



Light gauge stainless steel fitting for ordinary piping-Press Fitting with Safety Function Equipped





**BENKAN** Corporation

# **DOUBLE PRESS** TM

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# **System of Benkan Double Press**



### **SAFETY FUNCTIONS**

- Safety Edge Backup feature for preventing insufficient insertion.
- Ring with lump Backup un-pressed condition (allow water to leak when un-pressed)

### Description

Benkan stainless steel has been updated with a special profile which consist of ends with W-shaped grooves, and a sealing ring with lump. During the pipe connecting process, the special profile provides extraordinary safety function with double-edge. Adding the updated function of the safety edge on outside of the fitting prevent insufficient insertion. Moreover, if the fitting is un-pressed, the sealing ring with a lump allows the outflow of waterdrop and indicates un-pressed location. The compress-seizing method uses a special pressing tool to install BENKAN Double Press system.

Stainless steel pipes or the equivalent are widly used in developed countries. Advantages include better hygiene, durability, less required maintenance, and cost savings, when taking into account the life cycle cost. Installation costs are also competitive. It delivers the best results when used with stainless steel press fittings, and is especially suitable for concealed location behind concrete wall or when laid underground.

# Why Choose Stainless Steel Plumbing ?

When it comes to potable water supplies, particularly in large institutional, commercial, and residential buildings, there are many good reasons to consider stainless steel.

### The many advantages of stainless steel plumbing include

- Low cost of maintenance and other life cycle cost advantages.
- Does not demand water treatment chemicals, except for bacteria control.
- Pipe work is unaffected by high water flow rates.
- Able to sustain the full range of potable water, including soft water.
- Very good corrosion resistance, hence there is no danger of contamination from drinking water supplies.
- Strong yet ductile.
- Non-toxic.
- Manufactured from a high proportion of recycled materials and is 80% recyclable.
- Good outlook after installation.

BENKAN provides a full range of joining methods and fittings for our stainless steel tubing to suit the requirements of our clients over the world.

## Scope

• Applicable pipe: Light gauge stainless steel fittings for ordinary piping (JIS G 3448)

: Light gauge stainless steel fitting for water work (JWWA G 115)

- Usage : cold water, hot water, coolant water, chilled/hot water. Unavailable for steam plumbing.
- Maximum water pressure : 2.0MPa (20.4kgf/cm)
- Water quality criteria : Please refer to the chart below to check water quality.
- Maximum water temperature : under 80°C

#### BENKAN'S water quality criteria

Water composition	BENKAN's specified water qualities level
Chloride ion	under 25mg/L
Sulfate ion	under 30mg/L
Hardness	under 80mg/L
Electrical conductivity	under 250µS/cm
Iron or Chemical compound	under 0.05mg/L
pH level	over 7.0

# Safety Edge: Backup Feature for Preventing Insufficient Insertion

### Safety Edge

### **Preventing insufficient insertion**

The edge portion is one of the most important features of the BENKAN Double Press.

In the case of insufficient insertion of the pipe, but with the pipe inserted up to the L2 Length shown below, the fitting still delivers the water sealing performance required SAS322(Stainless Association Standards in Japan) in order to seal water.

Also, when a pipe is inserted less than L2 depth/length, leakage can be found by inspection(Hydrostatic Test) ; thus, failure can be identified.



**CAUTION**: Please touch or visually check druing hydrustatic test for insufficient installation

## Safety Sealing Ring : Indicating Un-pressed Locating.

### Sealing Ring with Lump

#### Backup for un-pressed conditions. (allows water to leak when un-pressed)

If the fitting had not been compressed in error, the exact spot can easily be found because of the unique sealing ring with lump.

When applying water / air pressure for inspection after the completion of the entire work, a little drop coming out of a small gap between two lumps of the rubber ring indicates un-pressed location.

#### Length of life span for Sealing O-ring.

This O-ring is Isobutylene Isoprene Rubber and maximum temperature is  $80^{\circ}$ C.

According to T.W.Dakin for reatciton kinetics and Arrhenius for rate equation, we briefly calculated for BENKAN IIR life span.

 $2.303 \log K = -E/RT + C$ 

- K: rate constant reaction
- E: activation energy
- R: gas constant
- T: absolute tempereture



### Performance

### DOUBLE PRESS ABILITY CHART

		13Su	20Su	25Su	30Su	40Su	50Su	60Su
Hydrostatic Pressure MPa(kgf/cm)	Min	3.5 (35.7) Holding 2min. No leak or Pull out						
	L1	Pass	Pass	Pass	Pass	Pass	Pass	Pass
	L 2	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Tensile Strength kN (kgf)	Min	2.2 (224)	3.8 (387)	4.9 (500)	7.0(714)	8.8 (897)	10.1 (1030)	15.8(1611)
	L 1	Pass	Pass	Pass	Pass	Pass	Pass	Pass
	Min	-96kPa (-720mmHg) Holding Time: 2Min.						
Negative Pressure	L 1	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Alternative Internal Pressure	Min	0 ⇔ 5.0MPa (51.0kgf/cm³) , 4Sec/Cycle, 10,000Times						
	L 1	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Bending under Water Pressure	L 1	>30°	>30°	>30°	>30°	>30°	>30°	>30°

• Freezing Prevention - In cold regions, more attention should be paid to prevent freezing.

- Refer to our Technical Data for more details and other results.
- Hydrostatic Pressure Test Conforms to SAS322 (Stainless Association Standard)
- Tensile Test Conforms to SAS322 (Stainless Association Standard).
- Negative Pressure Test Conforms to SAS322 (Stainless Association Standard).
- Alternative Internal Pressure Test Conforms to SAS322 (Stainless Association Standard).
- Bending Under Water Pressure Test Conforms to BENKAN's Test Standard.

# **Quality Test (Engineering Specification)**

### We never hesitate to spend time performing various tests improve quality

#### **Tensile test**

Measuring tensile strength using Amsler universal test machine; an air pressure of 0.2MPa(2.0kgf/cm<sup>2</sup>) was enclosed in the pipe.



#### **Bending Pressure Test**

After applying a water pressure of 2.5MPa (25.5kgf/cm) by a pump machine, measuring the max bending degree using Amsler universal test machine.



10,000 cyclic applications. No leakage or any problems can be found.

#### **Corrosion Test**

**Testing Solution** Prepare 200±20mg/liter Cl of solution following JIS method using JIS K8150 (sodium chloride reagent) and distilled water. Temp:80±2℃ Duration: 30 days



(Testing solution must be changed every 15days).

#### **Test Result**

Axial cut test sample. Gap observed at 5 to 20 magnification. No pitting corrosion or cracks can be seen.





# Items

90E/90CE	ASM II	T	AEM I
90Elbow / 90Compact Elbow	Adapter Socket Male II	Тее	Adapter Elbow Male I
432	3	R	ALF
45Elbow	Socket	Reducer	Adapter Elbow Female
90SE	BS	ASM1	
90Socket Elbow	Bare Type Socket	Adapter Socket Male I	Lap Joint Stab End
	and and a second s		
45Socket Elbow	Сар	Adapter Socket Female	Water Tap E w/clip plate
WIES	WIS	WIE	WIT
Water Tap Elbow Short	Water Tap Socket	Water Tap Elbow	Water Tap Tee
Under 40°C	Under 80°C		
Insulation Union	Insulation Union	Union I	Union II
	CF Under 60°C		
Water Tap Washer	Insulation Coated Flange		

Custom-made item is available. Please contact us for special orders.

### Flange



# Insulation Coated Flange (CF) & Lap Joint Stab End (LT)

By assembling our CF and LT, insulation between valves or other equipment which is made of steel and stainless steel can be completed. Therefore, stray current corrosion can easily be prevented. Insulation can be easily recognized compared to conventional methods using Teflon nut and washers. The flange can be checked visually.

### **Features**

- Prevents stray current corrosion of the piping.
  - CF is a carbon steel plate flange (SS400 steel plate JIS G 3101) with a Nylon coating with high insulation performance.
- Its insulation ability is 16kV/mm. Its performance is superior to Bakelite (10kV/mm).
- The maximum temperature for use of CF is 60°C

### Caution

When connected it an electrical device, even if the device side has a stainless connection, accidents may occur from stray current running to the piping. An insulating process must therefore be performed.



# **Fitting Application**

### The fitting application - suitable pipes, pressure and temperature range.

	opileation	suitable pipes, pressure and temperature range.						unit : mm
JIS G 3448	NPS	13Su	20Su	25Su	30Su	40Su	50Su	60Su
	OD	15.88	22.22	28.58	34.0	42.7	48.6	60.5
	Wall Thickness	0.8	1.0	1.0	1.2	1.2	1.2	1.5
Pressure Range		2.0MPa (20.4kgf/cm²)						
Temp Range		under 80°C						

# **Benkan Double Press Instruction Procedure**

# **Cutting pipes**

Please use a Rotary Cutter for JIS G 3448 standard pipe when cutting the pipes. The use of a band saw machine for the pipe may create burrs. If burrs occur, be sure to use a burr removal tool.

# **Insertion Length Mark**

Specialized insertion length marker and permanent maker shall be used for every pipes.

# $\mathbf 3$ Insert the pipe into to the marked insertion length.

Insert the pipe into the joint until it stops and mark reaches the joint end. If insertion is difficult, check for remaining burrs or deformation of the pipe. Replace the pipe if deformed.

# **4** Pressing

Set the curled portion of the joint at the gutter of the die. Press until both sides of the die touch and a slight shock it the motor is felt.

# **5** Checking

After pressed fitting, apply the hexagonal checking gauge to the hexagonal part of the joint and check that it is properly installed.











# **Information Background**

### Fluid flow experiment chart



# **Project References**



















### B<u>enkan</u>.

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