0,0	-0,7	-0,4	90010	6 mm float	none	none	15mm	LowE	none	float
-0,3	0,4	-0,9	-0,4	90007	3 mm float	none	none	20mm	LowE	none	float
-0,3	0,2	-0,3	-0,8	4204L	4 mm float	none	none	20mm	LowE	none	float
-0,5	-0,2	-0,6	-1,0	90056	5 mm float	none	none	20mm	LowE	none	float
-0,2	0,0	-0,4	-0,1	80006	6 mm float	none	none	20mm	LowE	none	float
-0,2	1,2	0,8	-1,0	80021	4 mm float	none	none	20mm	none	none	4mm float
0,3	1,2	0,1	-0,2	80002	6 mm float	none	none	20mm	none	none	6mm float
-0,4	1,2	0,9	-0,2	80023	4 mm tgh	none	none	20mm	none	none	4mm tgh
-0,1	0,9	0,5	-1,6	80005	6 mm tgh	none	none	20mm	none	none	6mm tgh

11 Appendix C: TECHNICAL SPECIFICATIONS

Overall Dimensions:	440*350*170	mm
Weight:	7	kg
Operating Conditions:	+10 - +35	°C
Humidity:	0 - 90 %	R.H. Non-condensing
Main Power Supply:	100 - 240	VAC
Power Consumption:	60	VA
Output Connectors:	RS232 Serial interface, D-Sub9 Screen power cable 7,0 VDC	
Display:	Sparklike LCD screen	
Measurement:	One button measurement	
Software:	Gasglass data logging software for PC	
Accuracy:	100% - 90 % ±1% 90 % - 85 % ±1.5% 85 % - 80 % ±2% 80% - Accuracy expected to be within ±5% but not guaranteed Lowest measurable concentration is approx. 50%	
Precision:	100% - 90% ±1% 90% - 85% ±1.5% 85% - 80% ±2% 80% - Precision expected to be within ±5% but not guaranteed For more precise measurements see the “Deviation Table”	NOTE! The precision table is a summary of the deviations in measurement results when measuring different types of IG units See the "Deviation Table" for more information.