



# dispensman®

User's Guide  
EN



 **GILSON®**





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## Chapter 1

# GENERAL PRODUCT DESCRIPTION



GENERAL PRODUCT DESCRIPTION

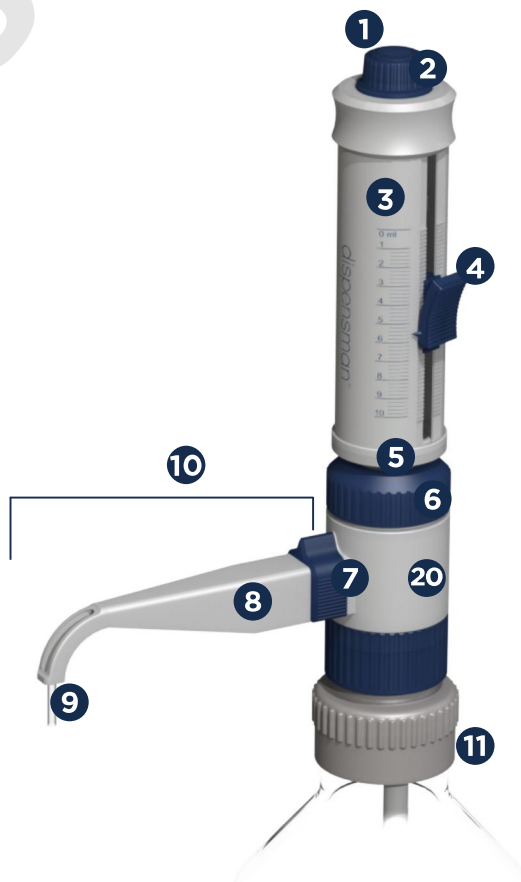
DISPENSAN® is a sophisticated dispensing system that fulfills increasing requirements for quality, precision, and reproducibility in laboratories. It consists of high precision components and extremely robust materials. It has a built-in recalibration mechanism that ensures reproducibility for the life of the instrument.

DISPENSAN is an exclusive instrument with 0% loss of reagent due to air-purging and draining within a closed circuit. The valve block can rotate 360°; therefore, the label of the bottle is always visible for your added safety. The dispenser has our unique 100% drip-free system for your safety at work: just turn the nozzle switch to “Empty” (180°) to drain it and prevent uncontrolled flow of liquid.

The dispenser is fully autoclavable at 121°C and can be completely disassembled for cleaning. Each instrument is individually tested and delivered with a certificate of performance.

## Description

- 1 Safety cap
- 2 Recalibration mechanism
- 3 Outer housing
- 4 Quick-lock knob
- 5 Adaptor ring
- 6 Cap nut
- 7 Nozzle switch
- 8 Protective sleeve
- 9 Discharge tube
- 10 Nozzle set
- 11 Bottle adaptor
- 20 Valve block





**Figure 1**  
Nozzle switch and its axle,  
located inside the valve block



**Figure 2**  
Valve block without nozzle

IMPORTANT: Edges on top!



**Figure 3**  
Valve block, top view



**Figure 4**  
Aspiration system, located  
under outer housing



**Figure 5**  
Valve block, bottom view

- 5 Adaptor ring
- 6 Cap nut
- 7 Nozzle switch
- 12 Suction valve
- 13 Valve star
- 14 Valve ball
- 15 Ejection valve
- 16 O-ring

- 17 Piston
- 18 Cylinder set
- 19 Cylinder
- 20 Valve block
- 21 Telescopic tube
- 22 Reflux tube



## Component Description

	COMPONENT	MATERIAL
<b>White components</b>		
3	Outer housing	PP (polypropylene) with 20% talcum
5	Adaptor ring	PP (polypropylene) with 20% talcum
7	Inside nozzle switch	PTFE (polytetrafluoroethylene)
8	Protective sleeve	PP (polypropylene)
11	Bottle adaptor	PP (polypropylene)
14	Valve ball	Ceramic
17	Piston	PTFE (polytetrafluoroethylene) / PVDF (polyvinylidene fluoride)
20	Valve block	PP (polypropylene) with 20% talcum
21	White component inside telescopic tube	PTFE (polytetrafluoroethylene)
<b>Blue components</b>		
1	Safety cap	Small volumes (2.5, 5, 10mL): PP (polypropylene) with 20% talcum Large volumes (25, 50mL): PP (polypropylene) with glass fiber
2	Recalibration knob	PP (polypropylene)
4	Sliding volume adjuster	PA66 (polyamide) with 30% glass fiber
6	Cap nut	PP (polypropylene)
7	Nozzle switch	PP (polypropylene)
<b>Clear components</b>		
9	Discharge tube	FEP (fluorinated ethylene propylene)
12	Inside valve block	ETFE (ethylene tetrafluoroethylene)
13	Valve star	ETFE (ethylene tetrafluoroethylene)
19	Cylinder	Glass
19	Protective transparent plastic for cylinder	PTFE (polytetrafluoroethylene)
21	Telescopic tube	FEP (fluorinated ethylene propylene)
22	Reflux tube	FEP (fluorinated ethylene propylene)
<b>Dark components</b>		
16	O-ring	FKM (fluorocarbon rubber)

## Parts Checklist

After unpacking the DISPENSMAN, verify that the following items were included and not damaged:

- 1 Gilson DISPENSMAN with an attached reflux tube
- 1 telescopic tube
- 1 protective sleeve with an attached discharge tube
- 1 calibration tool
- 4 adaptors with different diameters (mm):
  - For small volumes (2.5, 5, 10 mL): A25, A28, S40, A32/45
  - For large volumes (25, 50 mL): A25, A28, S40, A45/32
- 1 certificate of performance
- 1 user's guide



## SAFETY & USER PRECAUTIONS

### General Safety Precautions

In order to put the instrument into operation as quickly as possible and free from defects, it is necessary that you **read this manual carefully before using this instrument.**

Highest safety precautions should be used when dispensing corrosive, poisonous, radioactive, or hazardous chemicals.

- Observe the general safety regulations for handling chemicals (e.g., protective clothing, protective goggles).
- Use DISPENSMAN only with regard to the chemical resistance of materials and for the purpose for which is intended (see the chemical compatibility list, pages 17 and 18).
- Always check the instrument for leak tightness and a firm position of the plug and socket connection before you use it.
- Never use force. Breakage of any part will lead to hazardous exposure for the user as well as for other persons.
- Clean the instrument every week and if you want to use DISPENSMAN for another chemical solution or if you do not use it for a longer time.
- The temperature of the dispenser and reagent should not exceed 40°C (104°F).
- The user is responsible for checking that the instrument is suitable for his application.
- The proper and secure function is only guaranteed by using the supplied discharge tube ⑨. Do not use any other discharge tube.
- Never use damaged or deformed tubes. If the valve is damaged, the discharge tube might drop.
- The discharge tube should never face the user and a collection vessel should be placed underneath.
- Check all fittings for tightness approximately one hour after assembly or disassembly as temperature variations may cause material expansion, which can cause leakages.
- If you are unsure about dispensing a specific chemical solution, refer to the chemical compatibility list in pages 17 and 18 or contact your local Gilson representative.



## Safety Considerations Before Initial Operation

- Check instrument for damage caused in transit.
- The telescopic tube **21** should reach the bottom of the bottle.
- Do not use the outer housing **3** for carrying the assembled dispenser. If you need to carry the instrument, hold it by the base of the instrument.
- Attach discharge tube **9** and clip on protective sleeve **8** carefully to avoid damage.
- When screwing on/off the bottle do not hold the instrument at its outer housing **3**, but at the screw base.
- Do not pump before the instrument has been assembled completely and a collecting vessel has been placed underneath.

## Operating Limitations

Do not use for:

- PTFE swelling solvents
- Hydrofluoric acid
- Chemical solutions that react with platinum-iridium alloys

Liquids used with DISPENSMAN must not exceed the following limits:

OPERATION LIMIT	MAXIMUM
Vapor pressure	600 mbar
Viscosity	500 mm <sup>2</sup> /s
Density	2.2 g/cm <sup>3</sup>
Temperature	<+15°C and >+40°C <+59°F and >+104°F

## Liquid Contact Materials

The components having direct contact with the reagent are made of chemical resistant materials: platinum spring, ceramic valve balls, PTFE piston, and borosilicate glass 3.3 cylinder.

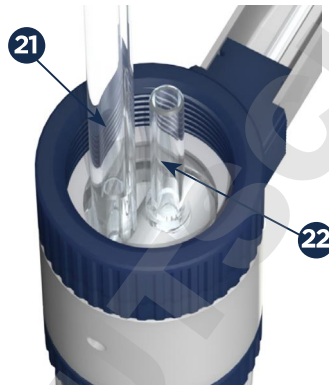


## INSTALLATION

### Telescopic Tube

Press gently the telescopic tube **21** into the smaller hole of the bottom part of the valve block. Check for the proper length of the telescopic tube (it should reach the bottom of the bottle).

The reflux tube **22** is already attached to the bigger hole.



**Figure 6**  
Valve block, bottom view

### Bottle Adaptor

Choose the right adaptor according to your bottle.  
Screw the chosen adaptor on to the extremity of the bottle and screw DISPENSMAN into the adaptor.  
Check the stability of the instrument on the bottle before operating.





## Chapter 4

# OPERATION



OPERATION

Legend of arrows in pictures:

ARROW	SIGNIFICATION
	User action on the instrument
	Liquid movement into the instrument

## Volume Adjustment

The quick-volume adjustment is performed with the quick-lock knob **4**. Push the quick-lock knob, slide it down to the desired volume, and then release.



## Air Purging

Turn the nozzle switch **7** to “Recycle” (90°). Set a small volume and dispense until the cylinder **19** is free from air. Air-purging is performed in a closed circuit for zero loss of reagent.

Turn the discharge tube back to “Dispense” (0°). Adjust to the desired volume. Dispense liquid precisely and carefully until the end of discharge tube **9** is fully filled. Without any air in the entire instrument, this step will guarantee that the dispensed volume is precise (zero point). Then, fill the cylinder up to the selected volume.

The DISPENSMAN is now ready to dispense the desired volume.





OPERATION

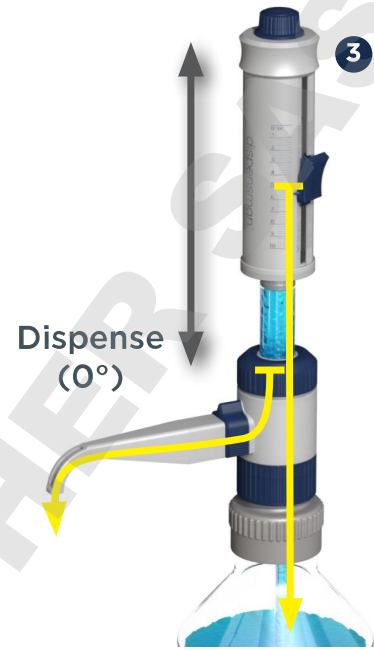
## Dispensing

### ⚠ CAUTION

To avoid personal injury from chemicals, wear eye protection and protective clothing and use appropriate safety equipment. Follow safety and operation instructions in this manual.

Raise the outer housing **3** until it reaches a hard stop at the set volume. The set volume will be dispensed into the collecting vessel by pressing down the outer housing to the lowest point. The movements should be smooth and constant to achieve an accurate dispense volume.

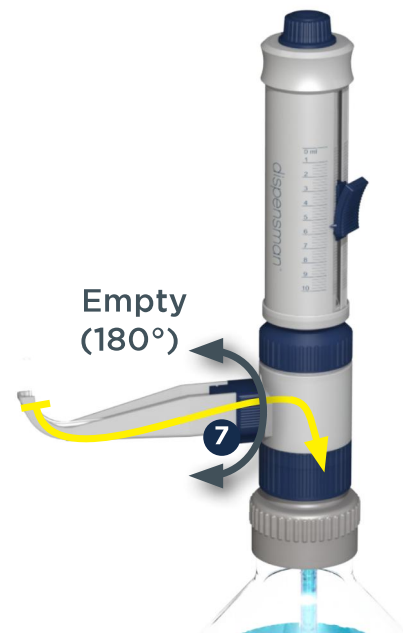
Noise while aspirating or dispensing is acceptable as it is because of the high quality suction valve with valve ball.



## Anti-Drop System

Turn the nozzle switch **7** to "Empty" (180°). The liquid from the discharge tube will now rinse back into the bottle. Any further dispensing of liquid is not possible in this position.

Turn the nozzle switch **7** to "Recycle" (90°) to seal the dispenser.





## Chapter 5

# MAINTENANCE

To avoid valve clogging, clean the dispenser if it has not been used for a while (refer to Chapter 6 [CLEANING & STERILIZATION](#), page 12).

Release clogged valves with a thin object (wire, paper clip, etc.) by pushing the upper side of the ejection valve 15 and / or the bottom side of the suction valve 12 (refer to Figure 3, page 4). Make sure that you rinse the valves residue-free, since clogged valves may lead to leakage of the instrument.

## Disassembly



Follow the general safety precautions (refer to Chapter 2 [SAFETY & USER PRECAUTIONS](#), page 6).

1. Rinse the dispenser with distilled water or alcohol (Refer to Chapter 6 [CLEANING & STERILIZATION](#), page 12).
2. Remove the telescopic tube 21 and the reflux tube 22.
3. Remove the protective sleeve 8 and then the discharge tube 9.
4. Loosen the fix screw 2 and pull out the piston 17.
5. Pull off the adaptor ring 5 from outer housing 3.
6. Press down the quick-lock knob 4 and pull it out of the slot.
7. Remove the outer housing 3.
8. Loosen the cap nut 6.
9. Pull the cylinder set 18 out of the valve block 20, be aware that the valve star 13 and the valve ball 14 might fall out.
10. Take the valve star 13 and the valve ball 14 out of the valve block 20.
11. Pull the nozzle switch 7 out of the valve block 20.

## Assembly

1. Push the nozzle switch 7 into the valve block 20.
2. Place the valve ball 14 and the valve star 13 into the suction valve. Check that the edges of the valve star 13 point upwards.
3. Attach the cylinder set 18 to the valve block 20. Check that the notches of the cylinder set are placed exactly over the spikes of the valve block.
4. Tighten the glass cylinder 19 with the cap nut 6. Check that all parts fit tightly.
5. Slide the outer housing 3 onto the cylinder 19.
6. Place the instrument horizontally and mount the quick-lock knob 4 into the slot of the outer housing 3.
7. Clip the adaptor ring 5 to the outer housing 3.
8. Push the piston 17 into the cylinder 19 until it stops.
9. Attach the fix screw 2 to the outer housing 3.
10. Attach the discharge tube 9 to the nozzle switch 7.
11. Slide the protective sleeve 8 over the attached discharge tube 9 + 7.
12. Push the reflux tube 22 and the telescopic tube 21 into the valve block 20.
13. Screw the assembled instrument on the reagent bottle.



## Chapter 6

# CLEANING & STERILIZATION

## Cleaning

Cleaning is necessary if you want to use the dispenser for another chemical solution or if it has not been used for a long time. During cleaning, please follow the safety instructions (refer to Chapter 2 [SAFETY & USER PRECAUTIONS](#), page 6).

Before cleaning, remove all liquid from the dispenser without any loss of reagent by following these steps:

1. Turn the nozzle switch to "Empty" (180°) and let the remaining reagent from the discharge tube flow back into the reagent bottle.
2. Unscrew the dispenser from the bottle.
3. Drain the telescopic tube 21 by slightly tapping inside the reagent bottle.
4. Turn the nozzle switch from "Empty" (180°) to "Recycle" (90°) and remove all remaining liquid from the cylinder back into the reagent bottle.

For cleaning, follow these steps:

1. Attach the telescopic tube and then screw the dispenser on a bottle with distilled water or alcohol.
2. Turn the nozzle switch to "Dispense" (0°).
3. Dispense multiple times until the instrument is clean.

If necessary, disassemble the dispenser (Chapter 5 [MAINTENANCE](#), on page 11) and clean all components.

The dispenser should be cleaned daily if used with following chemicals:

- Solutions that tend to crystallize (e.g., salts)
- Inorganic oxidizing solutions (e.g., biuret reagent)

## Sterilization

After removal of the reflux tube 22 and the telescopic tube 21, the dispenser can be steam-sterilized (121°C, 1 bar, 20 minutes) according to EN ISO 17665. Place the instrument on a cloth and avoid any contact with hot, metal surfaces.

The discharge tube 9 has to be attached to the protective sleeve 8.

In order to prevent loss of adjustment due to heat expansion of the different materials, the quick-lock knob 4 has to be set to a minimum of 2/10 of its maximum volume. Before you use the dispenser, let it reach room temperature (about 2 hours cooling time). After autoclaving, check all screw fittings for tightness and the calibration of the instrument. Recalibrate the dispenser, if necessary (refer to Chapter 7 [CALIBRATION](#), page 13). After autoclaving, perform a visual check of the instrument for any changes and verify all screw fittings.

In case of deformation, please return the instrument with a description of the autoclave protocols that were used.





## Chapter 7

# CALIBRATION



DISPENSAN is calibrated according to EN ISO 8655-5:2002 and EN ISO 8655-6:2002. After assembling the instrument, calibrate it per the instructions below:

1. Remove the safety cap **1**. The built-in recalibration mechanism is now visible (Figure 7).
2. Attach the calibration tool or standard hex key to the safety bolt (Figure 8).
3. Use the calibration tool or hex key to pull out the safety bolt.
4. Attach the calibration tool with the thicker side to the site of the safety bolt (Figure 9).
5. To recalibrate a volume set too low, rotate the calibration tool clockwise. To recalibrate a volume set too high, rotate the calibration tool counter-clockwise.
6. Attach the safety bolt to the piston (Figure 8).
7. Check the volume. If the measured volume exceeds the tolerance limits, then calibrate the instrument again. If the calibration was successful, attach the safety cap (Figure 10).



**Figure 7**  
Built-in recalibration mechanism



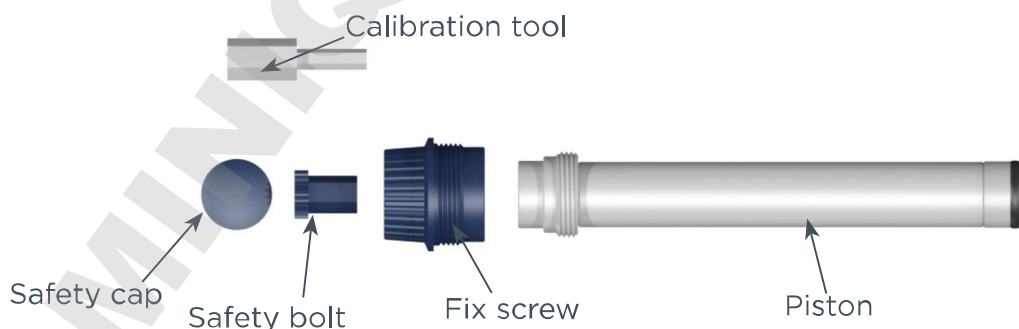
**Figure 8**  
Use of calibration tool



**Figure 9**  
Thin side of safety bolt



**Figure 10**  
Put back the safety cap



**Figure 11**  
Calibration system, from the top of DISPENSAN to inside, under outer housing





## TROUBLESHOOTING

### Valve Sticks

With the dispensing unit screwed on, ensure that the valves are surrounded by liquid and that the valve system is easy to move by rinsing it with distilled water and/or laboratory cleaning agent. As a last step, rinse with alcohol.

### Piston Difficult to Move

Check whether crystals have formed, and if so, carry out intensive cleaning of the piston and the cylinder (refer to Chapter 5 [MAINTENANCE](#), page 11).

### No Liquid Dispensed

- Check that the nozzle switch is set to “Dispense” (0°).
- Check the suction valve and then clean it, if necessary.
- Check the nozzle switch. If it is not clean and operational, clean unit by immersing nozzle set in cleaning fluid.
- Check the discharge tube. If it is not clean and operational, disassemble it, and then flush it with cleaning fluid.

### No Liquid Aspirated

- Check the fit of the telescopic tube into the suction valve. It should be firmly pressed into the smaller hole of the bottom part of the valve block (please refer to figure 6, page 8).
- Check the volume setting.
- Check the suction valve and then clean it, if necessary.

### Air Bubbles in Aspirated Liquid

- Check whether all air has been removed from the instrument, (See Chapter 4 [OPERATION](#), page 9).
- Check that the reservoir is not empty.
- Check the telescopic tube, if necessary slide it to shorten it or replace it in its socket.
- Ensure slow, steady aspiration of reagent.
- Check the suction valve and then clean it, if necessary.

### Incorrect Volume Dispensed

Calibrate the instrument (See Chapter 7 [CALIBRATION](#), page 13).





## Noise During Aspiration and Dispensing

Noise while aspirating or dispensing is acceptable as it is because of the high quality suction valve with valve ball.

If any problem persists, please return DISPENSAN back to your local Gilson service center.

## Return for Repair

**NOTICE**

Please clean the instrument carefully, as described in Chapter 6 **CLEANING & STERILIZATION**, page 12. Never send in instruments filled with reagents. Returned instruments can only be checked and repaired if they have been carefully cleaned and decontaminated by the customer.

Forced opening of the instrument invalidates any warranty claim. Enclose with the returned instrument a description of the trouble that has occurred and specify which reagents were used.

### Chapter 9

## SPECIFICATIONS

DISPENSAN is a high quality dispenser that offers excellent accuracy and precision; it is fully compliant with ISO 8655.

Each dispenser is inspected and validated by qualified technicians. Gilson declares that its manufactured dispensers comply with the requirements of the ISO 8655 standard, by type testing. The adjustment is carried out under strictly defined and monitored conditions.

MODEL	PART NUMBER	VOLUME RANGE	SCALING (mL)	MAXIMUM PERMISSIBLE ERRORS			
				GILSON		ISO 8655-5	
				SYSTEMATIC ERROR (mL)	RANDOM ERROR (mL)	SYSTEMATIC ERROR (mL)	RANDOM ERROR (mL)
DISPENSAN 2,5 mL	F110101	0,25 – 2,5 mL	0,05	±0,012	≤ 0,002	±0,030	≤ 0,010
DISPENSAN 5,0 mL	F110102	0,5 – 5 mL	0,10	±0,030	≤ 0,005	±0,030	≤ 0,010
DISPENSAN 10 mL	F110103	1 – 10 mL	0,20	±0,060	≤ 0,010	±0,060	≤ 0,020
DISPENSAN 25 mL	F110104	2,5 – 25 mL	0,50	±0,150	≤ 0,025	±0,150	≤ 0,050
DISPENSAN 50 mL	F110105	5 – 50 mL	1,00	±0,300	≤ 0,050	±0,300	≤ 0,100



## Chapter 10

# SPARE PARTS

### Spare Parts for Small Volumes (2.5, 5, and 10 mL)

	DESCRIPTION	PART NUMBER
	Calibration tool	F107122
8	Protective sleeve for discharge tube, 2.5 mL, 5 mL, and 10 mL	F107145
9	Discharge tube, 2.5 mL	F107124
9	Discharge tube, 5 and 10 mL	F107125
22	Reflux tube, 40mm, I.Ø:3mm, A.Ø: 4 mm	F107127
21	Telescopic tube, 125 - 240 mm	F107133
21	Telescopic tube, 250 - 480 mm	F107135
21	Telescopic tube, 70 - 140 mm	F107136
21	Telescopic tube, 195 - 350 mm	F107137
11	Thread adapters made of PP invert GL A45/A32	F107139
11	Thread adapters made of PP GL A32/A45	F107140
11	Thread adapters made of PP GL A32/S40	F107141
11	Thread adapters made of PP GL A32/A38	F107142
11	Thread adapters made of PP GL A32/A28	F107143
11	Thread adapters made of PP GL A32/A25	F107144

### Spare Parts for Large Volumes (25 and 50 mL)

	DESCRIPTION	PART NUMBER
	Calibration tool	F107123
8	Protective sleeve for discharge tube, 25 and 50 mL	F107146
9	Discharge tube, 25 and 50 mL	F107126
22	Reflux tube, 40mm, I.Ø:6mm, A.Ø: 7 mm	F107128
21	Telescopic tube, 170 - 330 mm	F107134
21	Telescopic tube, 250 - 480 mm	F107138
11	Thread adapters made of PP invert GL A45/A32	F107139
11	Thread adapters made of PP GL A32/A45	F107140
11	Thread adapters made of PP GL A32/S40	F107141
11	Thread adapters made of PP GL A32/A38	F107142
11	Thread adapters made of PP GL A32/A28	F107143
11	Thread adapters made of PP GL A32/A25	F107144





## Chapter 11

# APPENDIX



APPENDIX

## Chemical Compatibility

Acetaldehyde	Butyric acid	Glycol
Acetic acid 100%	Calcium carbonate	Glycolic acid 50%
Acetic acid 96%	Calcium chloride	Hexanoic acid
Acetone	Calcium hydroxide	Hexanol
Acetonitrile	Calcium hypochlorite	Hydriodic acid 57%
Acetylacetone	Chloro naphthalene	Hydrochloric acid 20%
Acrylic acid	Chloroacetaldehyde 45%	Isoamyl alcohol
Acrylonitrile	Chloroacetic acid	Isobutanol
Adipic acid	Chloroacetone	Isopropanol
Allyl alcohol	Chlorobenzene	Isopropyl ether
Aluminium chloride	Chlorobutane	Lactid acid
Amino acids	Chromic acid 50%	Methoxybenzene
Ammonia 20%	Chromosulfuric acid	Methyl alcohol
Ammonium chloride	Copper sulfate	Methyl benzoate
Ammonium fluoride	Cumene	Methyl butyl ether
Ammonium sulfate	Cyclohexanone	Methyl ethyl ketone
n-Amyl acetate	Decane	Methyl formate
Amyl alcohol	1-Decanol	Methyl propyl ketone
Aniline	Dibenzyl ether	Mineral oil
Barium chloride	Dichlorobenzene	Monochloroacetic acid
Benzaldehyde	Diethanolamine	Nitric acid 30%
Benzol	Diethylamine	Nitrobenzene
Benzoyl chloride	1,2-Diethylbenzene	Oleic acid
Benzyl alcohol	Diethylene glycol	Oxalic acid
Benzylamine	Dimethyl sulfoxide	Perchloric acid
Benzylchloride	Dimethylaniline	Phenol
Boric acid 10%	Dimethylformamide	Phenylethanol
Bromobenzene	Diphenyl ether	Phenylhydrazine
Bromonaphthalene	Ethanolamine	Phosphoric acid 85%
Butanediol	Ethyl acetate	Phosphoric acid 85% + Sulfuric acid 98%, 1:1
1-Butanol	Ethyl alcohol	Piperidine
n-Butyl acetate	Formaldehyde 40%	Potassium chloride
Butyl methyl ether	Formamide	Potassium dichromate
Butylamine	Glycerol	Potassium hydroxide





WARRANTY

Potassium permanganate	Sodium acetate	Tetramethylammoniumhydroxide
Propionic acid	Sodium chloride	Triethanolamine
Propylene glycol	Sodium dichromate	Triethylene glycol
Pyridine	Sodium fluoride	Urea
Pyruvic acid	Sodium hydroxide 30%	Zinc chloride 10%
Salicylaldehyde	Sodium hypochlorite	Zinc sulfate 10%
Silver acetate	Sulfuric acid 98%	

## Chapter 12

# WARRANTY

Gilson warrants the dispenser against defects in material under normal use and service for 1 year from the date of purchase. This warranty is valid only if the dispenser is used in the manner described in this manual and for the purpose for which it is designed. Gilson is not responsible for consequential damages resulting from the misuse of this instrument.





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