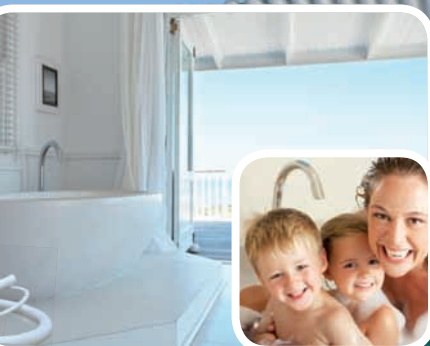


proven quality –  
safe solutions



GAMRAT PVC  
FLEXIBLE HOSES AND CABLES

NEW



PRODUCT CATALOGUE



## Table of contents

GAMRAT HYDRO	for transporting drinking water and solid materials	3
GAMRAT AGRO	for transporting water, sewage and chemicals	4
GAMRAT SANIT	for making hydro-sanitary installations	6
GAMRAT WENT	as exhaust and casing ducts	7
GAMRAT WENT-SEL	as super-flexible exhaust and casing ducts	8
	Resistance table	9
	Selection of hoses, used accessories	11
	Packing, storage and transport	11
	The rules of the correct assembly	12
	The rules of safe use	14

## Introduction

GAMRAT SA is the company operating since 1937. For more than 75 years of operation and the dynamic growth, we acquired the knowledge and experience which allowed us to become one of the biggest companies processing plastics for the purposes of the construction industry, mainly the social infrastructure and public utility sectors.

Due to the high qualifications of our employees, as well as the constantly upgraded technologies, the products produced by us, including PVC reinforced hoses and flexible cables, fulfil the requirements of the highest norms and give our customers long-term satisfaction from their use. The confirmation of the high quality of offered products is the obtained Quality Management System Certificate ISO 9001:2008 as well as positive opinions of users. GAMRAT SA is an environmentally friendly company what is proven by the Environment Management System Certificate ISO 14001:2004 awarded to the Company as well as the fact that our products, thanks to the use of modern process solutions, are recyclable.

The products presented in this catalogue are intended for use in many areas of industry depending on the specific requirements posed by individual sectors.

Meeting your expectations, we recommend not only high quality products, but also we can provide professional technical consultancy rendered by our highly qualified staff: Product Managers, Regional Sales Representatives and Customer Service Specialists who will provide you with exhaustive information on the offered hoses. We are also counting on your remarks and suggestions which will help us satisfy your expectations even more.

Wishing you many successes in your professional and personal life, we would like to invite you to cooperate with us.

## GAMRAT HYDRO

### Reinforced polyvinyl chloride spiral hoses



**Structure:** green walls made of soft PVC, white spiral made of hard PVC, smooth internal surface.

**Use:** for transporting drinking water and other liquids and materials.

THE SCOPE OF OPERATING TEMPERATURE: -10°C to +55°C



#### Type 1 – light

Internal diameter [mm]	Internal diameter tolerance [mm]	Wall thickness [mm]	Weight [g/m]	Safe operating pressure [MPa] in the temp. 23 ± 2°C	Safe operating pressure [MPa] in the temp. 55 ± 2°C	Bend radius [mm] in the temp. 23 ± 2°C
20	± 0,75	3,20	270	0,56	0,16	100
25	± 1,25	3,30	300	0,56	0,16	125
32	± 1,25	3,40	400	0,40	0,13	160
35	± 1,25	3,50	470	0,40	0,13	175
38	± 1,50	3,50	500	0,40	0,13	190
40	± 1,50	3,60	540	0,40	0,13	200
50	± 1,50	4,00	765	0,40	0,13	250
63	± 1,50	4,20	990	0,40	0,13	315
75	± 2,00	4,50	1260	0,30	0,10	375
80	± 2,00	4,80	1440	0,30	0,10	400
90	± 2,00	5,20	1620	0,30	0,10	450
100	± 2,00	5,50	1980	0,23	0,08	500
110	± 2,00	5,60	2250	0,23	0,08	550
125	± 2,00	5,80	2880	0,23	0,08	625
150	± 2,00	6,60	3870	0,20	0,06	750
160	± 2,00	6,70	4400	0,20	0,06	800
200	± 2,00	7,00	5850	0,20	0,06	1000

Wall thickness tolerance ± 5%

Factor of safety 1 : 3

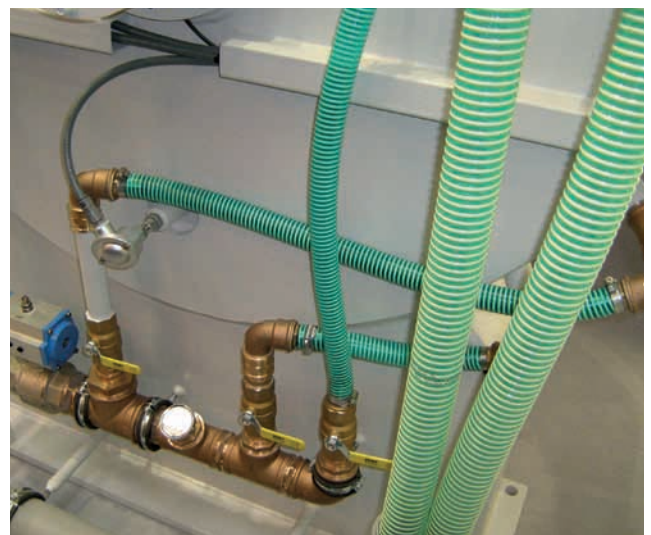
Bend radius in the temperature -10°C amounts to 20 x hose internal diameter

#### Bending strength:

House section subjected to bending up to the diameter given in descriptions should not be bent or cracked, and should pass the trial tests specified in ISO 1746.

#### Negative pressure strength:

On a hose subjected to negative strength, in the temperature of 23°C, of the value of 65 kPa, (absolute pressure of 35 kPa) no cracks or dents should occur.



<b>Quality requirements:</b> PN-EN ISO 3994:2011 TWT-ZPR-01/2013	<b>Approvals:</b> Hygienic assessment PZH No. HŽ/17521/01
--	---

## Reinforced polyvinyl chloride spiral hoses



**Structure:** green walls made of soft PVC, white spiral made of hard PVC, smooth internal surface.

**Use:** for transporting drinking and seawater, feeds, sewage, sludge, weak chemical solvents, chemical or natural fertilizers, abrasive materials, plant protecting agents.



type 2



type 3

THE SCOPE OF OPERATING TEMPERATURE: -10°C to +55°C

### Type 2 – medium

Internal diameter [mm]	Internal diameter tolerance [mm]	Wall thickness [mm]	Weight [g/m]	Safe operating pressure [MPa] in the temp. 23 ± 2°C	Safe operating pressure [MPa] in the temp. 55 ± 2°C	Bend radius [mm] in the temp. 23 ± 2°C
20	± 0,75	3,30	335	0,73	0,21	100
25	± 1,25	3,70	400	0,73	0,21	125
32	± 1,25	4,20	580	0,50	0,15	160
35	± 1,25	4,20	610	0,50	0,15	175
38	± 1,50	4,20	680	0,50	0,15	190
40	± 1,50	4,50	710	0,50	0,15	200
50	± 1,50	4,80	970	0,50	0,15	250
63	± 1,50	5,40	1405	0,50	0,15	315
75	± 2,00	5,50	1680	0,40	0,13	375
80	± 2,00	5,80	1795	0,40	0,13	400
90	± 2,00	6,20	2055	0,40	0,13	450
100	± 2,00	6,70	2600	0,30	0,10	500
110	± 2,00	6,70	2910	0,30	0,10	550
125	± 2,00	7,20	3395	0,30	0,10	625
150	± 2,00	8,40	5000	0,26	0,08	750
160	± 2,00	8,50	5500	0,26	0,08	800
200	± 2,00	10,00	7560	0,26	0,08	1000

Wall thickness tolerance ± 5%

Factor of safety 1 : 3

Bend radius in the temperature -10°C amounts to 20 x hose internal diameter



## Type 3 – heavy

Internal diameter [mm]	Internal diameter tolerance [mm]	Wall thickness [mm]	Weight [g/m]	Safe operating pressure [MPa] in the temp. 23 ± 2°C	Safe operating pressure [MPa] in the temp. 55 ± 2°C	Bend radius [mm] in the temp. 23 ± 2°C
20	± 1,25	4,30	415	0,93	0,26	160
25	± 1,25	4,60	555	0,93	0,26	200
32	± 1,25	4,80	680	0,60	0,20	256
35	± 1,25	4,80	730	0,60	0,20	280
38	± 1,50	4,80	775	0,60	0,20	304
40	± 1,50	4,90	825	0,60	0,20	320
50	± 1,50	5,60	1165	0,60	0,20	400
63	± 1,50	5,90	1700	0,60	0,20	504
75	± 2,00	6,30	1940	0,50	0,16	600
80	± 2,00	6,50	2135	0,50	0,16	640
90	± 2,00	6,90	2425	0,50	0,16	720
100	± 2,00	7,70	3200	0,40	0,13	800
110	± 2,00	8,10	3500	0,40	0,13	880
125	± 2,00	8,50	4075	0,40	0,13	1000
150	± 2,00	9,40	6110	0,30	0,10	1200
160	± 2,00	9,50	6800	0,30	0,10	1280
200	± 2,00	11,30	8730	0,30	0,10	1600

Wall thickness tolerance ± 5%

Factor of safety 1 : 3

Bend radius in the temperature -10°C amounts to 32 x hose internal diameter

### Bending strength:

House section subjected to bending up to the diameter given in descriptions should not be bent or cracked, and should pass the trial tests specified in ISO 1746.

### Negative pressure strength:

On a hose subjected to negative pressure, in the temperature of 23°C, of the value depending on the hose:

- medium type – 65 kPa, (absolute pressure of 35 kPa),
  - heavy type – 80 kPa, (absolute pressure of 20 kPa),
- no cracks or dents should occur.

#### Quality requirements:

PN-EN ISO 3994:2011  
TWT-ZPR-01/2013



## Reinforced polyvinyl chloride spiral hoses



**Structure:** white spiral made of hard PVC, white wall made of soft PVC, smooth inside and outside.

**Use:** for performing hydro-sanitary installations in pools, whirlpool tubs and other sanitary devices. Thanks to its flexibility, they allow for reducing the time of making the installation as well as the number of connectors.



THE SCOPE OF OPERATING TEMPERATURE: -10°C to +55°C

Internal diameter [mm]	External diameter [mm]	Safe operating pressure [MPa] in the temp. 23 ± 2°C	Safe operating pressure [MPa] in the temp. 55 ± 2°C	Weight [g/m]	Bend radius [mm] in the temp. 23 ± 2°C	Coil length (m)
16	20	0,56	0,16	145	80	30
27	32	0,56	0,16	310	135	30
42	50	0,40	0,13	745	210	30

Wall thickness tolerance ± 5%  
Factor of safety: 1 : 3

**Negative pressure strength:** On a hose subjected to negative strength, in the temperature of 23°C, of the value of 65 kPa, no cracks or dents should occur.

**Methods of connecting:** gluing with the use of PVC-U pressure fittings.

Quality requirements:  
PN-EN ISO 3994-2011  
TWT-ZPR-01/2013



### Reinforced polyvinyl chloride spiral hoses



**Structure:** grey walls made of soft PVC, white spiral made of hard PVC, smooth internal surface.

**Use:** for removing dust and fumes in the vacuum cleaning equipment.



THE SCOPE OF OPERATING TEMPERATURE: -10°C to +55°C

#### Type medium

Internal diameter [mm]	Internal diameter tolerance [mm]	Weight [g/m]	Bend radius [mm] in the temp. 23 ± 2°C
25	± 1,25	220	60
32	± 1,25	300	80
40	± 1,50	410	100
50	± 1,50	510	125
63	± 1,50	690	155
75	± 1,50	830	195
80	± 2,00	980	210
90	± 2,00	1130	245
100	± 2,00	1310	280
110	± 2,00	1480	315
125	± 2,00	1730	370
150	± 2,00	2190	460
160	± 2,00	2500	490
200	± 2,00	3380	630

#### Type heavy

Internal diameter [mm]	Internal diameter tolerance [mm]	Weight [g/m]	Bend radius [mm] in the temp. 23 ± 2°C
25	± 1,25	297	80
32	± 1,25	300	110
40	± 1,50	420	140
50	± 1,50	605	175
63	± 1,50	800	220
75	± 1,50	1000	275
80	± 2,00	1100	300
90	± 2,00	1440	350
100	± 2,00	1620	400
110	± 2,00	1680	450
125	± 2,00	1950	525
150	± 2,00	2800	650
160	± 2,00	4000	700
200	± 2,00	5400	900

**Negative pressure strength:** On a cable subjected to negative pressure for 10 min. in the temperature of 23°C, of the value dependent on the cable: medium type – 50 kPa (absolute pressure of 50 kPa), heavy type – 60 kPa (absolute pressure of 40 kPa), no cracks or dents should occur.

**Quality requirements:**  
TWT-ZP-01/2013

Cables Gamrat Went type 3 – heavy are produced upon request.

## Super-flexible reinforced polyvinyl chloride spiral cables



**Structure:** black walls made of soft PVC, white spiral made of hard PVC, smooth internal surface.

**Use:** cables intended for removing dust and fumes. They can be used for casing device cables.



THE SCOPE OF OPERATING TEMPERATURE: -10°C to +55°C

### Type 1 – light

Internal diameter [mm]	Internal diameter tolerance [mm]	Weight [g/m]	Bend radius [mm] in the temp. 23 ± 2°C	Negative pressure strength (kPa) in the temp. 23 ± 2°C
25	± 1,25	160	25	40
32	± 1,25	210	32	40
40	± 1,50	280	40	35
50	± 1,50	380	50	35
63	± 1,50	520	63	30
75	± 1,50	640	75	30
80	± 2,00	720	80	30
90	± 2,00	820	90	30
100	± 2,00	1000	100	30
110	± 2,00	1100	115	30
125	± 2,00	1240	135	30
150	± 2,00	1700	175	30
160	± 2,00	1880	200	30
200	± 2,00	2300	350	25

**Quality requirements:**  
TWT-ZPR-01/2013





## Resistance table

### Markings:

- 1 – satisfactory
- 2 – the material may be taken into consideration in the case when alternative materials are not satisfactory and when limited life-span is allowed. In the case when PVC is to be used with such chemicals, the full scope of tests in real conditions is particularly necessary.
- 3 – unsatisfactory

chemical substance	concentration	conditions	
		20°C	55°C *
acetone	trace	3	3
acetone	100%	3	3
ethyl alcohol		3	3
ethyl alcohol	40% aq. solution	1	
ethyl alcohol	100%	3	
isopropyl alcohol		1	
lauryl alcohol		1	
methyl alcohol	6% aq. solution	1	
methyl alcohol	100%	2	
ammonia	0,88 gw aq. sol.	1	
ammonia	dry gas	1	
ammonia	liquid	3	3
aniline		3	
benzaldehyde	100%	3	3
benzaldehyde	trace	3	3
benzene		3	3
petrol		3	3
waterless hydrogen bromide		1	
waterless hydrogen chloride		1	
acetic anhydride		3	3
borax		1	
bromine	gas, trace	3	3
bromine	100% dry gas	3	3
bromine	liquid	3	3
butanol		1	2
allyl chloride		3	3
methylene chloride		3	3
methyl chloride		3	3
mercuric chloride		3	3
chlorobenzene		3	3
chloroform		3	3
dextrose		1	1
cyclohexanol		3	3
cyclohexanone		3	3
carbon tetrachloride		3	3
tetraethyl lead		1	
tetrahydrofuran		3	3
dextrose		1	1
synthetic detergents	all concentrations	1	
propyl dichloride		3	
dichlorobenzene		3	3
dichloroethylene		3	3
dichloroethylene		3	3
carbon disulfide		3	3

chemical substance	concentration	conditions	
		20°C	55°C *
magnesium dioxide	con. in sol.	1	1
sulphur dioxide	dry	1	1
sulphur dioxide	wet	2	3
sulphur dioxide	liquid	2	3
carbon dioxide		1	1
wine extracts		1	
emulsifiers	all concentrations	1	1
photographic emulsions		1	1
ether		3	3
diethyl ether		3	3
phenol			3
hydrogen fluoride		1	
formaldehyde	40% treated weight in water	1	
fluorine		3	3
glycerine		1	
ethylene glycol		1	
glucose		1	1
casein		1	1
xylene		3	3
nitric acid	10%	1	
nitric acid	25%	1	
nitric acid	50%	2	2
nitric acid	70%	2	3
nitric acid	95%	3	3
chlorosulphonic acid		3	3
chromic acid	galvanic solution	3	
chromic acid	concentrated	3	3
hydrochloric acid	10% aq. solution	1	1
hydrochloric acid	22%	2	2
hydrochloric acid	concentrated	2	2
citric acid		1	
hydrofluoric acid	4% aq. solution	1	1
hydrofluoric acid	60% aq. solution	3	3
hydrofluoric acid	concentrated	3	3
phosphoric acid	20% aq. solution	1	1
phosphoric acid	30% aq. solution	1	1
lauric acid		1	
butyric acid	20% aq. solution	1	
butyric acid	concentrated	3	3
butyric acid	10%	1	
lactic acid	100%	3	3
formic acid	40%	2	2
formic acid	50%	2	3

chemical substance	concentration	conditions	
		20°C	55°C *
formic acid	100%	3	3
acetic acid	10%	2	2
acetic acid	60%	2	3
acetic acid	icy	3	3
oleic acid		1	
palmitic acid		1	
picric acid	1% weight water	1	
picric acid	1% weight water	1	
salicylic acid		1	1
sulphurous acid	30%	1	
sulphuric acid	10%	1	1
sulphuric acid	45%	2	2
sulphuric acid	50%	2	2
sulphuric acid	60%	2	2
sulphuric acid	98%	3	3
sulphuric acid	fumes	3	3
oxalic acid		1	
tannic acid		1	
tallow		1	
molasses		1	1
methyl ethyl ketone		3	3
milk		1	
mixed acid	various		3
mixed petrol: benzene	80 : 20	3	3
urea		1	
hydrogen peroxide	3% - 10 vol.	1	
hydrogen peroxide	12% - 40 vol.	1	
hydrogen peroxide	30% - 10 vol.	1	
hydrogen peroxide	90% and above	1	
kerosene		2	2
naphthalene		3	3
nitric fertilizers		1	
nitrobenzene		3	3
vinegar		1	
butyl acetate		3	3
ethyl acetate		3	3
vinyl acetate		3	3
transformer oil		2	3
diesel fuel		2	2
vegetable oils		1	
animal oils		1	1
ozone		1	
paraffin		2	
nitrogen fumes	wet		3
beer		1	

chemical substance	concentration	conditions	
		20°C	55°C *
sodium hypochlorite	15% act. Cl	1	2
calcium hypochlorite		1	
lacquer solvent		2	3
soap solution		1	
photographic fixer solutions		1	1
Ammonium sulfide		1	3
hydrogen sulfide		1	
brine		1	
ammonium salts		1	1
barium salts		1	1
zinc salts		1	1
aluminium salts		1	1
magnesium salts		1	1
copper salts		1	1
nickel salts		1	1
lead salts		1	1
potassium salts		1	1
sodium salts		1	1
calcium salts		1	1
iron salts		1	1
tetralin		3	3
oxygen		1	1
carbon oxide		1	1
toluene		3	3
trichloroethane		3	3
trichloroethylene		1	1
triethanolamine		3	3
water		1	1
chlorine water	saturated solution	2	3
seawater		1	1
wines and vodkas		1	1
ammonium hydroxide		1	
potassium hydroxide	1% aq. solution	1	1
potassium hydroxide	10% aq. solution	1	1
potassium hydroxide	con. aq. solution	1	3
calcium hydroxide		1	
sodium hydroxide	1% aq. solution	1	
sodium hydroxide	10% aq. solution	1	2
sodium hydroxide	40% aq. solution	1	3
sodium hydroxide	con. Aq. solution	1	3
hydrogen		2	2
tannin extracts		1	
photographic developers		1	1

The aim of this index list is to provide general information on chemical resistance of hoses to various chemical substances. The above information has been prepared based on the knowledge of the Plexaco company, the technology supplier. Due to the fact that the use of Gamrat reinforced PVC hoses for transferring different substances depends on specific operating conditions, the company does not make any guaranties.

## Selection of hoses, used accessories

### Factors significant when choosing hoses:

- type and concentration of the transferred substance
- (internal and external) operating temperature
- operating pressure
- purpose of the installation, way of using
- aggressiveness of the environment and the threat of mechanical damage
- special requirements (e.g. electrical conductivity)
- methods of cleaning

### Connectors and clamps used with Gamrat hoses:

- screw fixing clips
- shell clamps
- flange couplings
- Camlock connectors
- Perrot connectors
- fire connectors
- threaded connectors



### Use:

- protect the hoses against damage:
  - mechanical (excessive bending, turning, scratching, denting, etc.)
  - thermal (high temperature, heated objects, flames, spatters, etc.)
  - chemical
- control systematically the technical condition of hoses and connections
- observe all norms and instructions concerning specific uses
- use connectors and clamps suitable for specific uses

Observe the recommendations of connectors manufacturers and the recommendations given in the „Rules of the correct assembly” and the „Rules of safe use of reinforced Gamrat hoses”.

Pressure may be given in different units. Below are the conversion factors of most common units. For the comparison of individual values of pressure, the conversion factors were given with the approximation used in practice.



## Packing, storage and transport

### Packing

Reinforced hoses of the internal diameter up to 160 mm, are normally rolled in 30 m circles and are clipped with a tape made of plastic. Circles may be wrapped with PE foil. There is the possibility of settling their length in a circle with a customer. Also, the packing of hoses of diameters up to 160 mm in bundles or loose is allowed. Hoses of diameters above 160 mm are normally offered in straight 6 m sections.

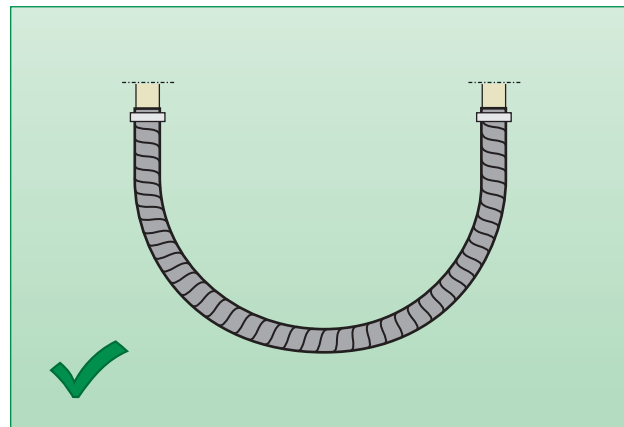
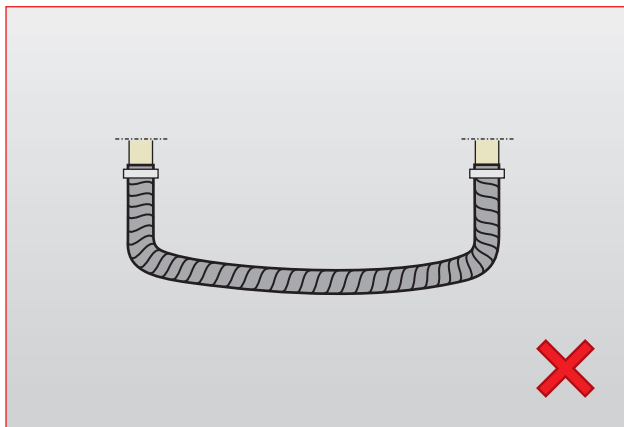
### Storage and transport

Reinforced hoses should be stored in roofed rooms protecting against the direct effect of sun rays in the temperature exceeding 25°C. They should be stored flat up to the height not exceeding 1.2 m. In order to avoid deformation, moved every 2 months. They can be moved with any means of transport. During transport they should be secured against moving and coming into contact with sharp objects. If air temperature exceeds 25°C, they should be moved in roofed means of transport. They should not be subjected to temperatures above 50°C and below -30°C.

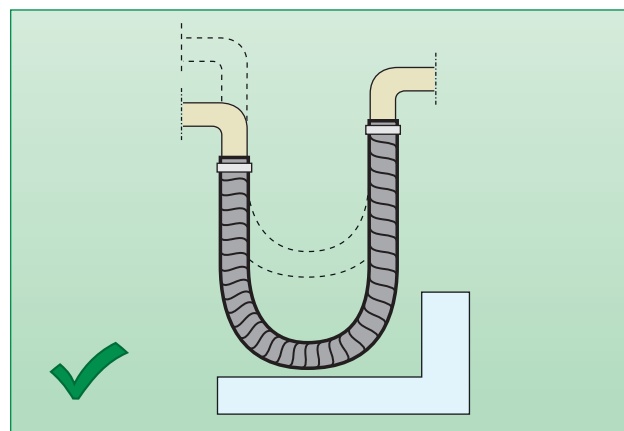
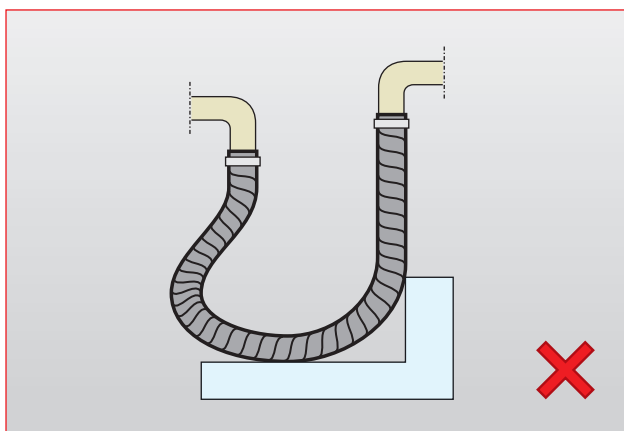
## The rules of the correct assembly of hoses and cables

The length of hoses may change depending on the changes of pressure in the hose and the temperature of the surroundings. When making hose installations, the following rules should be observed:

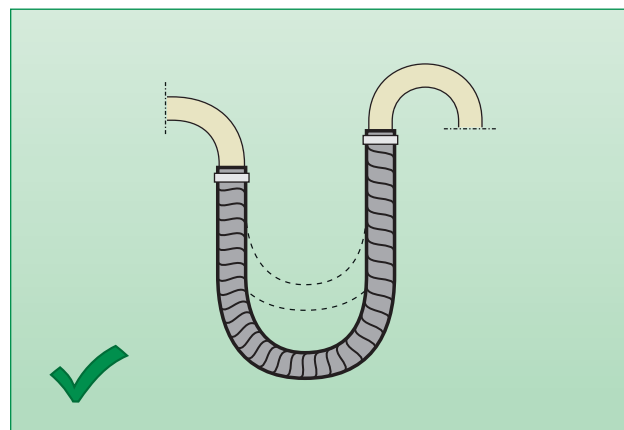
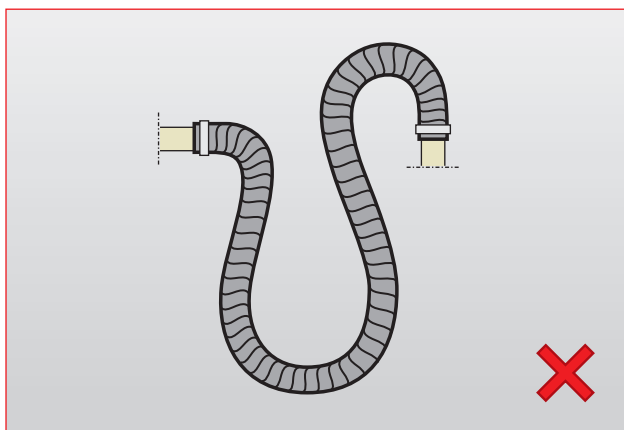
1. Installation intervals must be adopted in relation to the recommended bending diameters. Assemble the hose as the 180° arch with suitable ends.

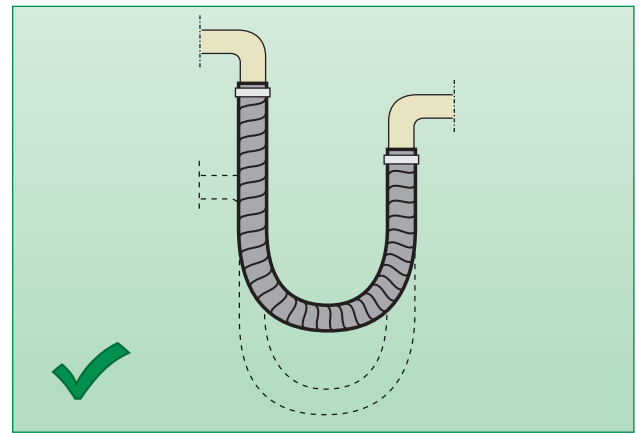
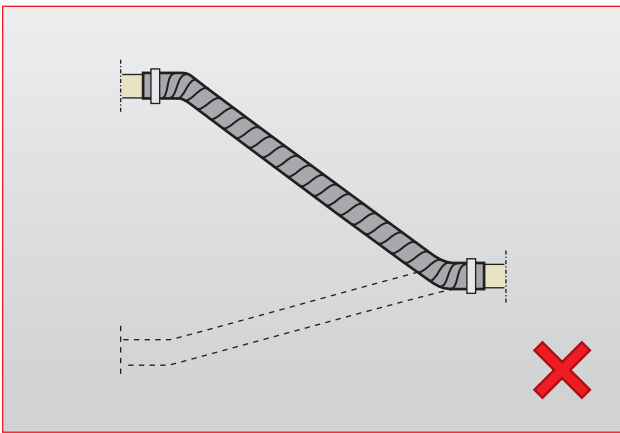
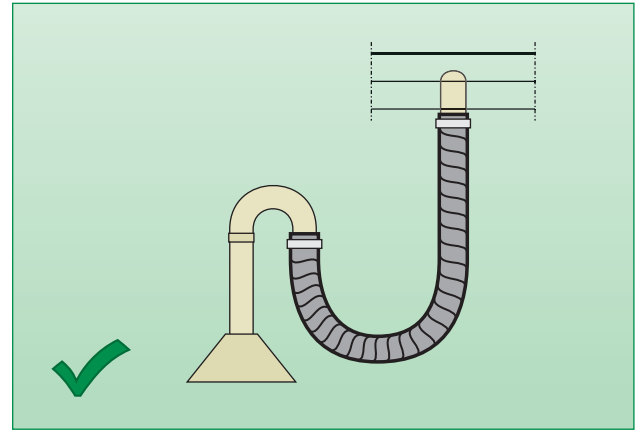
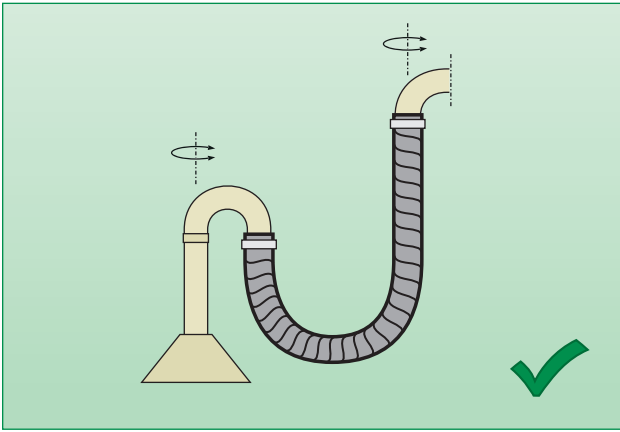


2. Assemble the hoses in such a way that they did not come into contact with the wall or other objects, even during vibrations.

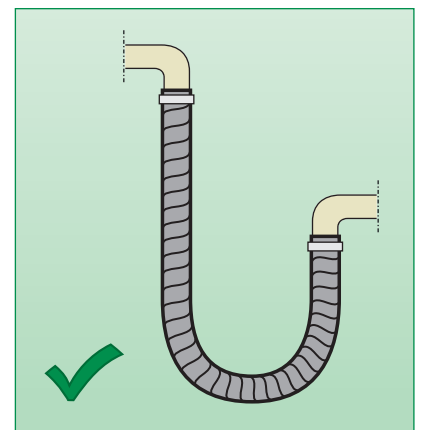
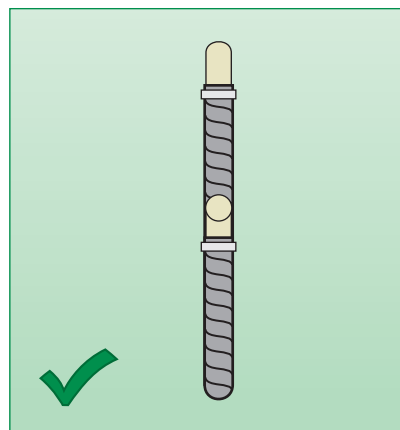
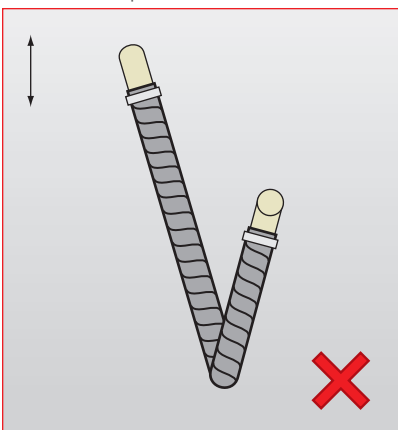


3. Use pipe fittings in order to avoid excessive bends behind the connector.





4. In order to avoid the twisting of hoses, the assembly must be performed in such a way that the direction and the axis of a hose were in one plane.



# The rules of safe use of Gamrat reinforced hoses

## 1. THE GENERAL RECOMMENDATIONS

- 1.1 **Reduced safety:** Reinforced hoses, fittings and hose connectors may be damaged due to many reasons. All installations should be designed in the reduced safety mode in such a way that the damage of a hose or accessories did not threaten the safety of people or did not cause the damage of property.
- 1.2 **User's responsibility:** Due to the big variety of applications and operating conditions for hoses, the company GAMRAT SA and its distributors do not guarantee that a given type of hose will be suitable for any end use. These safety rules do not analyse all technical parameters which must be taken into consideration when choosing a product. A user, based on trials and own analyses, with the use of the technical data contained in the catalogue, shall be responsible for:
  - Making the final selection of a hose, fittings and connectors.
  - Providing any suitable warnings concerning the health and safety in connection with the devices in which the hoses and hose fittings are used.
  - Ensuring the compliance with all applicable norms and state and industry requirements.

## 2. SELECTION AND ASSEMBLY OF HOSES

- 2.1 **Electrical conductivity:** Some applications require that a hose was non-conductive in order to avoid the flow of electric current. Other applications require that hoses and fittings and the surfaces of adherence of a hose/fitting were conductive enough to channel static electricity. Electric conductivity or non-conductivity of hoses and fittings depends on many factors and might be susceptible to changes. GAMRAT SA offers special hoses for applications which require hoses with anti-static properties. Such hoses must be suitably connected and properly earthed in order to channel the accumulating electric charge (see: the descriptions of individual hoses). Wrong connection or earthing of a hose may result in a fire or explosion.
- 2.2 **Pressure:** A hose must be selected in such a way that the published permissible pressure of hose operation was equal to or bigger than the maximum pressure of the system. Safety coefficients are only given for the purpose of factory testing, but they do not determine if a product may be used with pressure values above the given permissible operating pressure.
- 2.3 **Suction:** Hoses used in suction-related applications must be selected in such a way to ensure that a hose will be strong enough for the negative pressure of the system. A hose unsuitably chosen in suction-related applications may become hollow.
- 2.4 **Temperature:** Make sure that the fluid or ambient temperature, both permanent and temporary, do not exceed hose limitations. The temperature below and above the recommended limitations may degrade the hose and result in damage and fluid leaking. The hose should be properly insulated when it runs near hot objects. Do not use hoses in places where hose damage may cause the contact of transferred fluids with fire or other potential sources of ignition which may lead to the fire or the explosion of the transported fluids or fumes.
- 2.5 **Liquid compatibility:** The selected hose set must ensure the compatibility of a hose and fittings with the transferred fluid medium (see: resistance table). This information should be treated as a guide. The current useful resistance may be specified by the end user after testing considering all extreme conditions and other analyses. Some fluids which are to be transported via hoses require the use of the same type of hose which is used for oil-based liquids. Other liquids require a special hose or will not cooperate with any hose. Incorrectly chosen hose may be damaged in a very short time.

- 2.6 **Size:** The size of elements must be suitable in order to maintain the minimum losses of pressure and to avoid damage from the generated temperature or excessive speed of fluid.
- 2.7 **Location:** The location of the hose needs to be planned in order to minimize the potential problems (e.g. limiting the flow caused by hose wall falling in, hose twisting, proximity of hot objects).
- 2.8 **The Environment:** Attention should be paid so that the hose and fittings were suitable both for the given environment, as well as protected against it (i.e. ambient conditions to which they are exposed). Environmental conditions such as (but not limited to) ultraviolet radiation, sun light, heat, chemicals, aggressive atmosphere, may cause the degrading or premature damage..
- 2.9 **Mechanical loads:** External forces may significantly reduce the lifespan of a hose or cause damage. Mechanical loads which must be considered include: excessive bends, twists, entangling, side and lengthwise loads and vibrations. The use of the rotary type of fittings or connectors may be required in order to ensure that the hose will not be twisted. Some applications may require special tests before selecting a hose.
- 2.10 **Physical damage:** Attention should be paid to protecting a hose against damage caused by scratching, entangling, bending below the given diameter of bending, cutting. It is not recommended to run hose installations directly in the ground. Installations run through the area with the surface which could cause their tearing should be suspended. A hose which was entangled or bent below the bending diameter given in the catalogue or damaged in some other way should be removed.
- 2.11 **Length:** Specifying the correct length, one should consider the shift compensation because the length of the hose changes depending on the pressure in a hose and the ambient temperature..
- 2.12 **Specifications and norms:** During the selection of the hose, connectors and fittings, observe all applicable norms and state and industry recommendations.
- 2.13 **Welding and soldering:** Using a burner or arc welding machine in a close proximity to hose installations, the installations should be removed or guarded with the use of suitable fire-proof materials. Flame or spatter may burn the hose and ignite the leaking fluids causing serious damage..
- 2.14 **Dangerous connections:** Some connections may accidentally disconnect if they are dragged by obstacles. Threaded connections should be considered where accidental disconnection is feared.
- 2.15 **Inspecting elements:** Carefully inspect the hoses before assembling them. All elements must be inspected in terms of the correct type, size and length. A hose must be inspected in terms of cleanliness, obstacles on its way, blisters on its surface, folds, cracks, cuts and any other visible damage. Do not use hoses which show any signs of incompatibility.
- 2.16 **Assembly of hoses and fittings:** The user is responsible for the selection of fittings and connectors suitable for a given application, as well as for observing the procedures of their correct assembly.

### 3. Use

- 3.1 For potentially dangerous applications due to the potential damage, the previous experience with damaged hoses should determine the frequency of inspections and replacements of products in such a way that they were replaced before damage occurs.

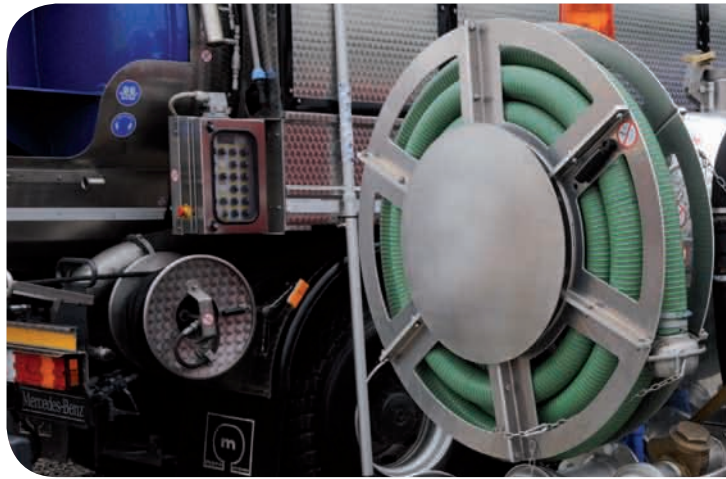
- 3.2 **Inspecting hoses:** Stating the below mentioned situation(s) requires an immediate exclusion of an installation and the replacement of a hose set:
- leaks near fittings or on the hose
  - entangled, folded, flattened or twisted hose
  - sliding of the hose of a fitting
  - damaged, cracked, soft, degraded or worn out surface
  - cracked, damaged or corroded fittings
- 3.3 **Functional test:** Start the system with the maximum, allowed in the norms, pressure and check for damage or leaks. Observe the recommendations concerning the tests given by device manufacturers. During testing and operating, personnel must avoid potentially dangerous places.
- 3.4 **Replacement periods:** After some time, hose sets and seals used in hose fittings and connectors get old, wear out or damage during cyclical operation. Hose sets and seals should be inspected and replaced in suitable replacement periods determined on the basis of previous lifespan, state and industry recommendations.



---

The GAMRAT SA company offers PVC products:

- drainpipe systems
  - soffits
  - flexible hoses and cables
  - pipe systems made of PVC-U and PE
-



## FLEXIBLE HOSES AND CABLES GAMRAT MADE OF PVC

### GAMRAT Spółka Akcyjna

ul. Mickiewicza 108, 38-200 Jasło  
e-mail: [gamrat@gamrat.com.pl](mailto:gamrat@gamrat.com.pl)  
[www.gamrat.pl](http://www.gamrat.pl)

### Customer Service department:

tel. +48 13 491 47 49  
fax +48 13 491 50 93  
e-mail: [bok-profile@gamrat.com.pl](mailto:bok-profile@gamrat.com.pl)

### Technical information:

tel. +48 13 491 48 08  
fax +48 13 491 50 55  
mobile phone no. +48 606 787 166  
e-mail: [wzawadzki@gamrat.com.pl](mailto:wzawadzki@gamrat.com.pl)

### Domestic sales head:

tel. +48 606 787 140

