

# Assembly Instructions and Technical Data Overview

**Step 1:** Cut the silicone hose at a right angle to the required length. Put a small chamfer on the internal diameter. See figure 1.0

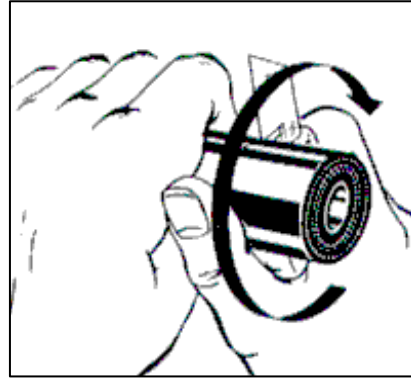


Figure 1.0

**Step 2:** Clamp the outer ferrule carefully in a bench vice. Twist the silicone hose by hand into the ferrule. It is designed to be a secure fit. Take Care to assure that the silicone hose is absolutely dry when inserting into the outer ferrule. See Figure 2.0

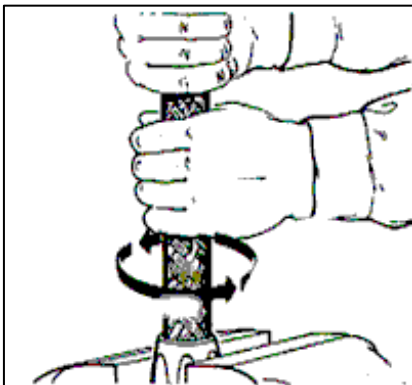


Figure 2.0

**Step 3:** Lubricate the internal diameter of the hose and the outside of the hose nipple, including the threads. Use a generous amount of glycerine (recommended) or alternatively silicone grease. See Figure 3.0

(Glycerine in 100ml bottles Item No: 00.000.GL.YZ.0)  
(Silicone Grease FDA approved Item No: 00.000.GR.SI.0)  
(BBS White Grease FDA approved Item No: 70137)

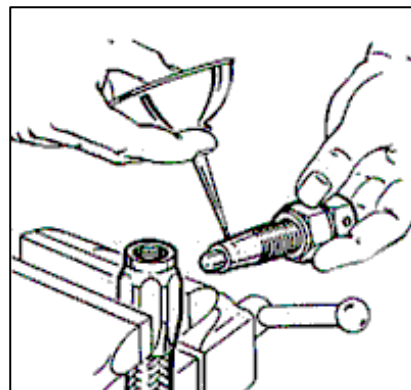


Figure 3.0

**Step 4:** Twist the nipple by hand into the hose until the threaded part of the nipple is about to catch on the thread of the outer ferrule. Screw the nipple clockwise into the sleeve until they are completely screwed together. Use a wrench if required but **DO NOT TIGHTEN** at this time. Please note that disassembly procedure is the reverse of this sequence. See Figure 4.0

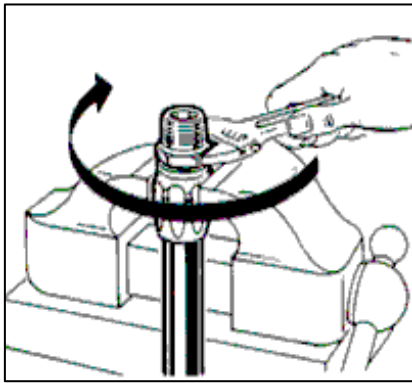


Figure 4.0

**Step 5:** Remove from the bench vice and flush the assembly with air to clean (Figure 5.0). Make a visual inspection of the assembly to assure no problems (Figure 6.0) .

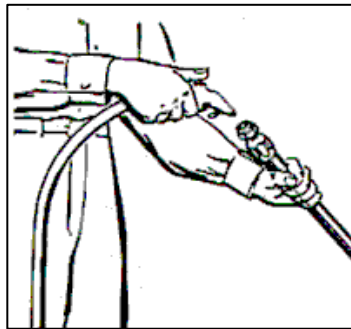


Figure 5.0

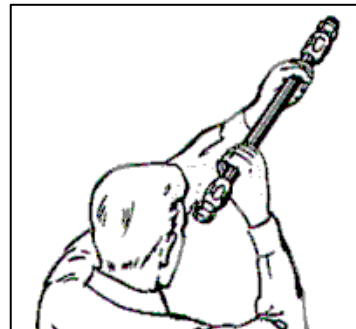


Figure 6.0

**Step 6:** Clamp the assembly by the outer ferrule sleeve back into the bench vice and fully tighten the nipple and ferrule together. Figure 7.0

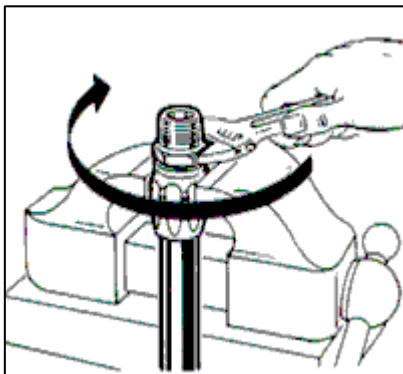


Figure 7.0

**We recommend that ALL new hose assemblies are tested before they are installed into service.**

**Step 7:** Apply a test pressure according to the list in this brochure. Maintain the pressure for a minimum of 1 minute to a maximum of 5 minutes. While the assembly is under test pressure, check for leaks, bubbles etc. Figure 8.0

On the next page you will find a table which details the recommended test pressures according to the specification and size of hose that you are using. It is suggested to follow these recommendations.

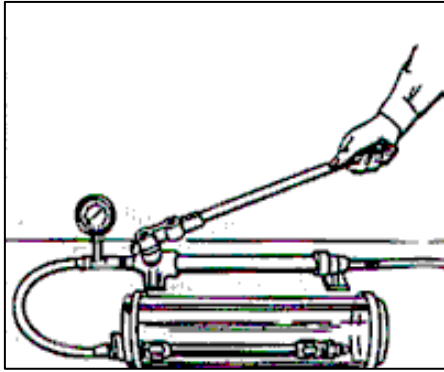


Figure 8.0

**Recommended test pressures for ALL new hose assemblies.**

<b>BBS-4S Platinum Cured Silicone Hose</b>				
<b>BBS Item Key.</b>	<b>Hose Size</b>	<b>Re-enforcement</b>	<b>Coil length in m</b>	<b>Test pressure / Bar</b>
BBS-4S-00.R04.00.CL.0	DIN DN 04	Without	50	<b>2.90</b>
BBS-4S-00.R06.00.CL.0	1/4" / DIN DN 06	Without	50	<b>2.90</b>
BBS-4S-00.R08.00.CL.0	DIN DN 08	Without	50	<b>2.10</b>
BBS-4S-00.R10.00.CL.0	DIN10 / ISO DN 08	Without	50	<b>1.40</b>
BBS-4S-00.S10.00.CL.0	1/2" / ISO DN 10	Without	25	<b>1.40</b>
BBS-4S-00.R04.00.MD.0	DIN DN 04	Silk Thread	50	<b>22.50</b>
BBS-4S-00.R06.00.MD.0	1/4" / DIN DN 06	Silk Thread	50	<b>21.50</b>
BBS-4S-00.R08.00.MD.0	DIN DN 08	Silk Thread	50	<b>20.00</b>
BBS-4S-00.R10.00.MD.0	DIN DN 10 / ISO DN 08	Silk Thread	50	<b>17.50</b>
BBS-4S-00.S10.00.MD.0	1/2" / ISO DN 10	Silk Thread	25	<b>14.50</b>
BBS-4S-00.S15.00.MD.0	3/4" / ISO DN 15	Silk Thread	25	<b>12.00</b>
BBS-4S-00.S20.00.MD.0	1" / ISO DN 20	Silk Thread	10	<b>8.50</b>
BBS-4S-00.S25.00.MD.0	ISO DN 25	Silk Thread	10	<b>6.00</b>
BBS-4S-00.R10.00.MA.0	DIN DN 10 / ISO DN 08	Aramid	50	<b>23.00</b>
BBS-4S-00.S10.00.MA.0	1/2" / ISO DN 10	Aramid	25	<b>22.00</b>
BBS-4S-00.S15.00.MA.0	3/4" / ISO DN 15	Aramid	25	<b>18.00</b>
BBS-4S-00.S20.00.MA.0	1" / ISO DN 20	Aramid	10	<b>14.00</b>
BBS-4S-00.S25.00.MA.0	ISO DN 25	Aramid	10	<b>11.00</b>
BBS-4S-00.S32.00.MA.0	1 1/2" / ISO DN 32	Aramid	10	<b>7.00</b>
BBS-4S-00.S40.00.MA.0	ISO DN 40	Aramid	10	<b>7.00</b>
BBS-4S-00.S50.00.MA.0	2" / ISO DN 50	Aramid	10	<b>7.00</b>
00.R10.00.MR.0	DIN DN 10/ ISO DN08	Stainless Steel	25	<b>24.00</b>
00.S10.00.MR.0	1/2" / ISO DN 10	Stainless Steel	25	<b>23.00</b>
00.S15.00.MR.0	3/4" / ISO DN 15	Stainless Steel	25	<b>18.00</b>
00.S20.00.MR.0	1" / ISO DN 20	Stainless Steel	10	<b>14.00</b>
00.S25.00.MR.0	ISO DN 25	Stainless Steel	10	<b>11.00</b>
00.S32.00.MR.0	1 1/2" / ISO DN 32	Stainless Steel	10	<b>8.00</b>
00.S40.00.MR.0	ISO DN 40	Stainless Steel	10	<b>7.00</b>
00.S50.00.MR.0	2" / ISO DN 50	Stainless Steel	10	<b>6.00</b>



## 1.) General Information

BBS Silicone hose Types CL, MD, MA and MR are fully functional and have lean maintenance. Flow direction and installations are open but should follow the recommended installation procedures and recommendations.

Working pressure and allowed temperature conditions are summarized in the technical information sheets. Assembly of BBS Silicone hose systems shall be performed by adequately instructed and trained staff only. BBS hose unions are designed and approved for use in combination with BBS Silicone hose. If BBS hose unions are assembled with other manufacturers hose the functionality and tightness can not be assured and may result in unsafe installations. It is not recommended to use BBS hose unions with any other make of hose.

## 2.) CE-Marking

According to the Machine Guidelines 89/392/EWG these hose systems are not regarded as machines; they can, however, be built into installations which are considered as machines. In such cases, please note the following.

We declare that operation is prohibited until it has been confirmed that the machine (plant) into which the products have been built corresponds to the conditions of the EC Machine Guidelines 89/392/EWG.

## 3.) Choice of Silicone hose

All general information are reference values. Dimensions indicated in technical information sheets DN 04 to DN 50 are part of the BBS Standard Equipment. Other sizes may be available upon request. Indicated pressures are in direct conjunction with the re-enforcement material and construction of the hose.

In standard applications it is usual for standard type CL hose to be used which is without re-enforcement. In higher pressure applications type MD (Polyester-Multifilament) is used; for even higher pressure applications type MA (Polyester-Monofil or Aramid) re-enforcement is used. The trade name of the type MA re-enforcement is Kevlar.

Type MR re-enforcement is with stainless steel stranded lacing wires. This hose has similar properties as MA type regarding flexibility and pressure resistance. This hose is antistatic when assembled accordingly into a standard BBS hose union. (See information later on regarding this assembly).

BBS Silicone hose are free of peroxide. Standard hose is platinum cured and meets following guidelines.

- United States Department of Agriculture ( USDA )
- FOOD und DRUG ADMINISTRATION ( FDA ) 21 CFR Part 177.2600
- BGA XV
- USP Class VI
- Eu.Phr.

This product information acts as reference and not as specification. The data published are typical values for such equipment. Changes in case of production or other technical applications may occur. Toxicity and material properties should be taken from the individual material data safety data sheets which are available on request.

#### 4) Working, Burst and Test Pressure

The indicated pressure data in the technical information sheet is based on ambient temperature (20°C) if nothing else explicit is stated. Working pressure and test pressure are in direct conjunction to the burst pressure (security factor). The security factor depends on the application and the criticality of the product in use. For high temperature applications a reduction of the working pressure in comparison to the values indicated is recommended.

Standard security factors for working pressure is burst pressure divided by factor 2.5 up to 4. For test pressure 1:2. All the units of measurement are stated in Bar.

A rise in temperature reduce burst pressure circa. 10% per 40 degree C incremental increase.

If the temperature of the media is different to the ambient temperature the working pressures have to be accommodated according to the recommendations accordingly. Unless other specific data are provided the recommended values provided can be used as factor of correction. Please notice and recalculate if the ambient pressure is substantially different to 20°C. BBS hose is not recommended for use with pulsating pressure applications or for continuous steam applications.

Vacuum conditions have to be considered carefully. Please note if absolute pressure or negative pressure is stated. The effective vacuum resistance is to be evaluated in the specific application.

Pressure drops - Hose installations are basically under strained pressure drops due to hose expansions, bending, flow velocity, viscosity of media, roughness of surface and size. The length of the hose, the assembly and the type hose unions are also in direct influence of delta p. This delta p can be calculated analogically for standard pipes in respect to Reynolds Factor. Due to the individual applications calculations are recommended for critical processes. Should not be used under pulsating conditions.

Elongation while pressure inside - All hose with or without re-enforcement changes in the length while pressurized. This change could be a few percent of the effective hose length depending on hose type, reinforcement and pressure. This effect shall be considered especially for very short or very long hose assemblies.

#### 5). Temperature

The temperatures indicated in the technical information sheet are valid for the medias and set a range in conjunction with experienced appropriate life cycles of the hose. If higher requirement is requested, the maximal life cycle will reduce. As limits, temperatures which permit the hose flexibility requested shall be specified. If ambient pressure is substantially different to 20°C the limits of the working temperature shall be duly considered. All specified pressure indications are valid at ambient temperature. Correction factors to be calculated accordingly.

Use in steam means we recommend a thorough investigation of the application data. Especially to determine whether saturated steam, superheated steam or pure steam in use.

#### 6). Chemical resistance

If you are not sure about chemical compatibility please contact us for consultation.

Silicone hose is resistant to many chemical substances. In respect of the silicon resistance for non published substances we recommend that tests under specific requested conditions should be made. Please pay attention to thermal conditions and chemical mixture while testing as it might influence the life cycle of the silicone material.

The decision for use the hose rests with the user.

## 7) Special applications and properties

BBS Silicone Hose which is internally or externally in contact to media which are in use in medical applications has to be insipid and free of any exhalation. Physiological and Toxic harmless as well the chemical resistance have to be guaranteed. Depending on the individual national law and regulations the security for humans and animals are regulated. Such individual regulations are described in FDA or BGA, etc. and exact compliance and following is mandatory.

Surface quality – the internal surface quality on BBS platinum cured silicone hose based at circa. Ra 0.2 µm. This value is measured in the hose while depressurized. If hose is pressurized this value will raise due to expansion. The same increase can occur if hose is subjected to special chemical treatment.

Electrical properties – the ingredients of the silicone compound regulates the electrical properties. Especially the kind and quantity of the additive (i.e. soot particle number density) affects the electrical resistance. The value in general is in between antistatic (106 – 108 Ω/cm) and insulation (> 109 Ω/cm); Silicone usually has a higher resistance.

Specified electrical conductivity can only be reached if the hose is suitably prepared. For such applications the silicone hose has to be equipped with special copper lacings which have to be connected to the hose union. This is for BBS hose types CL, MA und MD.

The BBS hose in MR quality (SS reinforcement ) is electrically conductive. When using the hose in applications where this is required the connection of the SS wire to the union has to be guaranteed. To assure the conductivity of the assembled hose system a verification should be made by measuring the electrical resistance.

Atex – Silicone hose in the quality CL, MD and MA are not electrical conductive and shall not be installed in Ex Zone areas. Type MR hose meets the regulation of Atex Richtlinien 94/9/EG and can be installed in Zone 1, 2, 20 und 21.

To assure the conductivity the hose assembly has to be tested by electrical resistance measurement which shall be respectively protocol led. The result of such measurement shall meet  $<10^3 \Omega/\text{cm}$  . If this value is not reached the connection of the wire and the union is to be remade and proven. It is prohibited to use hose in such applications unless is proved that the resistance measurement meets the recommended values. Hose assemblies used in such Ex Zones have to be equipped with a non removable marking.

## 8). Installation and Connection of Hose Assemblies

If following recommendations are attended the optimized live cycle of the hose assembly will be reached.

1. Careful installation while appropriate union is chosen.
2. The assembly to be installed completely free of any torsion.
3. Straight lines to be installed undiluted (pressure will elongate the hose).
4. Oscillation movement should not be with the area of bend radius of the hose.
5. Restrict overstress of bending.
6. Silicone hose is not buckle resistant. Buckled hose to be replaced immediately.

Installation recommendations are shown in technical information sheet BBS-04.



## 9.) Security Aspects

Contrary to stainless steel piping silicone hose is a flexible, elastic material which accommodates a respective re-enforcement material used to achieve certain pressure resistance. Such elastic material is affected by ageing and therefore restricted in life cycle through a natural material fatigue.

Therefore hoses are always to be inspected at regular intervals. If necessary the hoses to be changed at each maintenance service. To support this we recommend to mark each assembly with correct size, date of assembly, date of installation and an individual TAG number. Such marked assemblies shall be noted in the service plan (maintenance protocol) of the plant. This can be arranged with labels or by engraving the outer ferrule.

Aging – if silicone hose is cracked on the outer surface due to aging, the hose is to be exchanged immediately. Any hardening on the outer surface is caused by heat and if it is soft then a chemical influence is likely occurring. Such symptoms shall lead to a thorough investigation to assure that the correct hose material is in use.

Life cycle – it is almost impossible to foresee the lifetime of a hose. The mechanical, chemical and thermal influences in their combinations with each other are so multiple that only separate testing under exact conditions of use will give an indication of life cycle.

## 10) Sterilization Recommendations

Sterilization of BBS Silicone hose can be accomplished with Steam at 135°C with a pressure of 3.5 Bar. The maximum recommended sterilization time shall not exceed more than 1.5 hours 135°C.

Between multiple sterilization cycles of the hose, it is recommended to decrease the pressure to standard atmospheric pressure and cool the temperature to room temperature for re-stabilization of the silicone hose materials – a minimum duration of 1 hour is suggested.

Steam has a direct influence to the mechanical and volumetric properties of Silicone. After 150h of steaming we recommend a throughout inspection of the hose system.

## 11) Storage

- The hose should be protected against direct sun light. (UV-Radiation aging).
- Horizontal storage is recommended
- Storage temperature should be at room temperature and humidity of ~65%.
- Do not bend the hose more than recommended bend radius in technical sheet BBS-04.
- Do not store the hose more than 36 Month after production (purchasing) date.

## 12.) Material Properties

Eigenschaft/ Property/Propriété	Standard	Dimension	Value
Härte Hardness Dureté	DIN 53505 DIN EN ISO 868	[Shore A]	80+/-5
Dichte Density Densité	DIN 53479 ISO/R 1183	[g/cm <sup>3</sup> ]	1.19
Reißfestigkeit Tensile Strength Résistance à la rupture	DIN 53504 ISO/DIS 37	[MPa]	7.0
Reißdehnung Elongation Allongement à la rupture	DIN 53504 ISO/DIS 37	[%]	350
Weiterreißwiderstand Tear Strength Résistance au déchirement	ASTM D 624 B	[N/mm]	20
Druckverformungsrest Compression Set Déformation rémanente à la compression	DIN 53517 (22h/175°C) DIN ISO 815	[%]	30
Durchschlagfestigkeit Dielectric strength Rigidite dielectrique	VDE 0303	[KV/mm]	20
Einsatztemperatur Temperature Range Plage d'utilisation temperature		[°C]	-50 / + 180
Farbe Colour Couleur			transparent oder eingefärbt transparent or colored transparent ou coloré