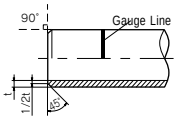
Installation of TS Connection

1 Pipe Cutting

Use wide thick paper or tape for the pipe cutting area, put a cutting gauge line with a permanent marker on the entire circumference, and cut perpendicular to the pipe shaft.

2 Chamfer

Lightly chamfer the entire inner/outer perimeters using a tool such as file or chamfer. When a pipe is cut, especially, finish the pipe end surface without burrs and warping.



Notes: Not properly performing chamfering could cause installation failure so please make sure to chamfer.

3 Entry of Gause Line

For the pipe insertion gauge line of the sizes 13 to 40 mm, measure the fitting socket length ℓ from the pipe end and mark on the pipe body with a marker. For the pipe insertion gauge line for the sizes 50 to 150 mm, it shall be at a position of the zero point plus the bonding margin length in Table 2. Mark the gauge line on the pipe body with a permanent marker.

Table 1. TS Fitting Socket Normal Length Unit: mm

Size	13	16	20	25	30	40	50	65	75	100	125	150
Fitting Socket Length	26	30	35	40	44	55	63	61	64	84	104	132

[Reference] Table 2. Bonding Margin Length Unit: mm

Size	13	16	20	25	30	40	50	65	75	100	125	150
Bonding Margin Length	10	10	15	15	15	20	20	20	25	30	35	45

* Refer to [Explanation] 2.

4 Rinsing

Wipe and clean the inner face of fitting socket and the outer face of pipe insertion port with a cloth. In particular, when oil or water is on the connection part, clean by using a small amount of acetone and alcohol.

Notes: Not properly performing rinsing could cause installation failure so please make sure to rinse.

5 Adhesive Application

Use a special adhesive compatible to the type of pipe and apply it evenly in the order of on the inner face of fitting and the outer face of pipe. In particular, apply thinly and evenly to the inner face of fitting. The reference ratio of adhesive application is 7 to 3 for pipe and fitting.

Table 3. Usage of Adhesive per Connection Part (Reference)

Size (mm)	13	16 (15)	20	25	30 (32)	40	50	65	75	100	125	150
Usage (g)	0.9	1.2	1.7	2.0	3.1	5.0	7.1	9.9	12	20	30	44

* Refer to [Explanation] 4.

6 Insertion

After applying adhesive, insert pipe into fitting straight without turning the pipe immediately at once and press it in that condition. Refer to Table 4 for this normal press time.

* Use an inserter for large diameters.

Table 4. Normal Press Time of TS Connection

Size (mm)	50 or less	65 or more
Normal Press Time (Sec.)	30 or more	60 or more

Notes: Due to the relationship of pipe and fitting dimension tolerance, it may not be inserted all the way to the end. In this case, do not insert it forcibly by hammering and such. Inserting forcibly may place a large burden on the fitting and cause damage.

7 Adhesive Treatment

After connection, wipe the protruded adhesive immediately and do not apply forcible stress on the connection part.

8 Removal of Solvent Content

Adhesive contains organic solvent, and the solvent steam needs to be removed after connection. During curing after piping, open both ends of pipe without enclosing and remove the solvent steam. During curing, the steam can be removed more effectively by ventilating inside piping using a ventilator (low-pressure specification) or washing inside piping by filling the water after the adhesive is hardened.

* Refer to [Explanation] 4.

[Explanation]

1 TS connection utilizes the swelling and elasticity of PVC by making the fitting socket tapered and using adhesive. Applying adhesive to the pipe and fitting would create a swelling layer of approximately 0.1 mm thickness on its surface as shown (Figure 1), and this layer makes the insertion of the pipe fluidly. After insertion, respective swelling layers of the pipe and fitting would interact each other, and the bonding surface would be unified.

Figure 1. Installation of TS Connection

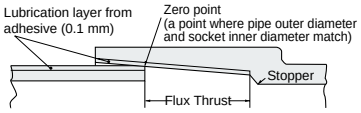
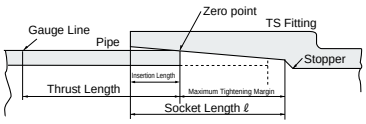


Figure 2. Zero Point and Tightening Margin



2 Based on a result of testing the relationship between the bonding margin length and pressure-resistant strength, it has been confirmed that practically acceptable water pressure strength can be secured by inserting approximately 1/3 of the fitting socket [ℓ] in addition to the insertion length without applying adhesive (zero point).

In regards to insertion margin in TS connection, it is ideal to insert TS fitting to the length of TS fitting gasket (stopper), but considering the tolerance of pipe and fitting dimensions, the length from zero point plus the bonding margin length shown in Table 2 to the stopper in Table 1 is sufficient enough, and inserting to the stopper of the fitting is not necessarily required.

However, if it cannot be inserted due to the adhesive being dried,etc., cut the connection part and reconnect again by using a new socket.

3 Inserting the pipe into the fitting before applying adhesive is to check the zero point. In this case, a combination of pipe and fitting that provide the insertion length of 1/3 to 2/3 ℓ from the pipe end surface (refer to Figure 2) is standard.

4 Be cautious of excessive adhesive (it may cause solvent cracking and damage). Caution is needed in low-temperature installation because solvent steam does not evaporate easily and tends to remain (it may cause solvent cracking and damage). During curing after piping, open both ends of pipe without enclosing and remove the solvent steam. During curing, the steam can be removed more effectively by ventilating inside piping using a ventilator (low-pressure specification) or washing inside piping by filling the water fully after the adhesive is hardened.

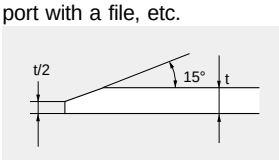
Installation of Rubber Ring Connection

1 Pipe Cutting

Wrap marking tape perpendicular to the pipe shaft, put a cutting section surface on the entire circumference with a permanent marker and cut using a manual saw by avoiding misalignment.

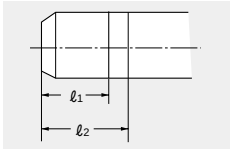
2 Chamfering of Insertion Port

Chamfer the end surface of insertion port with a file, etc.



3 Entry of Gauge Line (Insertion Length)

Mark a gauge line on the insertion port pipe.



Size	ℓ_1	ℓ_2
50	94	107
75	107	120
100	119	132
125	125	138
150	139	152

4 Cleaning of Socket Inner Face

Wipe off the soil and sand attached on the rubber ring and groove and the socket inner face with a cloth.

5 Rubber Ring Installation Method

If the rubber ring is removed for cleaning, put it into the groove by squeezing into a heart shape. Check for twisting and misalignment.

6 Cleaning of Insertion Outer Face

Wipe off the soil and sand attached on the insertion port outer side with a cloth.

7 AV Lubricant Application

Apply AV lubricant to inner face of rubber ring and insertion port (especially the chamfered tip area) evenly. (Never use oil, grease, soap, etc.)

Normal Application Amount g/location

Size (mm)	50	75	100	125	150
Application Amount	4	5	10	15	20

8 Connection

Insert to between 2 gauge lines. Make sure to avoid the shaft center misalignment and never hammer in by using a hammer.

9 Insertion Depth Check

After connection, check the entire circumference using a check gauge to see if the rubber ring is in a proper condition.

Piping Precautions

① Do not throw around when loading/unloading. Be cautious especially in Winter.

② Store away from direct sunlight and avoid unevenness on the pipe platform. Do not use a transparent sheet because it has no effect and gives a negative influence.

③ Do not hammer in when connecting pipes.

④ For rubber ring connection, make sure to check the rubber fitting and inspect for twisting and direction. Be cautious of attachment of soil/sand, muddy water, etc.

⑤ Do not clean the rubber ring groove with a slippery item such as lubricant.

⑥ If you notice spring water before backfilling, drain, put sand in a couple of layers and tamper sufficiently.

⑦ Sufficiently fill the area around pipes to avoid any cavity.

⑧ The groove bottom shall be sand, in principle. For weak ground, additionally lay crushed stones underneath or improve the soil quality. Do not have stones and bedrock hit pipes directly.

⑨ Follow the procedure below in the diagram for backfilling.

<Example> In the case of the size 100

Notes: 1. Dotted line shows the position immediately after inserting soil and sand.

Notes: 2. Solid line shows the position after tampering the soil and sand.