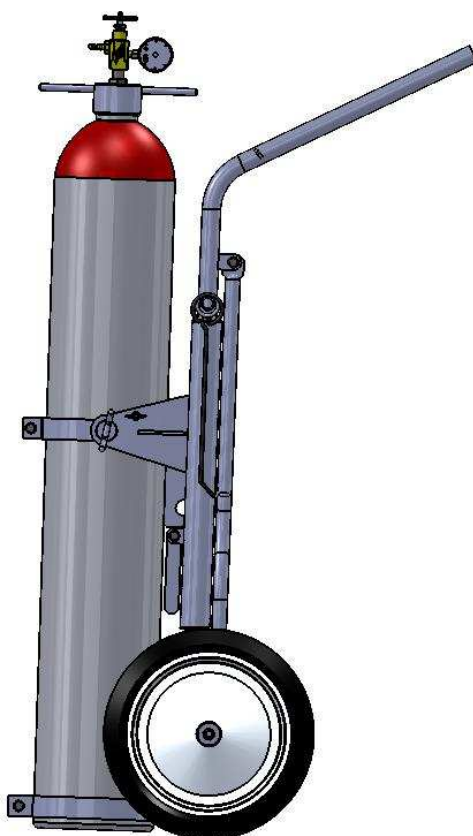


TECHNICAL SPECIFICATIONS
FOR CHEMICAL HYDROGEN GENERATOR
TYPE GIP™ 3



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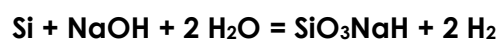
1 - GENERALITIES AND PRINCIPLE

The GIPT™ 3 type hydrogen generator, manufactured by SAGIM, is an easily operated unit suitable throughout the world.

Its production per charge is 3 m³ of hydrogen (measured dry at 15°C and 760 mm of mercury).

The preparation procedure of the hydrogen required for the GIPT™ 3 type hydrogen generators is based on a high-pressure, high-temperature attack of the silicon by caustic potash in an aqueous solution.

With this in mind, we advise the use of dosed charges made by us for the following reaction:



The caustic soda is, therefore, subject to the action of the silicon in the autoclave.

The pressure is produced by the reaction itself which is not reversible. The local increase of temperature enables the liquid to reach a temperature high enough to substantially compensate for the retarding effect of the pressure and ensure the complete attack of the silicon.

2 – EQUIPMENT DESIGN

2.1 DESCRIPTION

The GIP™ 3 type hydrogen generator unit is comprised of the following:

- o the generator,
- o a trolley (for accessibility to the generator),
- o a set of accessories.

2.1.1 The generator

- a) The body of the GIP™ 3 type hydrogen generator is comprised of a cylinder made of drawn seamless steel with a capacity of approximately 45 liters, pressure tested to 300 bars, and stamped at 200 bars by the 'Service des Mines'. This cylinder is shrink-fitted at the bottom and has a neck with external threads.

The middle has a steel two-part ring assembled by bolts with pivots at two diametrically opposed points enabling it to swivel on the trolley and a hook for it to be locked on to the cylinder in respect to the trolley.

- b) The threaded neck of the cylinder has a cap screwed onto it. This special patented system provides sealed closing due to a set of rubber locking washers.
- c) The top part of the cap has a hydrogen draw-off cock equipped with an end piece on which a flexible hose is adapted to draw off the hydrogen, a safety burst type valve, and a pressure gauge. The bottom part of the cap has a chain with a suspended basket made of perforated sheet metal and provided to hold the silicon charge.

2.1.2 The trolley

The trolley mainly includes a cradle made of tubular steel, two rubber-coated wheels, and a prop stand.

The wheels are comprised of two side plates made from bolted sheet metal, a hub and solid rubber tread for wheeling over all types of terrain.

2.1.3 The accessories

Housed in a wooden box, the accessories include:

- a) One bucket with lip designed to measure the quantity of water required for the reaction and to take the waste liquid when draining the unit,
- b) One large bent funnel to add alkaline charge, powdered silicon and water to the generator,
- c) One small funnel to fill the basket with crushed silicon,
- d) One scoop to facilitate the silicon handling,

- e) One poker,
- f) One spanner to operate the nut of the closing cap and change the disk of the burst valve,
- g) One set of earthing connecting cables including:
 - one earth cable 4 mm² length 20.00 m,
 - one earth cable 4 mm² length 10.00 m,
 - one earth cable 4 mm² length 1.10 m,
- h) One pair of goggles,
- i) One pair of gloves,
- j) One brush,
- k) One technical booklet.

2.2 DRAWING

See Annex

2.3 TECHNICAL SPECIFICATIONS

NO.	DESCRIPTION	SPECIFICATIONS
1.	HYDROGEN GENERATOR	
1.1	Hydrogen volume	3 m ³ at 15°C
1.2	Hydrogen storage pressure	130 to 140 bars (apparatus hot) 100 bars (apparatus cold)
2.	UTILITIES	
2.1	Water consumption	13 liters per GIP cartridge

2.4 GIP™ 3 INFORMATION ON METEOROLOGICAL BALLOONS

The GIP™ 3 type hydrogen generator cartridges are stored in waterproof plastic boxes made of quantitative dosage of:

- o alkaline cartridge
- o priming cartridge
- o granulated silicon cartridge

A manipulation allows the generation of a hydrogen volume enough to inflate one 600 gr. balloon.

After the gas take-off phase, the generator has to be emptied and rinsed with water.

Immediately after the rinse with water, it is ready for a new operation. If necessary, a production of hydrogen can be made every two hours.

In other words, a 600 gr. hydrogen balloon can be inflated every two hours with the GIP™ 3 type hydrogen generator.

3 - MAINTENANCE

3.1 SPARE PARTS LIST (typical)

QUANTITY FOR 1 YEAR	QUANTITY FOR 2 YEARS	DESIGNATION OF SPARE PARTS
1	2	<i>Spanner</i>
0	1	Closing ensemble (axle and washer only) (drawing ME-15003 détail 8,18,16)
0	1	Draw-off cock (drawing ME-15003)
1	1	Straight funnel for filling the basket with silicon (drawing ME-15004)
1	1	Bent funnel for filling the generator (drawing ME-15004)
2	2	Set of 7 EPDM gaskets for the closing (drawing ME-15003 détail 17)
1	2	Pressure gauge \varnothing 60 mm
1	2	Silicon basket (drawing ME-15004 détail 2)
1	2	Shovel
1	3	Set of gaskets for draw-off cock with bursting disk (drawing ME-15003 détail 9,10,11,12,13,14,15)
1	1	Poker (drawing ME-15004 détail 3)
1	2	Bucket (13 liters)

3.2 DAILY CHECKS

DAILY CHECK	FREQUENCY
Cleaning and brushing of the threaded cap	Before every operation
Greasing of the generator neck and of the threaded cap	Before every operation
Safety disk	Before every operation

3.3 PREVENTIVE MAINTENANCE

For preventive maintenance, the safety disk must be changed every 12 months.

4 - SAFETY

4.1 SAFETY OF EQUIPMENT

A safety valve is provided on the closure system of the chemical generator to avoid any build up of pressure in the generator.

4.2 USER AND TRAINING MANUAL

- a. User and maintenance manual
A complete technical booklet is provided in duplicate with the unit.
- b. Equipment risk analysis
All components constituting the equipment have been subjected to a hazard risk review.
- c. User training plan
SAGIM S.A. provides a complete training plan including services tailored to the needs of its Customers and of a high technical level, whether in the fields of quality, safety and international standards.

5 - QUALITY INSURANCE

All our services, beginning with the order and following through to the commissioning of our installations at customers as well as the development stage, production, installation and after sales service at customer are **ISO 9001-2000** quality certified.

6 - REACTIVE CARTRIDGES

The GIP™ reactive cartridges are in compliance with the technical clauses for cartridges for GIP™ no. 491 generators of the “Météorologie Nationale” department.

6.1 THE CARTRIDGES

The complete cartridge for the production of 3 m³ of hydrogen per operation using GIP™ 3 type hydrogen generators mainly includes:

- o Alkaline cartridge
- o Priming silicon cartridge
- o Silicon cartridge

The special patented alkaline cartridge comprised of a eutectic mixture of caustic soda and potash, not giving any solid residue, is housed in a sealed plastic box.

The same applies for the priming silicon cartridge which has the bare quantity required to cause the reaction.

The cartridge of granulated silicon, called the production cartridge, is supplied in a plastic bucket. The dosage depends on the actual capacity of the generator's metal basket.

Supplying the products required for the hydrogen production in this way eliminates any risk of error while at the same time simplifies the handling by eliminating weighing operations.

6.2 THE PACKING

For the transport, the reactive cartridges are housed in wooden boxes 18-mm thick, strapped twice for 6 alkaline cartridges and 6 priming cartridges housed in the same box. The granulated silicon cartridges, called production cartridges, are housed in one plastic buckets each with 12 cartridges. Therefore, 2 boxes of 6 alkaline cartridges are required to use one bucket of 12 cartridges of granulated silicon.

The boxes containing 6 alkaline cartridges and 6 priming cartridges have the following features:

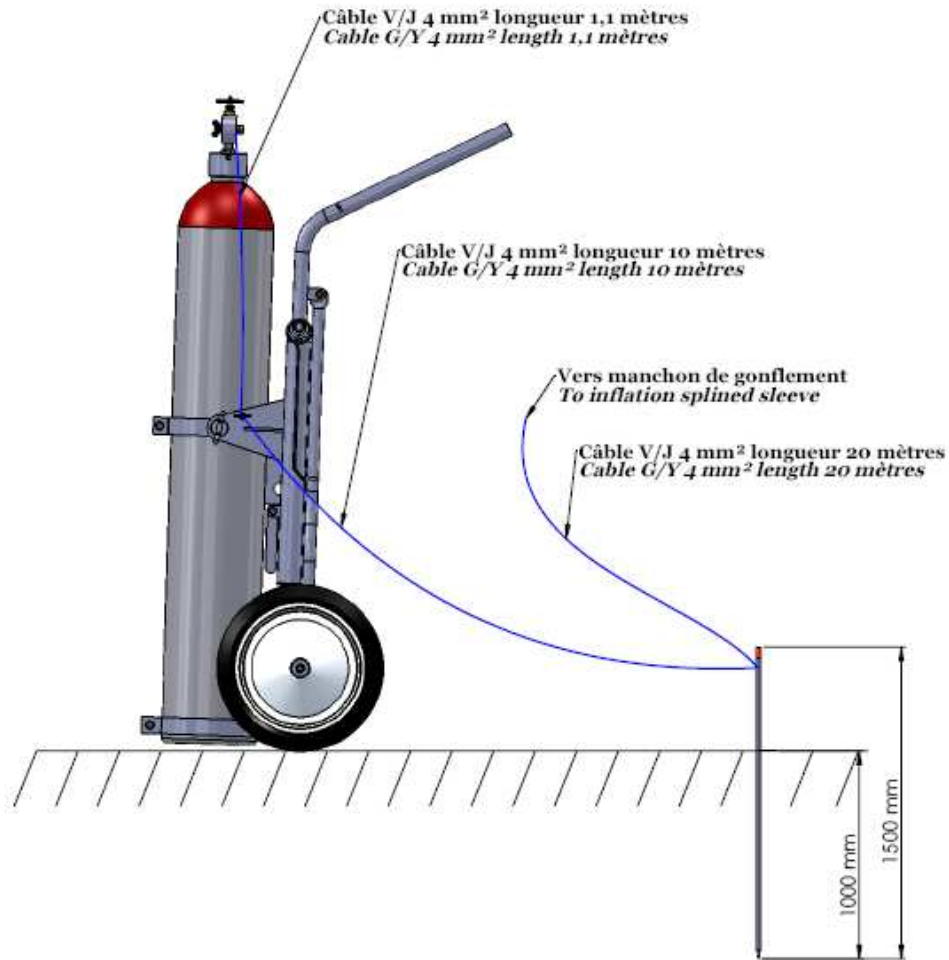
- | | |
|-----------------|--------------------|
| a) Dimensions | 0.55 x 0.40 x 0.30 |
| b) Gross weight | 35 kg |
| c) Net weight: | 23 kg |

The metal buckets containing 12 granulated silicon cartridges have the following features:

- | | |
|-----------------|--------------------|
| a) Dimensions | 0.33 x 0.33 x 0.26 |
| b) Gross weight | 20 kg |
| c) Net weight | 18 kg |

7 – ANNEX

MISE A LA TERRE DU GENERATEUR GENERATOR EARTHING DEVICE



LOT D'ACCESSOIRES ACCESSORIES SET

Entonnoir coudé
Bent funnel



Entonnoir droit
Straight funnel



Seau jaugeur
Bucket



Pelle
Scoop



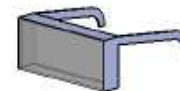
Poussoir
Poker



Clé à molette (12")
Spanner (12")



Paire de lunettes
Pair of goggles



Paire de gants
Pair of gloves



Brosse laiton
Brass brush



Piquet de mise à la terre
Earth rod



Jeu de câbles pour mise à la terre
Set of earth connecting cables



Câble V/J 4 mm² Lg:1,1m-10m-20m
Cable G/Y 4 mm² Lg:1,1m-10m-20m

Notice d'exploitation et d'entretien
Technical booklet



GENERATEUR CHIMIQUE TYPE GIP™ 3 CHEMICAL HYDROGEN GENERATOR TYPE GIP™ 3

UTILISATION
USE



CHARGEMENT
CHARGING

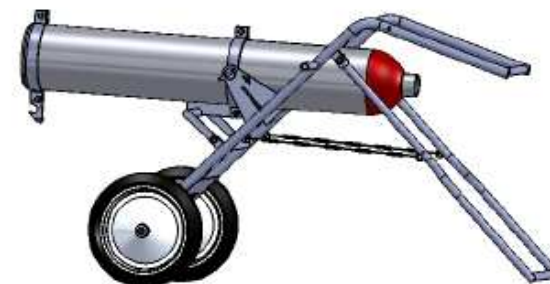


- 3m³ d'hydrogène produit en moins de 10 minutes
- 3m³ of hydrogen produced within 10 minutes

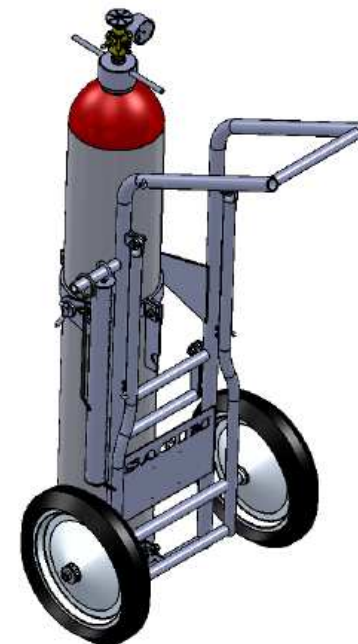
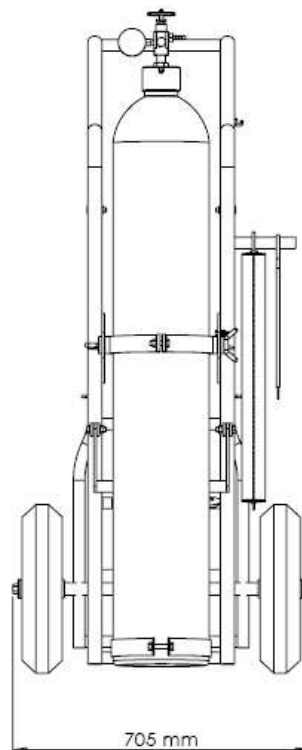
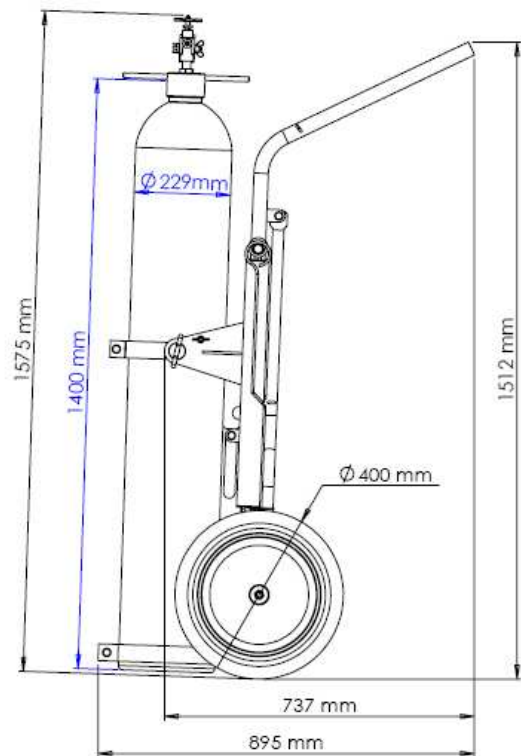
VIDANGE
DRAINING



RINCAGE
RINSING



GIP 3 LAYOUT (SERIAL 6000) SCHEMA D'ENCOMBREMENT (SERIE 6000)



Weight : 152Kg
Poids: 152Kg

Rep	Date	Name	Verif	Modification
	19/03/09	C.CHILLET		
		 DIVISION GIP		35,rue Scheurer Kestner 42000 ST-ETIENNE - FRANCE Tél :04 77 92 20 00 Fax : 04 77 74 71 09
GIP 3 Layout GIP 3 Schema d'encombrement (New generation 2009)				Client : Format : A3 Ech : 1/10 Drawing n°: GIP 3 -IM-15000/1 Rev 0