POSEIDON®

Non Return Valve

東榮產品有限公司
East Wind Products Limited

Preface

Traditional drainage system commonly used water-filled elbow (U bend) as a defense for unwanted substances from drainage pipes. However, should the water evaporates to a certain level, there is nothing to stop gas, odour, insects, bacteria and viruses from traveling through the pipes and into the residence and potentially cause serious health consequences. In addition, U bend offers no protection against backflow at all.

This has driven East Wind Products Limited to spend many years into the research and development of Poseidon® Non-return Valves. This invention is well-tested and proven to prevent backflow of untreated sewage, gas, odour, insects, bacteria and viruses from entering through drainage pipes. In addition, by installing Poseidon® Non-return Valves, can potentially reduce the amount of chemical agents being discharged into the environment and also play an important role in safeguarding our health.

Table of Contents

Introduction

Most drainage system is equipped with U-bend as a defense for unwanted substance from drainage pipes. However, should the water inside the U-bend evaporates to a certain level; there is nothing to stop odour, insects, gas, bacteria and viruses from emitting through the drainage pipe. In addition, U-bend offers no protection against backflow at all.

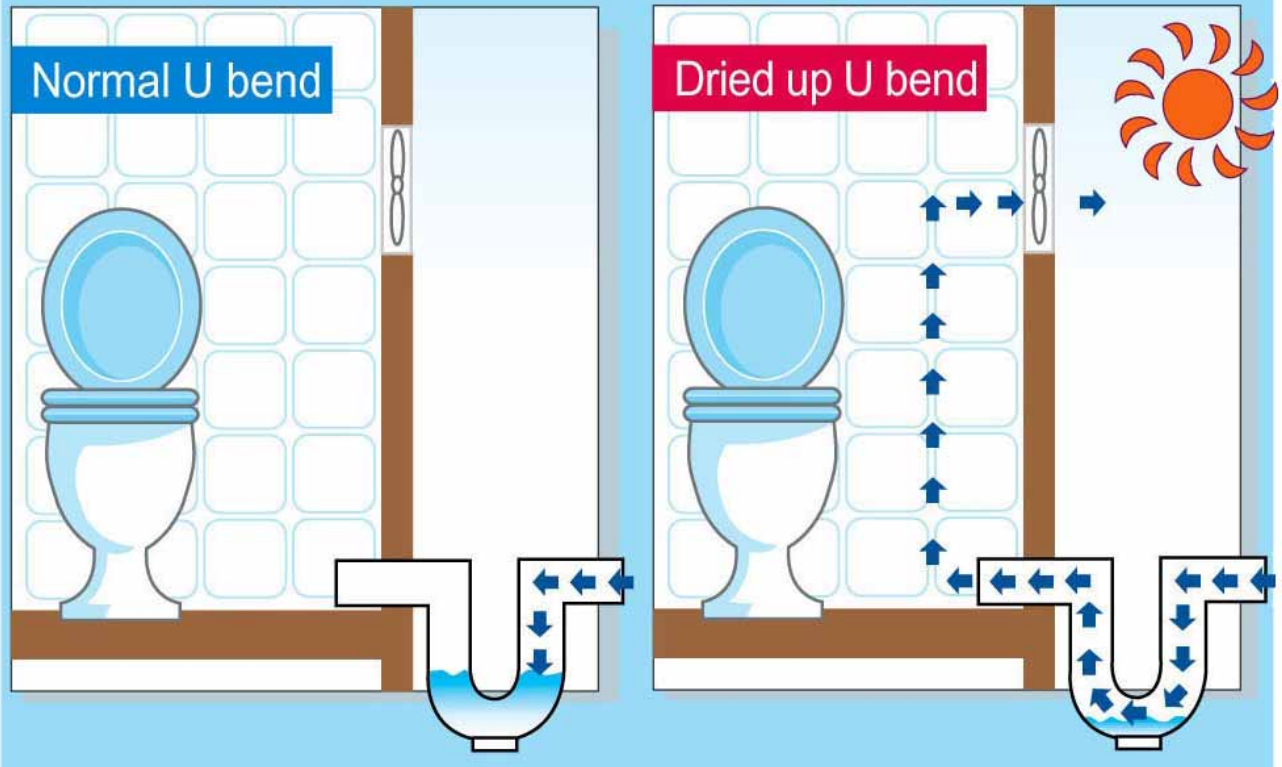
Whenever there is a blockage in the drainage system, there is a possibility of backflow. Especially in low lying area or multi-story buildings, where upper levels continue to release waste water down to the clogged drainage pipes. In time, backflow of untreated sewage will occur to unfortunate residences whose drainage pipes are not protected.

Backflow is not a pretty scene and the smell is horrible. When it occurs, residence may not only suffer tremendous property damage, but also expose to unhygienic bacteria and viruses. Backflow can enter a building or apartment through any unprotected drainage pipes, and is a serious risk that must be dealt with.

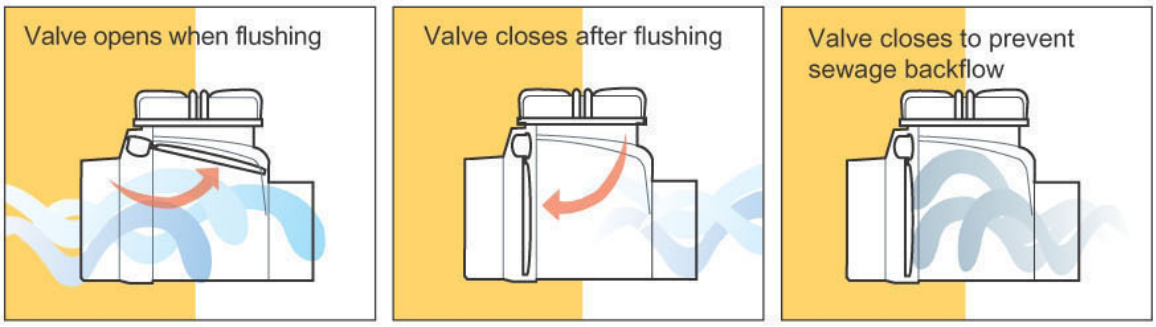
Design Concept

Design concept

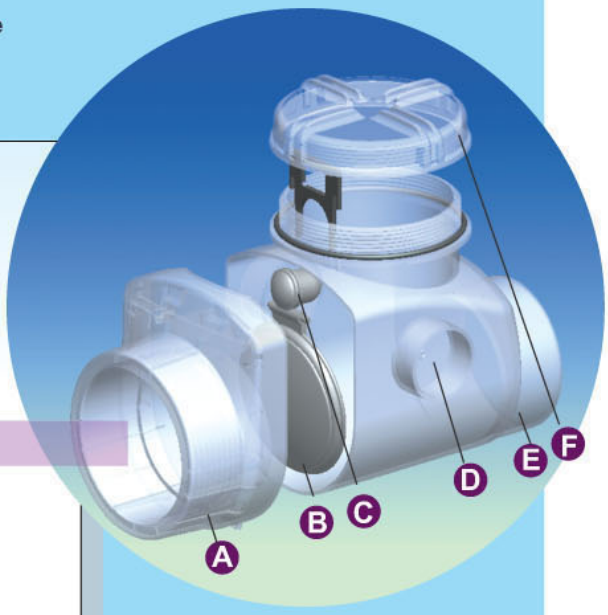
1. Provide a solution to the shortcoming of traditional U-bend in case the water evaporates.
2. Prevent the backflow of sewage, gas, odour, insects, bacteria and viruses from entering the premises through drainage pipes. Especially where there is a negative pressure situation where bacteria and viruses may be drawn into the premises through unprotected drainage pipes and cause serious health consequences.
3. Potentially reduce the amount and frequency of chemical agents such as bleach needed to eliminate bacteria and viruses in the drainage system, and maintain a healthier environment.

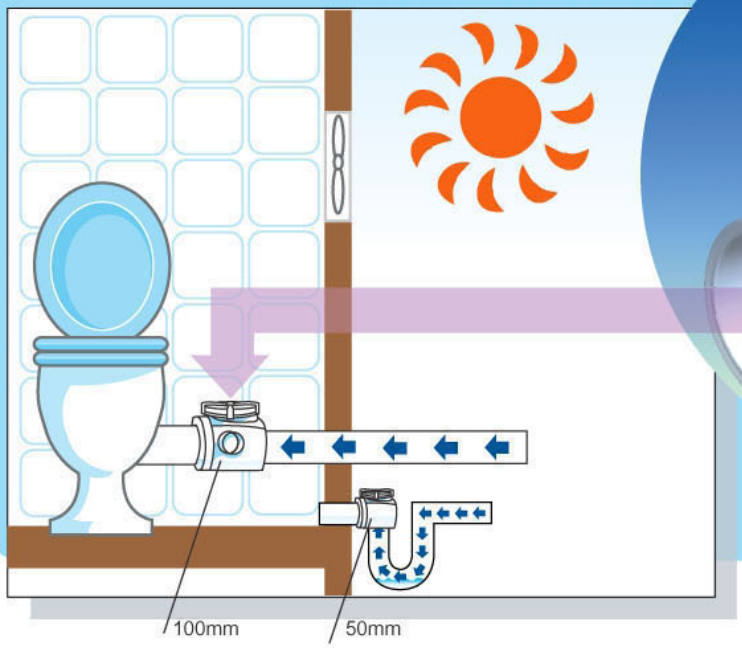


Product Characteristics



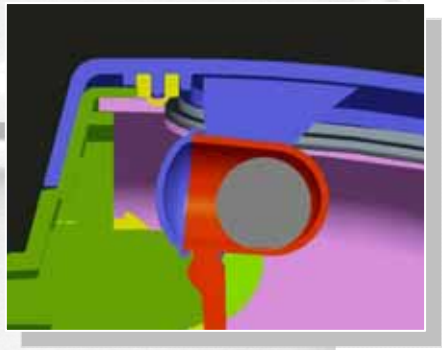
- **A** Unibody base designed for precise construction of Poseidon Non-return Valve
- **B** Double rib gasket provides better air/water seal and arched flapper enhances water flow
- **C** Weight activitated Mechanism (W.A.M.) designed to enhance water flow
- **D** Two 50mm stacks are reserved for vent/drain pipe installation
- **E** The outlet is designed with male connection for installation in narrow spaces
- **F** Double thread design is easy and quick to operate





Poseidon Advantages

Traditional non-return valve uses a dead weight flapper which may severely impacted the water flow. Poseidon® patented Weight Activated Mechanism (W.A.M.) is designed to reduce the weight of the flapper when it opens and exerts less resistance on water flow.



Poseidon® non-return valve may be the first uPVC non-return valve in the world to have two pre-built stacks reserved for vent or drainage pipe installation. This design may also save cost because no extra fitting is necessary.

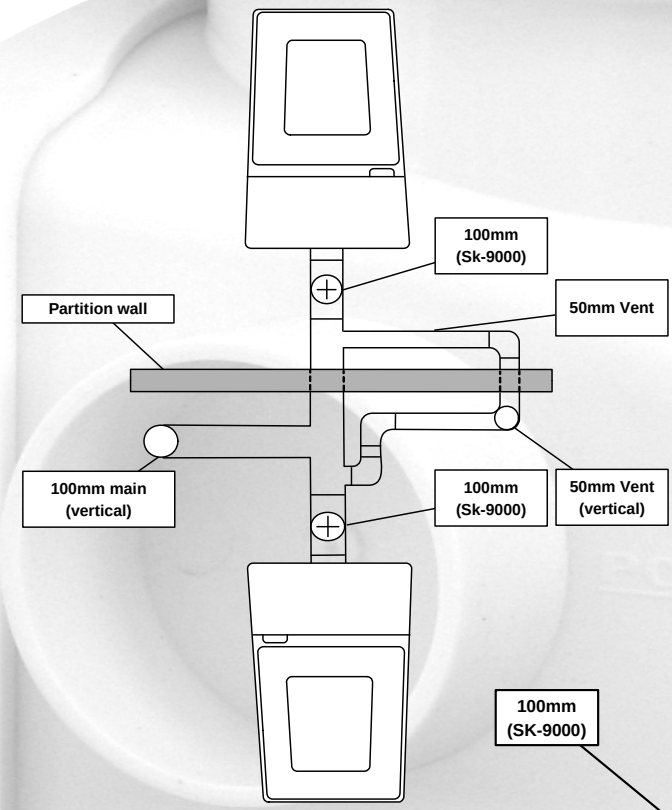
Poseidon® Sk-9000 has an open angle of over 90° degree and passes BS 4514 Ball Passing Test with a 100mm spheroid, where a 95mm spheroid is required to pass the fitting.

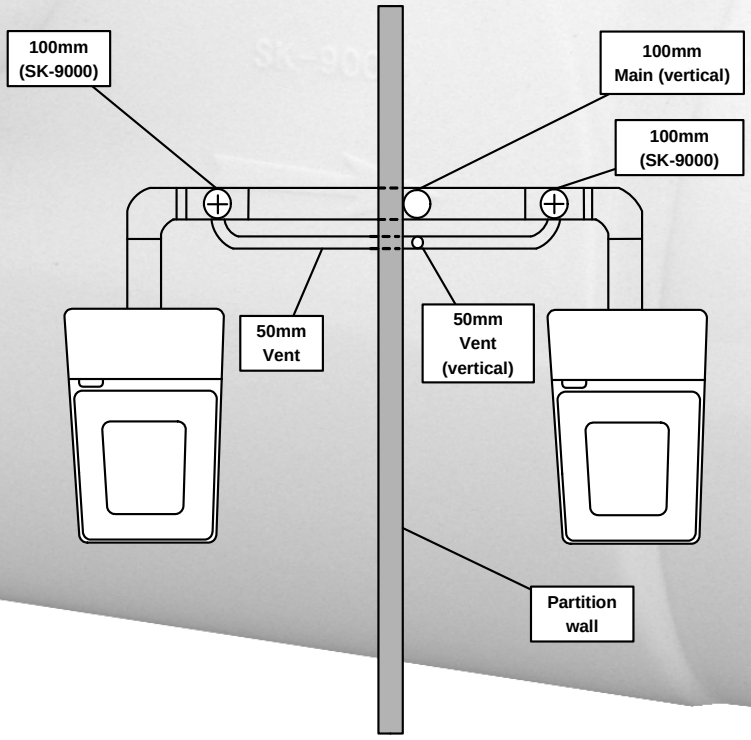
Poseidon® non-return valve is equipped with Double Rib Gasket on the flapper, which is superb in air/water seal. It is tested to block 99% of gas penetration by HKU. The shape of the flapper is arched which provides superior flow characteristic. Traditional non-return valves may not even have a gasket and most of them use a flat flapper design.

The outlet connection of Poseidon® Sk-9000 is male, unlike tradition female design, which requires longer connection spaces. In addition, the access cap is specially designed to open and close easily and quickly.

Sample Installation Diagrams

Two lavatories sharing one drainage pipe (Common Discharge):
Poseidon® non-return-valve can prevent sewage backflow from neighboring pipe.





Product Series and Dimension

	Model #	Nom. Size (mm)	Angle	Length (mm)	Width (mm)	Height (mm)	Connection
	SK – 9000 (Straight)	100 X 100	Horizontal	266	193	208	Female / Male
	EL – 9000 (Elbow)	100 X 100	90˚	218	193	253	Female / Female
	EL – 9000L (left Elbow)	100 X 100	90˚	229	193	212	Female / Male
	EL – 9000R (Right Elbow)	100 X 100	90˚	229	233	212	Female / Male
	SK – 8000 (Straight)	50 X 50	Horizontal	150	83	110	Female / Female
	EL – 8000 (Elbow)	50 X 50	90˚	113	83	140	Female / Female
	PCS (with Pan Collar)	100 X 100	Horizontal	273	193	208	Female / Male
	PCE (with Pan Collar)	100 X 100	90˚	225	193	253	Female / Female
	PCL (with Pan Collar)	100 X 100	90˚	236	193	212	Female / Male
	PCR (with Pan Collar)	100 X 100	90˚	236	193	212	Female / Male

Custom-made Solutions

East Wind Products Limited can offer custom-made Non-return Valves (NRV) for our clients. Please contact us for details.

Hinge Durability Report

Introduction:

The purpose of this test is to investigate the durability of the hinges of Poseidon non-return valve. Hinge durability is measured by the amount of deterioration of hinges diameter after 100 hours of continuous operation. A testing apparatus is setup to operate an open and close cycle of the hinges of Poseidon non-return valve 33 times per minute.

Length of test: 100 Hours

Total number of cycles the hinges were opened and closed: (33 times/minute) X (60minutes/Hour) X (100 Hours) = 198,000 cycles.

Assumption:

Assume a daily open and close cycle of Poseidon non-return valve of 50 times. This represents 18,250 cycles per year. The 100 hours of testing with 198,000 cycles represent over 10 years of operation of the hinges.

Diameter of Hinges:

Before test	Left hinge	Right hinge
	4.94	4.90
After test	Left hinge	Right hinge
	4.86	4.84
Percentage of deterioration	1.6%	1.2%

Test Result:

After 100 hours of continuous open and close cycles of Poseidon non-return valve. The hinges diameter deteriorated 1.6% and 1.2% respectively. This test result suggests minimum deterioration of hinge diameter even after 10 years of operation.

HKU Test Report Page 1 - 4

University of Hong Kong, Department of Mechanical Engineering performs the follow tests; Leakage, Resistive Torque, Flow Characteristics (with water closets), Passage of Bulky Foreign Matter (without water closets) and Aerosol Penetration.

Test Report on Non-Return Valve for Water Closets

Objective of Tests:

To test samples of a non-return valve for soil drainage systems involving water closet sanitary fittings in order to determine the performance characteristics.

Non-Return Valve Samples Submitted by:

East Wind Products Limited,
10A Fraser Road,
Tuen Mun, N.T.,
Hong Kong

Description of Samples:

The samples were made of transparent plastic molding material. As shown in Figure 1, each sample consisted of a casing, a hinged flap and a removable cover at the top. The overall external dimensions were 260 mm long by 185 mm wide by 190 mm high. The inlet and outlet were 110 mm and 102 mm in internal diameter respectively. Two vent pipe connections of 50 mm internal diameter were provided on the casing.

Figure 1 Non-Return Valve Sample

Tests Completed on:

17 August 2006

Tests Conducted:

(A) Leakage

A water head was applied to the flap of the non-return valve in the reversed flow direction as shown in Figure 2. The leakage rates at different levels of water head were determined using direct measurement of the volume of water leaked out against the time taken.

Figure 2 Setup for Leakage Test

(B) Resistive Torque

A light thread was attached to the lowest point of the flap so that the flap could be lifted up at different angles. The resolved component of the force perpendicular to the plane of the sealing ring on the flap was multiplied by the moment arm about the hinge of the flap to determine the resistive torque to drainage flow.

(C) Flow Characteristics (with Water Closets)

Two water closets were each fitted with a non-return valve and arranged to have a common discharge connection to the drain stack as shown in Figure 3. High-level cisterns were installed to provide the source of flushing water. A submersible water pump placed inside the collection tank was used to enable the recirculation of flushing water. The comparison of flow characteristics for water closet flushing between cases with and without non-return valve was made by keeping the flap intact and removing the flap respectively. The highest level reached by the water in the horizontal drain for the water closet outlet and the maximum flap opening attained during flushing were measured. The flushing characteristics involving solid waste were observed by adding into the w.c. bowl 5 Nos. barium sheet length, each about 28 mm diameter and 50 mm long prior to the flushing action as shown in Figure 4.

Figure 3 Setup for Flow Characteristics Test

Figure 4 Setup for Solid Waste Flushing Characteristics Test

(D) Passage of Bulky Foreign Matter (without Water Closets)

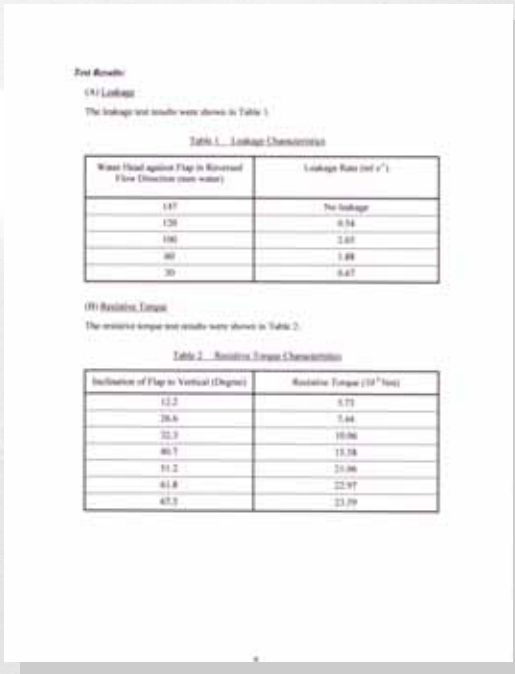
A towel measuring 560 mm long by 330 mm wide was placed inside the inlet pipe to a test sample of the non-return valve as shown in Figure 5. A total of 3650 ml of water was poured into the inlet pipe to test if the towel could be flushed through the non-return valve.

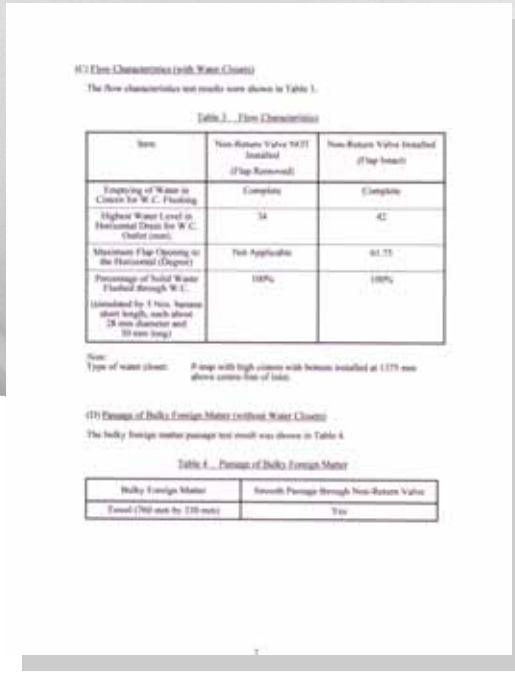
Figure 5 Setup for Bulky Foreign Matter Passage Test

Full size report available upon request

HKU Test Report Page 5 - 8

The test results are satisfactory and we are especially proud at the Aerosol Penetration test, where Poseidon® non-return valve achieved 99.07 percent blockage of gas penetration. In addition, Poseidon® non-return valve also achieved 100 percent water blockage in the Leakage test when the water head reached 147mm*.



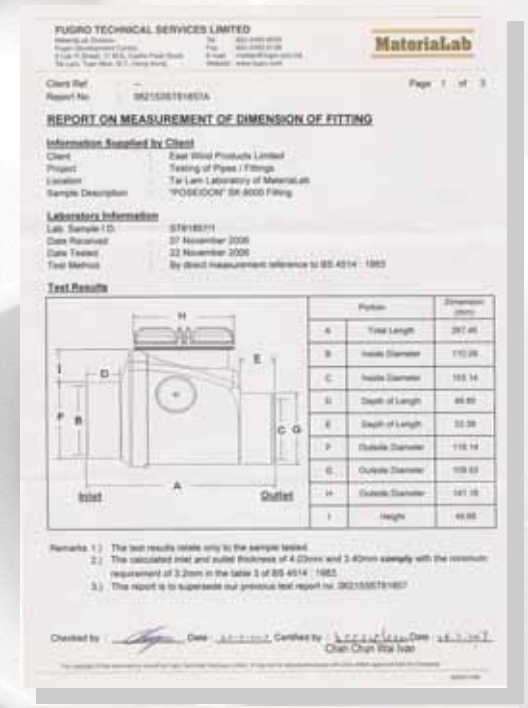


Full size report available upon request

* Water head needed to achieve 100% water blockage may vary slightly.

MateriaLab Test Report 1-4

Poseidon® non-return valve successfully passed all BS 4514 tests performed by MateriaLab. These tests include Ball Passing Test, Vicat Softening Test and Corrosion Resistance Test.



FUGRO TECHNICAL SERVICES LIMITED

MateriaLab

REPORT ON MEASUREMENT OF DIMENSION OF FITTING

Information Supplied by Client

Client : East Wind Products Limited
Project : Testing of Pipes / Fittings
Location : Tai Lam Laboratory of MateriaLab
Sample Description : "POSEIDON" SK-9000 Fitting

Laboratory Information

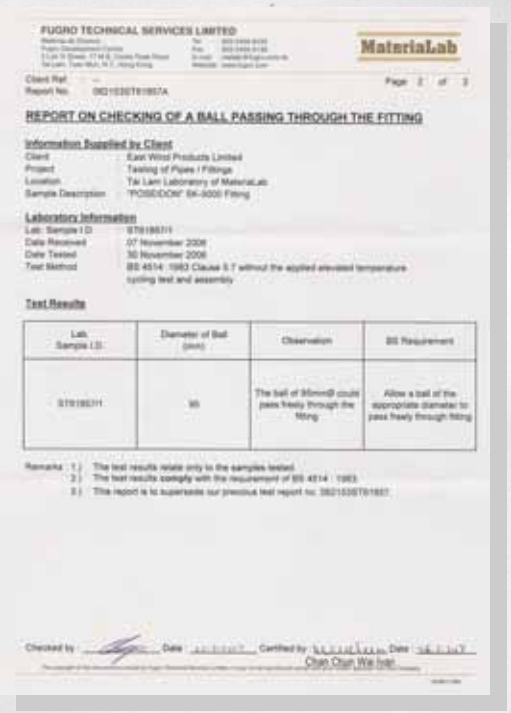
Lab. Sample I.D. : ST0185211
Date Received : 07 November 2006
Date Tested : 22 November 2006
Test Method : By direct measurement reference to BS 4514 : 1983

Test Results

Portion	Dimension (mm)
A Total Length	267.46
B Inside Diameter	110.06
C Inside Diameter	103.14
D Depth of Length	46.60
E Depth of Length	33.38
F Outside Diameter	118.14
G Outside Diameter	109.03
H Outside Diameter	141.16
I Height	46.66

Remarks 1.) The test results relate only to the sample tested.
2.) The calculated inlet and outlet thickness of 4.03mm and 3.40mm comply with the minimum requirement of 3.2mm in the table 3 of BS 4514 : 1983.
3.) This report is to supersede our previous test report no. 062153ST01857

Checked by : Date : Certified by : Date :
Chan Chun Wai Ivan



FUGRO TECHNICAL SERVICES LIMITED

MateriaLab

REPORT ON CHECKING OF A BALL PASSING THROUGH THE FITTING

Information Supplied by Client

Client : East Wind Products Limited
Project : Testing of Pipes / Fittings
Location : Tai Lam Laboratory of MateriaLab
Sample Description : "POSEIDON" SK-9000 Fitting

Laboratory Information

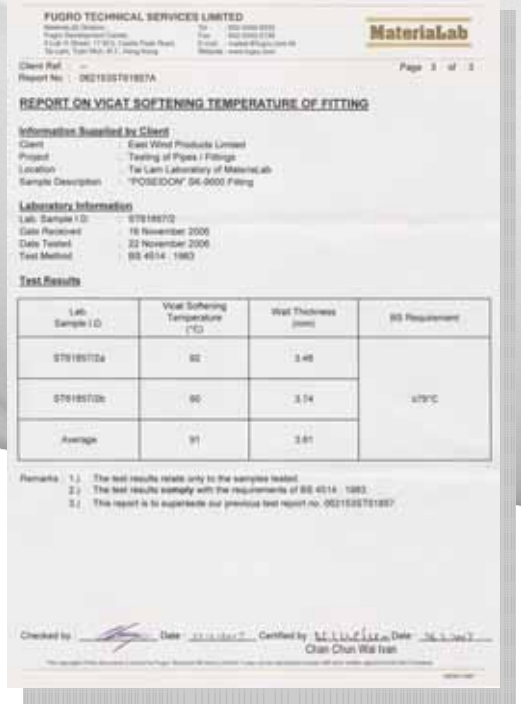
Lab. Sample I.D. : ST0185211
Date Received : 07 November 2006
Date Tested : 30 November 2006
Test Method : BS 4514 :1983 Clause 5.7 without the applied elevated temperature cycling test and assembly

Test Results

Lab. Sample I.D.	Diameter of Ball (mm)	Observation	BS Requirement
ST0185211	95	The ball of 95mm Ø could pass freely through the fitting	Allow a ball of the appropriate diameter to pass freely through fitting

Remarks 1.) The test results relate only to the samples tested.
2.) The test results comply with the requirement of BS 4514 : 1983.
3.) This report is to supersede our previous test report no. 062153ST01857

Checked by : Date : Certified by : Date :
Chan Chun Wai Ivan



FUGRO TECHNICAL SERVICES LIMITED

MateriaLab

REPORT ON VICAT SOFTENING TEMPERATURE OF FITTING

Information Supplied by Client

Client : East Wind Products Limited
Project : Testing of Pipes / Fittings
Location : Tai Lam Laboratory of MateriaLab
Sample Description : "POSEIDON" SK-9000 Fitting

Laboratory Information

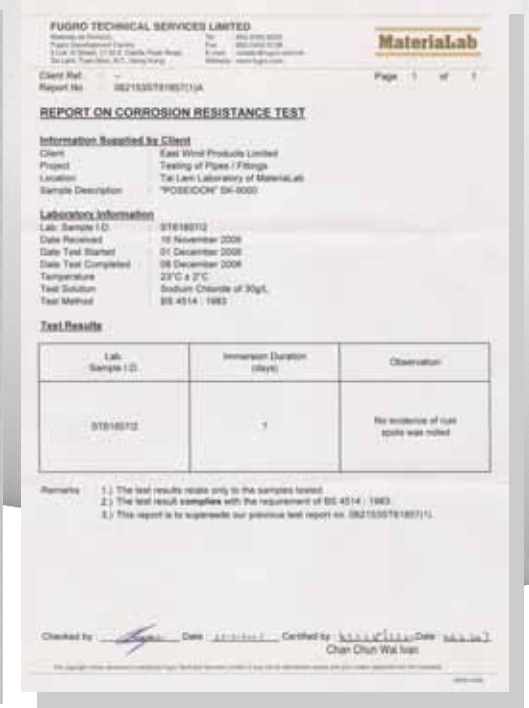
Lab. Sample I.D. : ST0185712
Date Received : 16 November 2006
Date Tested : 22 November 2006
Test Method : BS 4514 : 1983

Test Results

Lab. Sample I.D.	Vicat Softening Temperature (°C)	Wall Thickness (mm)	BS Requirement
ST0185712a	92	3.48	≥79°C
ST0185712b	90	3.74	
Average	91	3.61	

Remarks 1.) The test results relate only to the samples tested.
2.) The test results comply with the requirements of BS 4514 : 1983.
3.) This report is to supersede our previous test report no. 062153ST01857

Checked by : Date : Certified by : Date :
Chan Chun Wai Ivan



FUGRO TECHNICAL SERVICES LIMITED

MateriaLab

REPORT ON CORROSION RESISTANCE TEST

Information Supplied by Client

Client : East Wind Products Limited
Project : Testing of Pipes / Fittings
Location : Tai Lam Laboratory of MateriaLab
Sample Description : "POSEIDON" SK-9000

Laboratory Information

Lab. Sample I.D. : ST0185712
Date Received : 16 November 2006
Date Test Started : 01 December 2006
Date Test Completed : 08 December 2006
Temperature : 23°C ± 2°C
Test Solution : Sodium Chloride of 30g/L
Test Method : BS 4514 : 1983

Test Results

Lab. Sample I.D.	Immersion Duration (days)	Observation
ST0185712	7	No evidence of rust spots was noted

Remarks 1.) The test results relate only to the samples tested.
2.) The test result complies with the requirement of BS 4514 : 1983.
3.) This report is to supersede our previous test report no. 062153ST01871(1).

Checked by : Date : Certified by : Date :
Chan Chun Wai Ivan

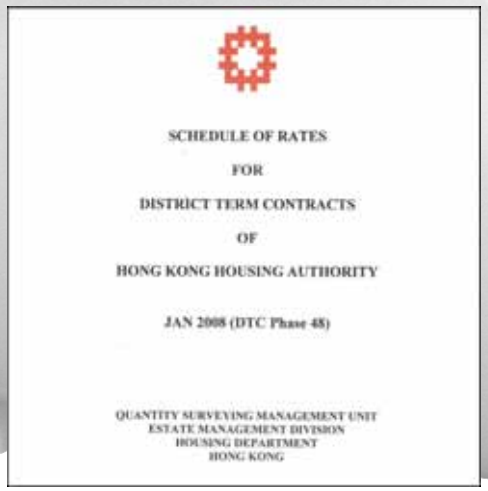
Full size report available upon request

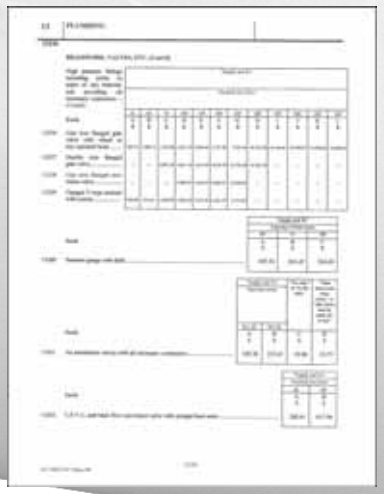
Product Quality

At East Wind Products Limited, quality is **paramount**! We only use high grade materials and our products are produced by high-end injection molding machines and our manufacturers are ISO 9001:2000 certified. In addition, we require each finished products to go through a detail quality control process.

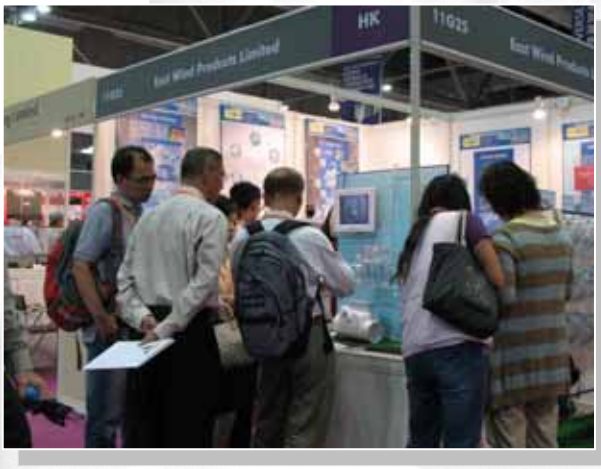

QUALITY MANAGEMENT SYSTEM
Certificate of Approval
ISO9001:2000
DAS

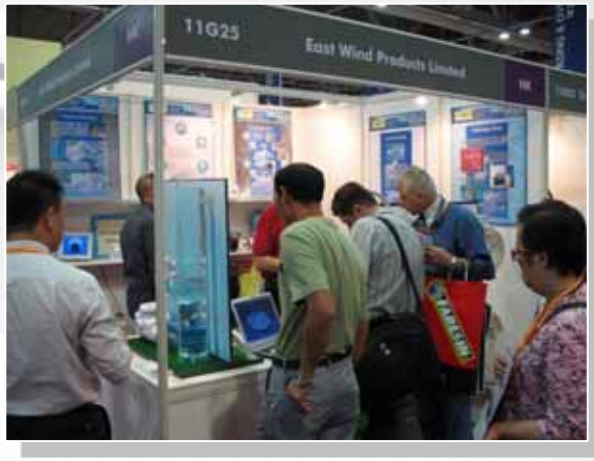
Poseidon NRV are listed in the Schedule of Rates of HKHA

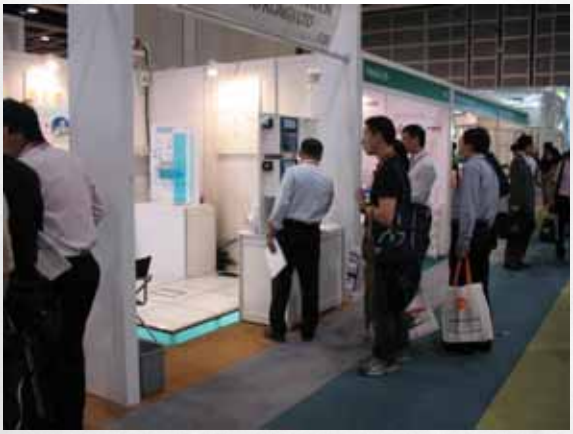

SCHEDULE OF RATES
FOR
DISTRICT TERM CONTRACTS
OF
HONG KONG HOUSING AUTHORITY
JAN 2008 (DTC Phase 48)
QUANTITY SURVEYING MANAGEMENT UNIT
ESTATE MANAGEMENT DIVISION
HOUSING DEPARTMENT
HONG KONG



2007-2009 Hong Kong International Building Materials and Construction Equipments Fair

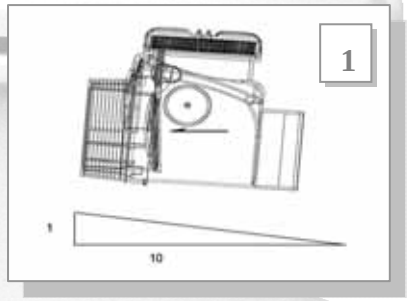




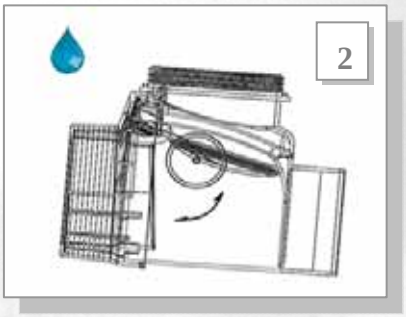


Installation Manual

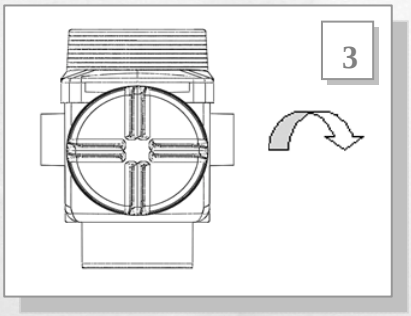
1. Poseidon® Sk-9000 non-return valve is designed to remain closed when situated up to 1: 10 grade.



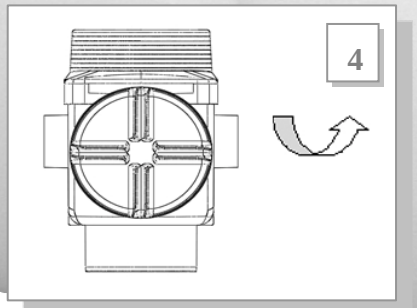
2. Clean and dry all connection areas, be sure that all foreign objects and PVC shreds (from sawing) are removed. Apply appropriate amount of solvent cement and attach pipe to fitting. Depending on the geographical location of the installation, different type/grade of solvent cement should be applied professionally to ensure the connection will withstand the environment. After the connection is made, it is very important that the installer verifies that no solvent cement or foreign object remains inside the valve, and the flapper has a free range of movement as intended.



3. Close the access cap and turn clockwise by hand to tighten the access cap. Please do not use any tools to tighten the access cap.



4. To open the access cap, simply insert a screwdriver between the groves on the access cap and turn counterclockwise.



Job References

順天村:	1981 年入伙，雙工型、相連長型第一款、舊長型、雙塔型。
彩雲(一)村:	1979 年入伙，雙工字型、舊長型、單座工字型。
坪石村:	1970 年入伙，舊長型、單塔式。
梨木樹村:	2005 年入伙， 新和諧一型、新和諧式一型、附翼五型、小單位大廈。
啓業村:	1981 年入伙，舊長型、三座相連 (I)字型。
竹園南村:	1984 年入伙，雙工字型、舊長型、雙塔式。
長發村:	1989 年入伙，新長型、Y3 型。
翠屏北村:	1982 年入伙，雙工字型、相連長型第一款及第三款、新長型、舊長型、Y2 型。
樂富村:	1984 年入伙，和諧一型、相連長型第三款、新長型。
東頭村:	1965 年入伙，第四型。
橫頭磡村:	1982 年入伙，雙工字型、和諧三型、相連長型「L」款/第一款/第三款。
大元村:	1980 年入伙，雙工字型、舊長型、三座相連工字型。
麗瑤村:	1976 年入伙，舊長型、小單位大廈、雙塔式 。
大窩口村:	1979 年入伙，雙工字型、和諧一型、相連長型「L」款/第一款、舊長型 。
和樂村:	1962 年入伙，舊長型。
寶琳村:	1988 年入伙，新長型、小單位大廈、Y2 型 。
慈樂村:	1995 -2004 入伙，和諧一型、和諧三型、非標準型、小型家庭大廈。
廣福村:	1983 年入伙，舊長型、Y2 型、雙塔式。
建生村:	1989 年入伙，Y4 型。
葵盛東村:	1989 年入伙，和諧一型、和諧 3A 型、相連長型第一款、小單位大廈。
嘉維村:	(房屋協會)
宜新大廈:	香港般咸道
太古城:	第三期
長江中心:	中環總部
金碧閣:	九龍 尖沙咀 金巴利道 58-60A 私人大廈
廣豐臺:	香港 西環 第三街 161-177 號 私人大廈


Innovation for a better tomorrow