

# GA', GD, GE, GF, GG

## Технические характеристики

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# Gas Analysis/Detection

## Orsat Gas Analyser

### Gas Analyser, Orsat

With burette and jacket, stopcock manifold and absorption vessels mounted in a carrying case. All absorption vessels are filled with glass tubes and the 3- and 4-vessel models additionally have one with copper wires included. Overall dimensions 520 x 350 x 150mm. Without chemicals.

### With 2-absorption vessels

For the determination of CO<sub>2</sub> and O<sub>2</sub> in flue gases.

**GA500-20** 50ml burette

### With 3-absorption vessels

For the determination of CO<sub>2</sub>, O<sub>2</sub> and approximate CO in flue gases.

**GA502-30** 100ml burette

### With 4-absorption vessels

For the determination of CO<sub>2</sub>, O<sub>2</sub> and approximate CO in flue gases.

**GA504-30** 100ml burette

### Spares

**GA510-10** Absorption vessel, empty

**GA510-12** Absorption vessel, with glass tubes

**GA510-16** Absorption vessel, with glass tubes and copper wires

**GA510-23** Manifold, 3-stopcock for 2-vessel model

**GA510-28** Burette, 50ml

**GA512-23** Manifold, 4-stopcock for 3 vessel 100ml burette model

**GA512-25** Manifold, 5-stopcock for 4 vessel 100ml burette model

**GA512-28** Burette, 100ml

**GA510-30** Burette jacket only

**GA510-32** Burette jacket with rubber bungs

**GA510-36** U-tube

**AS100-06** Levelling bottle

**BP210-10** Bellows

Gas Absorption Towers and Tubes, straight and U-form, Arnold and Midvale patterns – see AB050 to AB190 in the Absorption section.



## Gas and Vapour Detector System

# KITAGAWA

For measuring pollutants in the atmosphere and flue gases etc. Incorporating a lightweight and portable aspirator pump sampler on which can be mounted a wide range of colour change detector tubes. This simple to use system requires no specialist knowledge and there are no chemical reagents to prepare. The detector chemicals are sealed in tubes and ready for immediate use. A reading can be obtained in a few minutes and therefore many locations can be sampled in a short time. The pump is available on its own or supplied with carrying case and 2 spare rubber inlets, but without detector tubes.

**GD100-15** Aspirator sample syringe only

**GD100-17** Aspirator sample syringe and case

### Detector Tubes

Glass with break-off tip. Further, or less, pumping strokes are required to achieve extended ranges as indicated. Supplied in packs of 10.

Tubes Cat. No.	Ref. No.	Detector Tube	Measuring range		Colour Original	Colour Change
			Standard	Extended		
<b>GD105-40</b>	105SC	Ammonia	5 to 130ppm	10 to 260ppm	Pale purple	Pale yellow
<b>GD107-15</b>	126SA	Carbon dioxide	0.2 to 5.2%	0.1 to 2.6%	Purple blue	Pale pink
<b>GD107-28</b>	126SH	Carbon dioxide	1 to 28%	—	Pink	Yellow
<b>GD109-27</b>	106SC	Carbon monoxide	1 to 50ppm	—	Orange	Reddish purple
<b>GD110-30</b>	109SB	Chlorine	0.125 to 2.5ppm	0.5 to 10ppm	White	Pale orange
<b>GD110-40</b>	232SA	Ethylene glycol	20 to 250mg/m <sup>3</sup>	—	Pink	Yellow
<b>GD110-50</b>	171SA	Formaldehyde	20 to 1500ppm	—	Yellow	Pink
<b>GD113-20</b>	187S	General hydrocarbons	50 to 1400ppm	—	Orange	Yellowish green
<b>GD114-28</b>	120SB	Hydrogen sulphide	0.75 to 37.5ppm	6 to 300ppm	White	Dark brown
<b>GD114-31</b>	120SC	Hydrogen sulphide	50 to 1600ppm	—	Pale yellow	Dark blue
<b>GD114-35</b>	120SH	Hydrogen sulphide	0.1 to 4%	—	Pale blue	Black
<b>GD115-10</b>	155U	Methyl isobutyl ketone	5 to 300ppm	—	Yellow	Pale blue
<b>GD115-30</b>	175SH	Nitrogen oxides (NO +NO <sub>2</sub> )	100 to 2500ppm	—	White	Yellow
<b>GD118-20</b>	158S	Styrene	2.5 to 150ppm	5 to 300ppm	White	Yellow
<b>GD118-50</b>	103SD	Sulphur dioxide	1 to 60ppm	—	Pink	Yellow
<b>GD119-40</b>	134SA	Trichloroethylene	5 to 150ppm	10 to 300ppm	White	Red

Alternative tube ranges and parameters are available - details on request.



# Gas Analysis/Detection

## CO Meter, Model 317-3



For carbon monoxide level testing in ambient air.

- ◆ Range 0 to 1999ppm x 1ppm resolution
- ◆ Accuracy  $\pm 3$ ppm (0 to 29ppm),  $\pm 10\%$  of value (30 to 1999ppm), both  $\pm 1$  digit
- ◆ Adjustable alarm levels with audio-visual beep alarm, with frequency rising to continuous sound at 200ppm (danger level)
- ◆ No zeroing required
- ◆ Easy-to-read, backlit display
- ◆ Battery life up to 150 hours

As described. Supplied with belt clip, lanyard and 2 x 1.5V AAA batteries Overall 215 x 68 x 47mm, L x W x D. Weight 100g.

**GD260-15** Testo 317-3

**BL610-08** Spare battery (2 required)

## CO<sub>2</sub> Meter, Model 535



Ideal instrument for measuring indoor air quality.

- ◆ Range 0 to 9999ppm x 1ppm resolution
- ◆ High accuracy
- ◆ Hold, max./min. and mean functions
- ◆ Infra-red output port using accessory printer
- ◆ Stable, two channel infra-red sensor
- ◆ Auto-off function after 10 minutes without use extends battery life

As described. Supplied with permanently attached probe on 1.2 metre cable, 9V PP3 battery and calibration protocol. Overall 190 x 57 x 42mm (meter only). Weight 300g.

**GD264-20** Testo 535

**BL610-25** Spare battery

### Thermal paper printer

With infra-red cordless data communication. Supplied with 4 x AA batteries and 1 roll of paper.

**AN472-40** Printer

Spare thermal paper for AN472-40, pack of 6 rolls.

**AN472-45** Paper

## Combustible Gas Leak Detector, CD100B



Developed for pinpointing combustible gas leaks within a system. Operates by setting a "background" level for the gas. As concentration increases, a red LED indicator flashes faster and an audible tick-rate increases accordingly.

Gases sensed	Hydrogen; methane; natural gas; ammonia; propane; acetone; petrol; refrigerants; ethylene; halon; lacquer thinners; solvents; alcohol; jet fuel
Sensor	Solid-state, low power, semi-conductor
Sensor mount	Flexible goose neck 400mm long with LED illuminator in sensor head
Overall mm	205 x 100 x 36 L x W x D (housing)
Weight g	460
Power	9V PP3 battery

As described. Supplied with 9V PP3 battery and instructions.

**GD267-15** CD100B

**BL610-25** Spare battery



GD260-15



GD264-20



GD267-15

# Gas Collection/Distribution

## Gas Collection

### Gas Jars

Heavy glass. Ground flange. Nominal dimensions are height x internal diameter in mm. Without cover.

<b>GE300-10</b>	150 x 50
<b>GE300-20</b>	200 x 50
<b>GE300-40</b>	250 x 50
<b>GE300-50</b>	300 x 60
<b>GE300-60</b>	300 x 80

### Gas Jar Covers

<b>GE302-08</b>	for 50mm diameter jars
<b>GE302-12</b>	for 60mm diameter jars
<b>GE302-16</b>	for 80mm diameter jars

### Pneumatic Troughs

Cylindrical. Nominal dimensions stated are diameter x height in mm.

### Heavy glass

<b>GE310-15</b>	200 x 100
<b>GE310-25</b>	250 x 125

### Polyethylene

<b>BT810-25</b>	350 x 120
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### Delivery tubes, Azlon

Ideal for "Rate of Reaction" experiments in educational science. Rigid polypropylene tubing 4 x 6mm i.d. x o.d. Choice of shape design to suit a variety of apparatus set-ups. Supplied in packs of 5.

<b>GE320-12</b>	DT001, 90° right-angle bend
<b>GE320-14</b>	DT002, double bend, bung top
<b>GE320-18</b>	DT004, straight, delivery tube

### Beehive Shelves

Earthenware. Cylindrical. Nominal diameter stated.

<b>GE335-10</b>	75mm
<b>GE335-20</b>	100mm

### Wood Splints

Bundles of approximately 1000.

<b>GE350-10</b>	Splints
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### Deflagrating Spoon

Steel with flange cap. Overall length 400mm. Flange diameter 90mm.

<b>GE360-15</b>	Spoon
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### Gas Washbottle, Wouff

Glass. With 2 x 19/26 socket necks.

<b>GE515-36</b>	500ml
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### Gas Washbottle

Glass. With integral inlet and outlet tubes. Height x diameter. 125 x 25mm.

<b>GE520-20</b>	40ml
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Absorption Tower – see *Absorption section*.

Filter Sticks with sintered glass flat plate – see *Filtration section*.

Gas Lighters, Flint and Piezo models – see *Burners section*.

Whatman In-Line filters for pipelines – see *Filtration section*.



**GE300 with GE302**



**GE350**



**GE310**



**BT810-25**



**GE335**



**GE515**



**GE360 in use**



from left: **GE320-12, -18, -14**



**GE520**

# Gas Collection/Distribution

## Gas Distribution

### Gas Distribution Tubes, Pyrex

For dispersing gases in liquids. With sintered glass thimble on a tube stem. Thimble diameter 15mm. Overall length x tube diameter 300 x 8mm.

	Ref.	Thimble porosity
<b>GE700-10</b>	3830/00D	0
<b>GE700-11</b>	3830/02D	1
<b>GE700-12</b>	3830/04D	2
<b>GE700-13</b>	3830/06D	3

Absorption Tower – see *AB050*.

Gas Lighters, Flint and Piezo models – see *Burners section*.

Whatman In-Line filters for pipelines – see *Filtration section*.

### Pipeline Filter Tubes, Pyrex

With sintered glass flat disc set in-line with inlet and outlet tubes. Pressure differential across disc must not exceed 1 bar.

	Ref.	Disc porosity
<b>30mm disc</b> , 10mm o.d. stem, 190mm long		
<b>GE710-11</b>	3800/02M	1
<b>65mm disc</b> , 12mm o.d. stem, 235mm long		
<b>GE713-12</b>	3800/18D	2
<b>95mm disc</b> , 14mm o.d. stem, 260mm long		
<b>GE716-12</b>	3800/20M	2



**GE700**



**GE710/713/716**

# Gas Cylinder

## Cylinder Supports and Trolleys

### Gas Cylinder Trolleys

Single cylinder capacity. Stoved enamel steel frame finished in blue, incorporating side shield bars for added protection of the cylinder, galvanised retaining chain, wide, perforated base platform to aid condensation drainage and provide support, and tyred wheels. Maximum capacity 150kg and cylinder height 1220mm. Maximum cylinder diameter as indicated. Available with, or without, dismantlable rear arm with castors to aid manoeuvrability.

- GF402-10** For 280mm cylinder, without castor arm
- GF404-15** For 280mm cylinder, with castor arm
- GF406-20** For 380mm cylinder, without castor arm
- GF406-25** For 380mm cylinder, with castor arm

### Gas Cylinder Stand

For a single cylinder. Epoxy coated steel frame finished in blue, with heavy duty base plate drilled with holes for attachment to the floor. For cylinders up to 280mm diameter which are secured by hinged retaining bars. Overall 600 x 340 x 310mm H x W x D. Supplied without fixings.

- GF415-22** Gas cylinder stand, for 280mm cylinders

### Gas Cylinder Support

With bench clamp and webbing strap. For cylinders up to 230mm diameter.

- GF430-23** 230mm
- GF430-27** Spare strap

### Gas Cylinder Wall Brackets

Wall mounting. Strong, stoved enamel steel frame finished in blue with galvanised steel retaining chain. To hold cylinders and with overall sizes as indicated. Maximum cylinder diameter accommodated 280mm. Supplied without wall fixings.

	Cylinders held	W x D x H, mm
<b>GF440-20</b>	2	650 x 155 x 40
<b>GF440-35</b>	3	965 x 155 x 40



GF406-20, GF406-25 is similar



GF404, GF402 is similar



GF415



GF430 in use



GF440

# Gas Cylinder/Generator

## Gas Cylinder Regulators

To BS EN ISO 2503. Multistage regulators designed to minimise outlet pressure fluctuation. the first stage reduces cylinder pressure to 17 bar. the second stage is finely adjustable up to the pressure specified. Inlet  $\frac{3}{8}$ " female BSP, outlet  $\frac{3}{8}$ " male BSP.

**GF490-05** Air, 3.5 bar  
**GF490-10** Air, 10 bar

**GF490-15** Argon, 3.5 bar  
**GF490-20** Argon, 10 bar

**GF490-25** Carbon dioxide, 3.5 bar  
**GF490-30** Carbon dioxide, 10 bar

**GF490-35** Helium, 3.5 bar  
**GF490-40** Helium, 10 bar

**GF490-55** Nitrogen, 3.5 bar  
**GF490-60** Nitrogen, 10 bar

**GF490-65** Oxygen, 3.5 bar  
**GF490-70** Oxygen, 10 bar

Fittings and accessories for gas cylinders, including tubing adapters, multiple outlets, "Swagelok" adapters and flashback arrestors are available - *details on request.*

## Gas Generator

### Gas Generator, Kipps

Borosilicate glass with ground joint fittings. Central bulb 1000ml. With rubber separator, outlet tube with stopcock, upper safety bulb and stoppered outlet in lower reservoir. Without chemicals.

**GG100-20** Kipps

### Spare parts

**GG103-12** Outlet stopcock, 29/32

**GG103-18** Lower stopper, 29/32

### Gas Preparation Kit 1GS

Designed for educational use but can be used for the preparation of gases for a wide variety of chemical experiments – see *Q1GS in the Quickfit Section.*

Flowmeters for gases and liquids – see *FR200/FR300.*

### Hazard Warning Labels including:

Flammable Gas and Non-Flammable Compressed Gas – see *SC300 to SC304 in the Safety section.*



GF490



GG100

# Gas Generators

## Hydrogen Generators, Precision



Produce a continuous supply of ultra high purity gas to replace cylinder gas in gas chromatography and many other laboratory applications.

- ◆ Output suitable for both carrier and flame gas, when operating gas chromatographs at standard detection limits (>1000ppm or 1%), except GG150-18 which is suitable for Trace Analysis
- ◆ Safe, reliable Hydrogen generation using proven, membrane technology
- ◆ Automatic water feeding gives a virtually endless supply of gas
- ◆ Replaceable deioniser cartridge and silica gel charge maintains consistent purity and provides easy maintenance
- ◆ "On demand" generation ensures minimal Hydrogen stored in the system
- ◆ Built-in, gas leak detection system with automatic shutdown function

### Technical data:

- ◆ H<sub>2</sub> purity >99.9995% at maximum flow and pressure (GG150-88: >99.9999%)
- ◆ Choice of maximum flow rate according to model
- ◆ Adjustable output pressure from 0 to 100psi g (0 to 6.9 bar g)
- ◆ Water purity requirements: <1 S/cm conductivity and >1M -cm resistance
- ◆ Output connection: 3mm outside diameter
- ◆ Overall 380 x 540 x 406mm W x D x H
- ◆ Weight, excluding water, 29kg

### Hydrogen Generators

As specified. Supplied with inlet ferrule, power lead and instructions. For 110V, 230V 50Hz a.c. single phase supplies.

- GG150-14** Model Precision Hydrogen 100, 100ml per minute
- GG150-18** Model Precision Hydrogen 200, 200ml per minute
- GG150-48** Model Precision Hydrogen 300, 300ml per minute
- GG150-65** Model Precision Hydrogen 450, 450ml per minute
- GG150-88** Model Precision Hydrogen Trace 500, 500ml per minute\*

\* Trace Analysis (>99.9999% purity output) model

### Silica gel

- GG150-95** Silica gel, self indicating, pack of 500g. One complete recharge.
- GG150-97** Silica gel, self indicating, pack of 25kg

## Nitrogen Generators, Precision



Suitable deioniser for use with above generators – see DB120-10.

Produce >99.9995% purity N<sub>2</sub> to replace cylinder gas used for gas chromatography and many other laboratory applications.

The generators utilise a nitrogen enrichment technique with a highly efficient proprietary carbon molecular sieve that ensures the highest purity of the generated gas. The nitrogen separation process relies on differential diffusion and, with no physical absorption taking place, the carbon sieve easily self regenerates and does not require replacement. This means that the purity of the nitrogen remains consistent with no fall off in performance.

Note: These generators require a separate source of compressed air operating at minimum 35 litres/minute at 100-120psi g (or accessory Precision compressor) for operation.

- ◆ Replace the need to store and replenish gas held in pressurised cylinders
- ◆ Gas over-pressure safety system
- ◆ Only small volumes at low pressure are stored
- ◆ Continuous supply of gas

### Technical data:

- ◆ Nitrogen purity >99.9995%
- ◆ Output pressure 5.5 bar g (80 psi g)
- ◆ Output connection 3mm o.d.
- ◆ Overall 380 x 540 x 256mm W x D x H
- ◆ Weight 48kg

### Nitrogen Generators

As specified. Supplied with power lead and instructions. For 110V/230V 50/60Hz a.c. single phase supplies. Require, but do not include, separate air compressor for operation.

- GG170-08** Model Precision Nitrogen, 250ml per minute
- GG170-17** Model Precision Nitrogen, 600ml per minute
- GG170-19** Model Precision Nitrogen, 1000ml per minute

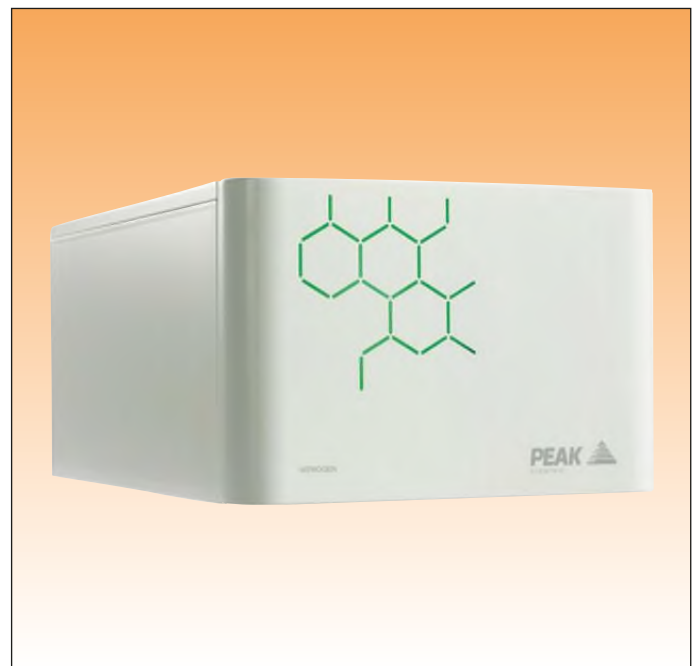
### Accessory Air Compressor

Suitable for use with GG170-series Nitrogen generators. Overall: 380 x 540 x 406mm W x D x H. Weight: 35kg. For 230V 50Hz a.c. single phase supplies.

- GG170-95** Precision Air Compressor



GG150



GG170



# Gas Meters

## Gas Meters

### Wet Type Gas Meters, for non-corrosive gases

Positive displacement meters for the measurement of total gas volume flowing in a given time. With large, graduated dial, stainless steel, 6 chamber drum, 6 digit electronic totalising counter (except GG500-20 which features 3 small index pointer subdials), "Hyde" type water level sight box, thermometer, fitted spirit level and levelling feet. GG500-10 and -15 must not exceed  $\pm 60$ mbar and GG500-20  $\pm 80$ mbar pressure during operation. Not suitable for use with corrosive gases.

Drum dm <sup>3</sup>	Dial cap. litres/rev, dm <sup>3</sup>	Litres per hour	Filling cap., litres	Overall H x W x D, mm	Weight, kg*
0.5	0.25	60	1.2	240 x 230 x 190	3.5
1.0	1.0	120	1.8	240 x 230 x 220	4
2.0	1.0	240	4.2	320 x 330 x 280	6

\* Approx. weight empty.

**GG500-10** 0.5dm<sup>3</sup> drum

**GG500-15** 1.0dm<sup>3</sup> drum

**GG500-20** 2.0dm<sup>3</sup> drum

### Flow Indicators

Simple to install indicators which give you a visual guide of either gas or liquid in-line Flow continuity.

#### ◆ Choice of materials

- Styrene acrylonitrile (SAN)  
Maximum operating temperature +30°C
- Polymethylpentene (PMP)  
Maximum operating temperature +60°C

Comprising paddle wheel in a transparent plastic housing. Rotation of the vanes gives a visual indication of either gas or liquid flow. Can accommodate flow rates down to approximately 150ml/minute. With stepped side arms for 6 to 11mm bore flexible tubing. Overall 88 x 40 x 15mm.

**FR200-12** Styrene acrylonitrile

**FR200-15** Polymethylpentene

### Tubing, PVC

Flexible transparent non-toxic general purpose tubing in coils as indicated.

	Bore x o.d. mm	Coil length metres
<b>TY403-15</b>	3 x 4.5	30
<b>TY403-20</b>	5 x 8	30
<b>TY403-30</b>	8 x 12	30
<b>TY403-35</b>	10 x 14	30
<b>TY403-40</b>	12.5 x 17	30
<b>TY403-50</b>	16 x 22.5	10
<b>TY403-55</b>	20 x 26.5	10
<b>TY403-60</b>	25 x 31.5	10

Full details and further information - see *Tubing* section.



**GG500-10, GG500-15 is similar**



**GG500-20**

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аер@nt-rt.ru || <https://ajcope.nt-rt.ru/>