

NEWASIA
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t.valop

Technical Information



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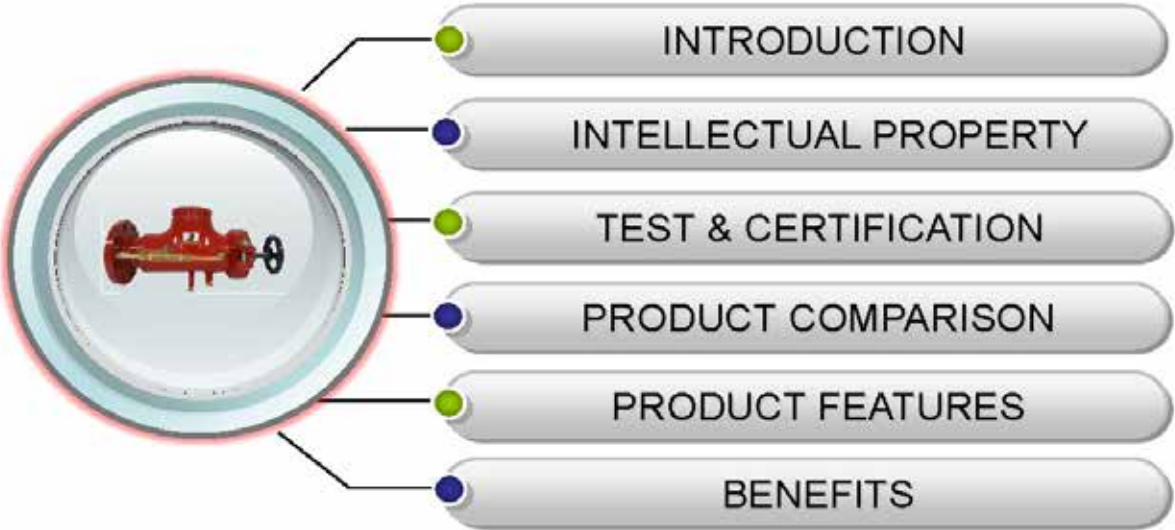
Technical Information

Suction Diffuser

4 in 1 Check Valve (Angle, Horizontal)

Hammerless Check Valve

CONTENTS



INTRODUCTION

1. Steel Pipe Valve [t.valop]

Steel Pipe Valve?
A valve manufactured using TEE, Elbow, etc., which are parts of the pipe, instead of casting material (cast iron) for the valve body while maintaining the function of the valve.

t.valop?
As a new concept of steel pipe valve, it means to develop the valve by using a Tee as the valve body.
<t.valop = tee + valve + develop>



- Why Steel Pipe Valve?**
- **SAFETY**
 - 1) No risk of leakage because of finer grain structure
 - 2) No material defect
 - 3) Impact resistance to external factors
 - **LOW COST**
 - 1) Construction time reduction due to the light weight
 - 2) Use of existing piping fittings
 - **VERSATILITY**
 - 1) Various type (flange, groove) of the inlet & outlet
 - 2) No restriction on flange specification
 - 3) Easy to assemble and disassemble with coupling type
 - 4) Reusable gasket

INTRODUCTION

1. Steel Pipe Valve

A. Suction Diffuser	Size : 2" x 1.5" ~ 20" x 20"	Max. Press. - 10K - 20K - Class 150 - PN 16	Type - Grooved - Flanged - Welded
B. 4 in 1 Check Valve	Size : 3" x 2.5" ~ 20" x 16"		
C. Hammerless Check Valve	Size : 2" ~ 16"		

Model [(1)-(2)(3)(4)] [ex. ASC-3GF, AAC-3FG or AHC-3GG]							
[1] Product Name		[2] Max. Press.		[3] Inlet Type		[4] Outlet Type	
Suction Diffuser	ASC	10K	1	Grooved	G	Grooved	G
4 in 1 Check Valve [Angle]	AAC	20K	2	Flanged	F	Flanged	F
4 in 1 Check Valve [Horizontal]	AFC	Class 150	3	Welded	W	Welded	W
Hammerless Check Valve	AHC	PN 16	4				

INTRODUCTION

1. Steel Pipe Valve

A. Suction Diffuser



[Horizontal Type]

B. 4 in 1 Check Valve



[Angle Type]

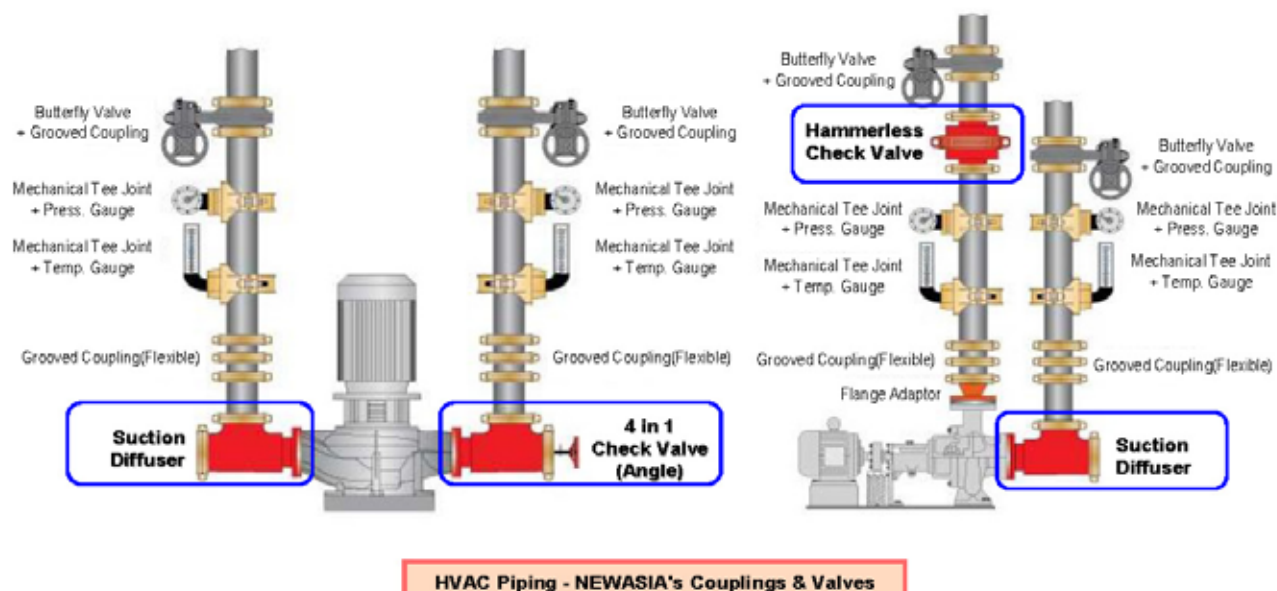


C. Hammerless Check Valve



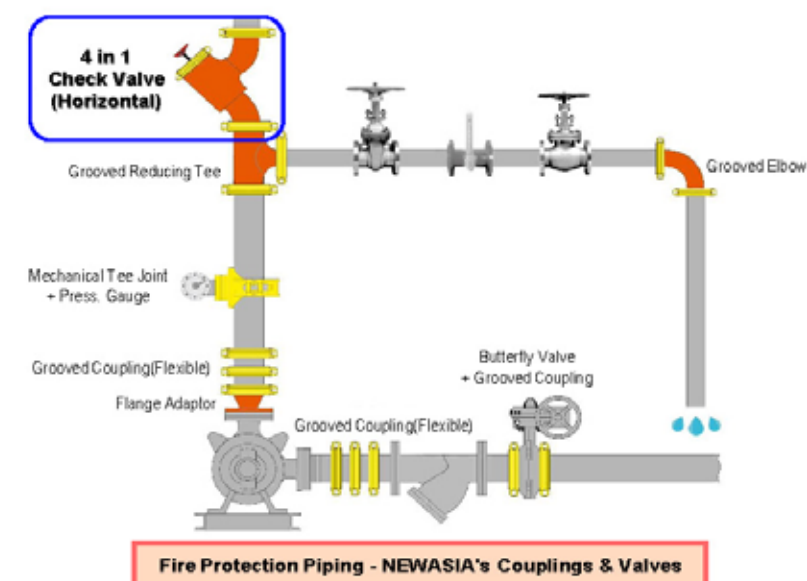
INTRODUCTION

2. Installation

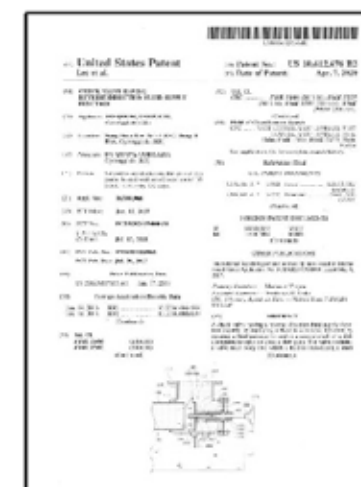


INTRODUCTION

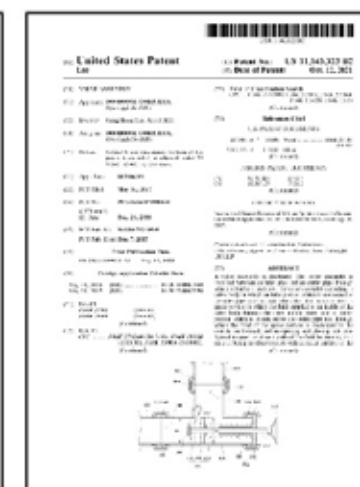
2. Installation



INTELLECTUAL PROPERTY



Check valve capable of supplying fluid in a reverse direction



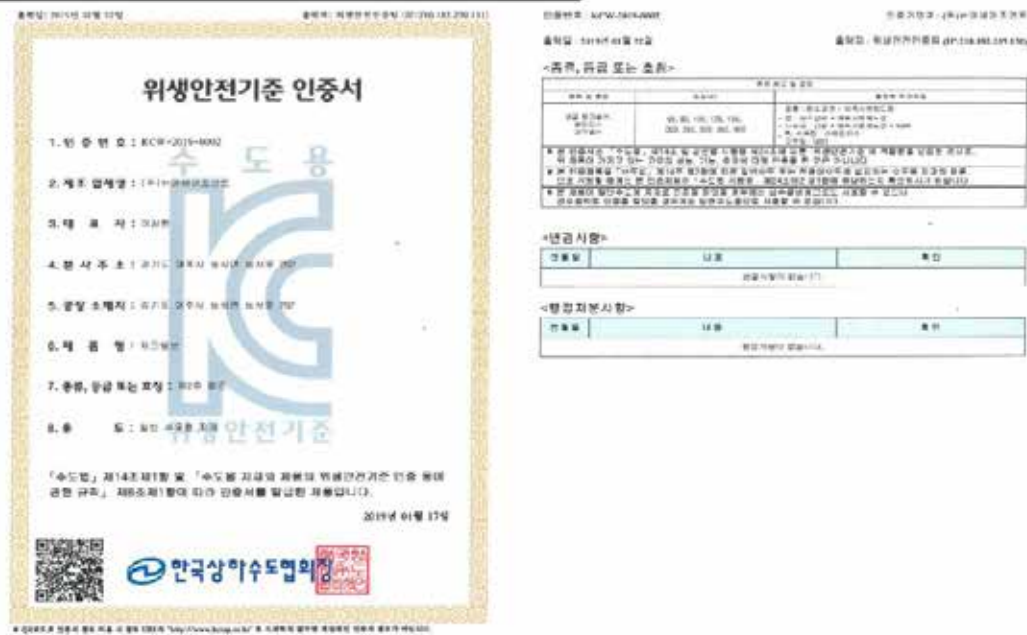
Valve assembly

[Status]

- Domestic Patent - Registration : 7ea
- Domestic Design Patent - Registration : 16ea
- Trademark - 4in1 Check Valve : 2ea - t.valop : 2ea (pending)
- Overseas Patent - Registration : 12ea - Pending : 4ea [USA, JAPAN, CHINA, UAE, SAUDIARABIA, EUROPE, INDIA]
- Overseas Design Patent - Registration : 9ea - Pending : 1ea [USA, JAPAN, CHINA, EUROPE, SAUDIARABIA]

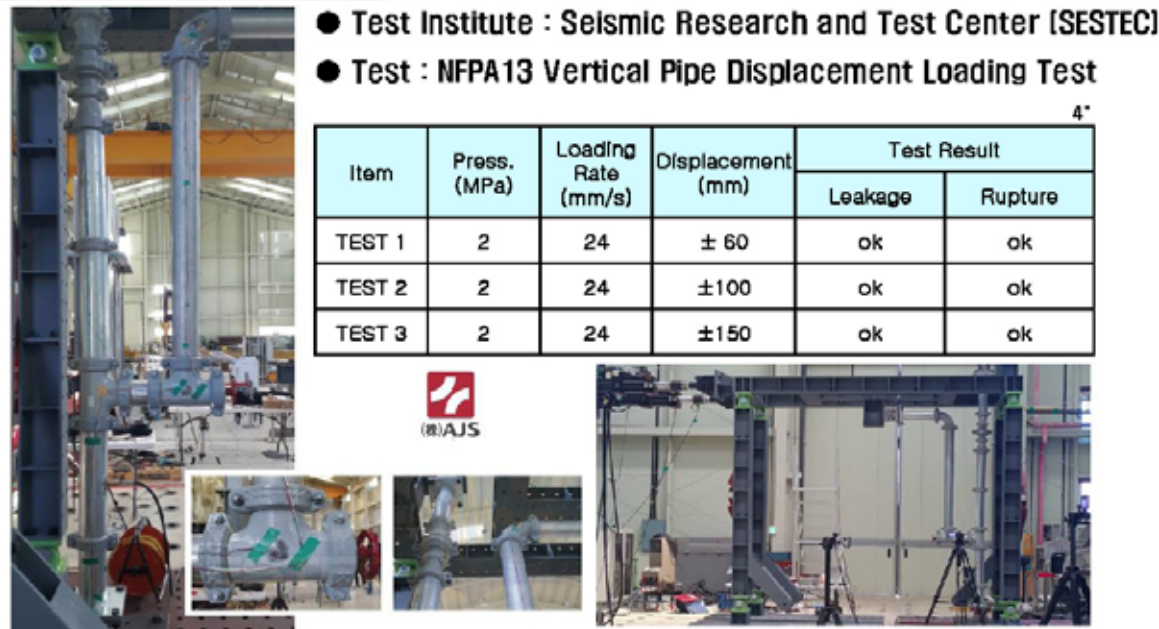
TEST & CERTIFICATION

KC Certification



TEST & CERTIFICATION

SEISMIC TEST



TEST & CERTIFICATION

SEISMIC TEST [4in1 Check Valve]

- Test Institute : SGS Korea
- Test : Seismic test including performance test

Specimen 1.
2" x 2.5" (20K)

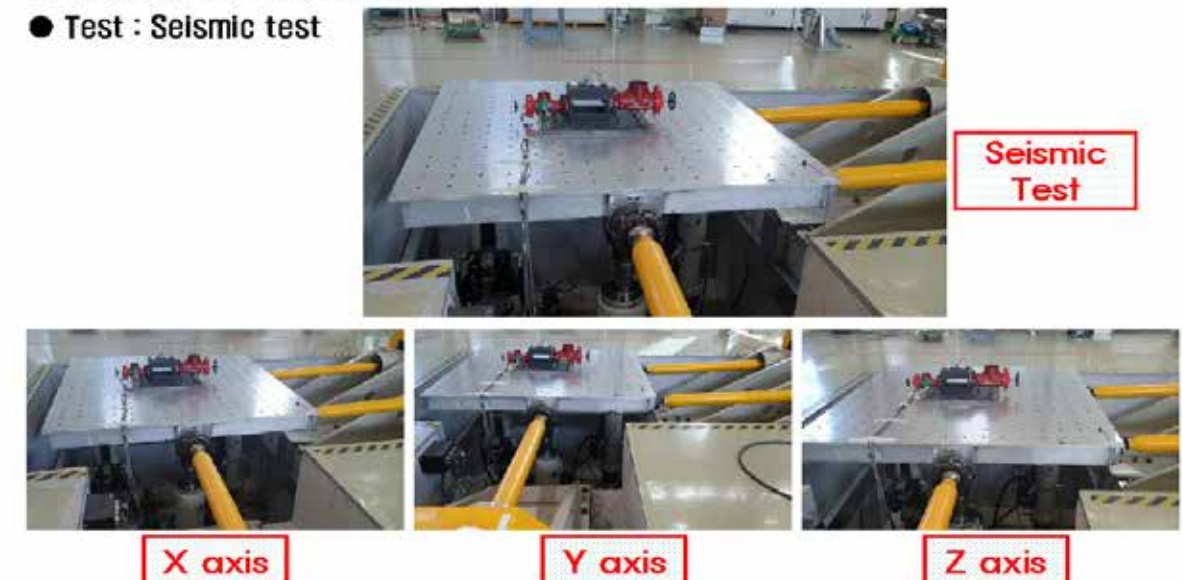
Specimen 2.
5" x 4" (10K)

Division	Evaluation	Test	Test Condition - Specimen1, 80A18"x65A12.5" 20K 4in1 Check Valve	Criteria
Before Seismic Test	Hydrostatic	Body Hydrostatic	Design Press. x 1.6 = 82 kg/cm ² (8.14 MPa)	No leakage for 8 min.
	Leakage	Check	Design Press./outlet x 1.6 = 32 kg/cm ² (3.14 MPa)	No leakage for 1 min.
	Leakage	Shut off	Design Press./inlet x 1.2 = 24 kg/cm ² (2.36 MPa)	No leakage for 1 min.
Seismic Test	Seismic	Seismic	Seismic Test Criteria (Standard)	-
After Seismic Test	Hydrostatic	Body Hydrostatic	Design Press. x 1.6 = 82 kg/cm ² (8.14 MPa)	No leakage for 8 min.
	Leakage	Check	Design Press./outlet x 1.6 = 32 kg/cm ² (3.14 MPa)	No leakage for 1 min.
	Leakage	Shut off	Design Press./inlet x 1.2 = 24 kg/cm ² (2.36 MPa)	No leakage for 1 min.
Division	Evaluation	Test	Test Condition - Specimen2, 125A15"x100A14" 10K 4in1 Check Valve	Criteria
Before Seismic Test	Hydrostatic	Body Hydrostatic	Design Press. x 1.6 = 16 kg/cm ² (1.57 MPa)	No leakage for 8 min.
	Leakage	Check	Design Press./outlet x 1.6 = 16 kg/cm ² (1.57 MPa)	No leakage for 1 min.
	Leakage	Shut off	Design Press./inlet x 1.2 = 12 kg/cm ² (1.18 MPa)	No leakage for 1 min.
Seismic Test	Seismic	Seismic	Seismic Test Criteria (Standard)	-
After Seismic Test	Hydrostatic	Body Hydrostatic	Design Press. x 1.6 = 16 kg/cm ² (1.57 MPa)	No leakage for 8 min.
	Leakage	Check	Design Press./outlet x 1.6 = 16 kg/cm ² (1.57 MPa)	No leakage for 1 min.
	Leakage	Shut off	Design Press./inlet x 1.2 = 12 kg/cm ² (1.18 MPa)	No leakage for 1 min.

TEST & CERTIFICATION

SEISMIC TEST [4in1 Check Valve]

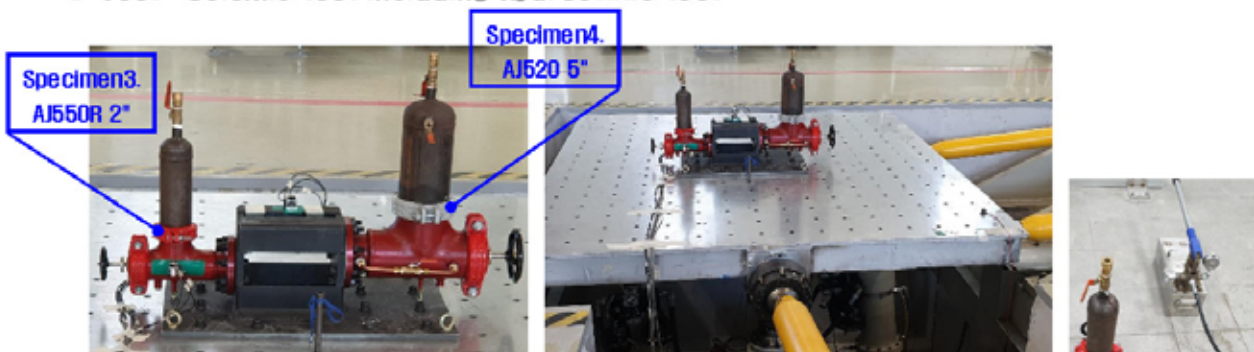
- Test Institute : SGS Korea
- Test : Seismic test



TEST & CERTIFICATION

SEISMIC TEST (Rigid Grooved Coupling)

- Test Institute : SGS Korea
- Test : Seismic test including hydrostatic test



Division	Evaluation	Test	Test Condition	Criteria
Before Seismic Test	Hydrostatic	Body Hydrostatic	Specimen3, AJ550R 80A18" L Specimen4, AJ520 125A15" L Rigid Coupling 36 kg/cm ² (3.54 MPa)	No leakage for 3 min.
Seismic Test	Seismic	Seismic	Seismic Test Criteria (Standard)	-
After Seismic Test	Hydrostatic	Body Hydrostatic	36 kg/cm ² (3.54 MPa)	No leakage for 3 min.

TEST & CERTIFICATION

SEISMIC TEST (Rigid Grooved Coupling)

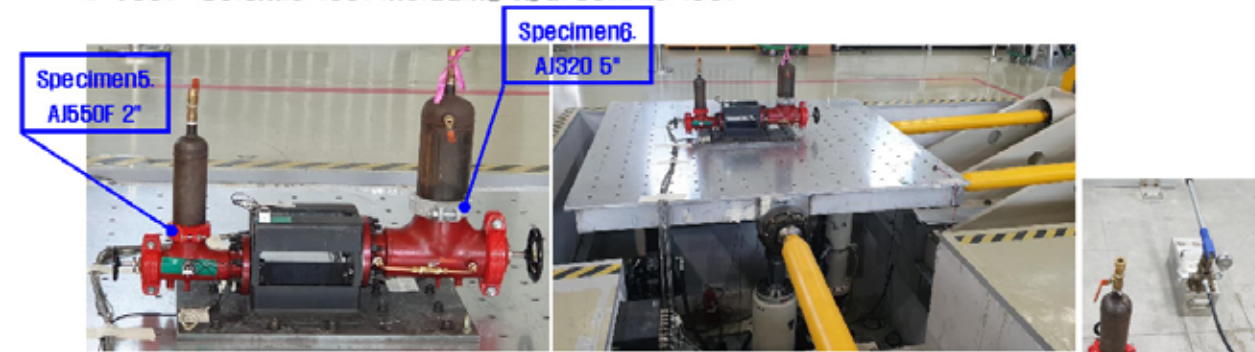
- Test Institute : SGS Korea
- Test : Seismic test



TEST & CERTIFICATION

SEISMIC TEST (Flexible Grooved Coupling)

- Test Institute : SGS Korea
- Test : Seismic test including hydrostatic test



Division	Evaluation	Test	Test Condition	Criteria
Before Seismic Test	Hydrostatic	Body Hydrostatic	Specimen5, AJ550F 80A18" L Specimen6, AJ320 125A15" L Flexible Coupling 36 kg/cm ² (3.54 MPa)	No leakage for 3 min.
Seismic Test	Seismic	Seismic	Seismic Test Criteria (Standard)	-
After Seismic Test	Hydrostatic	Body Hydrostatic	36 kg/cm ² (3.54 MPa)	No leakage for 3 min.

TEST & CERTIFICATION

SEISMIC TEST (Flexible Grooved Coupling)

- Test Institute : SGS Korea
- Test : Seismic test



TEST & CERTIFICATION

Seismic Test

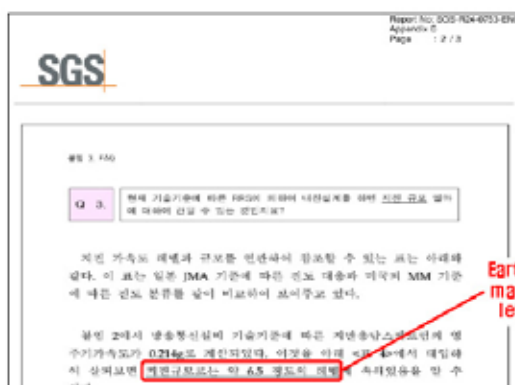
- Test Institute : SGS Korea
- Test Result : Seismic Test **SATISFIED**

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7.2 Seismic test results

Table 14: Seismic test results

Seismic test	TRIS-RRIS (TRIS - RRS)	Coharence (0.5 and less)	Structural integrity	Functionality
1st seismic test	Enveloped	Satisfied	No abnormality	No abnormality
2nd seismic test	Enveloped	Satisfied	No abnormality	No abnormality



7. RESULTS

7.1 Summary of the test results

Table 11: Test results

Test date	Check list	Acceptance criteria	Result
2019. 11.20	Functional test before and after the seismic test.	Refer to table 5 and 6	Refer to table 12, 13
2019. 11.20	The maximum single amplitude deflection at the top of the framework. (should not exceed 75 mm)	The maximum single amplitude deflection at the top of the framework (under 75 mm)	N/A
2019. 11.20	Roller of the specimen.	There is no roller	No abnormalities
2019. 11.20	Deviation or breakage of the fixed part of specimen should not occur.	There is no deviation or breakage	No abnormalities
2019. 11.20	Deviation of installed components.	There is no deviation or breakage	No abnormalities
2019. 11.22	Deformation or breakage of the specimen frame should not occur.	There is no deformation or breakage	No abnormalities
2019. 11.22	The joint part of the floor facility shall not deviate or the shaking table fixing part shall not be detached.	There is no deviation or breakage	N/A
2019. 11.22	Cracks, deformation and cutting of the fixing device itself such as anchoring and bolt should not occur.	There is no crack, deformation and cut-off	No abnormalities
2019. 11.22	Any other deformation or breakage that can be confirmed with the naked eye should not occur.	There is no deformation or breakage	No abnormalities

※ The performance test was conducted according to the procedure provided by the applicant.

Earthquake magnitude level 0.5

TEST & CERTIFICATION

Seismic Test

- Test Institute : SGS Korea
- Test : Seismic test **SATISFIED** [including hydrostatic, check, shut off]

Table 12: Summary of Functional test method - Specimen (B5A X 65A_20K)

Process	Evaluation	Test	Test Condition	Criteria	Result
Before seismic test	Hydrostatic	Body Hydrostatic	Design Press. x 1.6 = 32 kg/cm ² (3.14 MPa)	Should be leak-free after 3 minutes	No abnormalities
	Leakage	Check	Design Press. @outlet x 1.6 = 32 kg/cm ² (3.14 MPa)	Should be leak-free after 1 minutes	No abnormalities
	Leakage	Shut off	Design Press. @inlet x 1.2 = 24 kg/cm ² (2.36 MPa)	Should be leak-free after 1 minutes	No abnormalities
After seismic test	Hydrostatic	Body Hydrostatic	Design Press. x 1.6 = 32 kg/cm ² (3.14 MPa)	Should be leak-free after 3 minutes	No abnormalities
	Leakage	Check	Design Press. @outlet x 1.6 = 32 kg/cm ² (3.14 MPa)	Should be leak-free after 1 minutes	No abnormalities
	Leakage	Shut off	Design Press. @inlet x 1.2 = 24 kg/cm ² (2.36 MPa)	Should be leak-free after 1 minutes	No abnormalities

※ The performance test was conducted according to the procedure provided by the applicant.



Table 13: Summary of Functional test method - Specimen (125A X 100A_10K)

Process	Evaluation	Test	Test Condition	Criteria	Result
Before seismic test	Hydrostatic	Body Hydrostatic	Design Press. x 1.6 = 16 kg/cm ² (3.14 MPa)	Should be leak-free after 3 minutes	No abnormalities
	Leakage	Check	Design Press. @outlet x 1.6 = 16 kg/cm ² (3.14 MPa)	Should be leak-free after 1 minutes	No abnormalities
	Leakage	Shut off	Design Press. @inlet x 1.2 = 12 kg/cm ² (2.36 MPa)	Should be leak-free after 1 minutes	No abnormalities
After seismic test	Hydrostatic	Body Hydrostatic	Design Press. x 1.6 = 16 kg/cm ² (3.14 MPa)	Should be leak-free after 3 minutes	No abnormalities
	Leakage	Check	Design Press. @outlet x 1.6 = 16 kg/cm ² (3.14 MPa)	Should be leak-free after 1 minutes	No abnormalities
	Leakage	Shut off	Design Press. @inlet x 1.2 = 12 kg/cm ² (2.36 MPa)	Should be leak-free after 1 minutes	No abnormalities

※ The performance test was conducted according to the procedure provided by the applicant.

TEST & CERTIFICATION

Great Kobe Earthquake

1. Date : 1995. 1. 17
2. Epicenter : northern end of Awaji Island, 20 km away from the center of the city of Kobe.
3. Magnitude : **7.3** [about for 15 sec.]
4. Damage
 - A. Casualties : **6310 killed / 43,188 injured**
 - B. Monetary loss : **Buildings Destroyed 209,087 / Fires : 294**



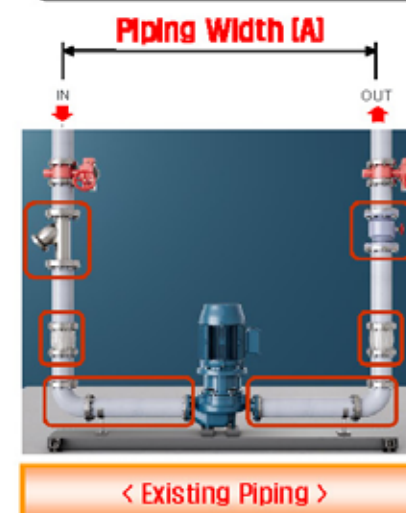
< 300A Welded Pipe >
damaged

< 300A Grooved Coupling >
No damaged

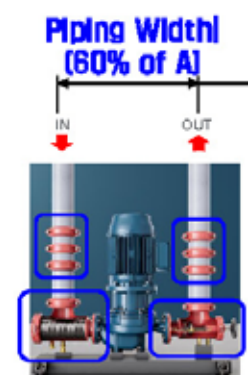
PRODUCT COMPARISON

1. NEWASIA Method

Suction Diffuser + 4in1 Check Valve



< Existing Piping >



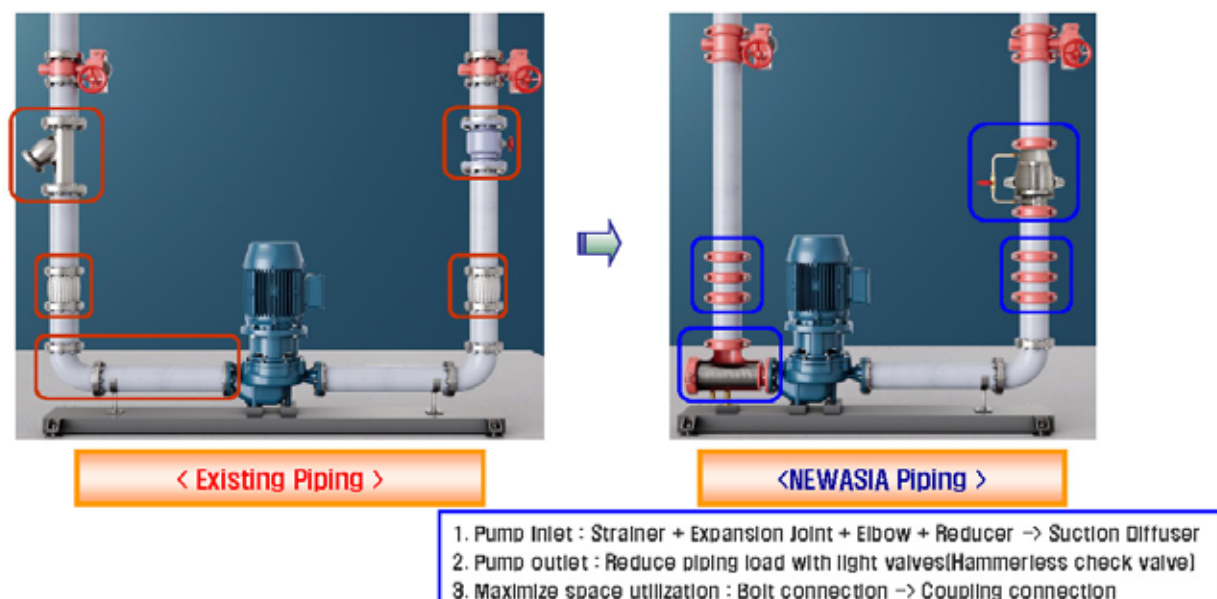
< NEWASIA Piping >

1. Strainer X
2. Check Valve X
3. Inlet&Outlet Elbow X
4. Inlet&Outlet Pipe X
5. Inlet&Outlet Supporter X
6. Inlet&Outlet Reducer X
7. Flange X
8. Gasket, Bolt/Nut X
9. Space Saving
10. Cost Saving (Labor, Time, Welding)

1. Pump Inlet : Strainer + Expansion Joint + Elbow + Reducer → Suction Diffuser
2. Pump outlet : Valves + Expansion Joint + Elbow + Reducer → 4in1 Check Valve
3. Maximize space utilization : possible to install in a small space

PRODUCT COMPARISON

2. NEWASIA Method Suction Diffuser + Hammerless Check Valve



PRODUCT COMPARISON

3. Casting Valve VS Steel Pipe Valve

	Casting Valve	Steel Pipe Valve
Shape		
Seismic load	- No Guarantee from earthquake - Vulnerable to earthquakes due to flange connection - Brittle and fragile in tension	The seismic performance of the valve is qualified. - Verified in seismic testing at magnitude 6.5 - Excellent seismic resistance with a coupling method that absorbs pipe's displacement. - Satisfied the requirement of vertical pipe displacement loading test in NFPA13.
Weight (note 1)	As the pressure increases, the body wall thickness and piping stress increases rapidly.	Since the steel pipe is used as the body, the thickness change due to the pressure increase is small.
Versatility	Difficult to meet the various length related to face to face dimension.	Possible to meet the various length related to face to face dimension.

PRODUCT COMPARISON

3. Casting Valve VS Steel Pipe Valve

	Casting Valve	Steel Pipe Valve
Shape		
Maintenance	To disassemble and assemble, a lot of bolts must be removed.	To disassemble and assemble, only 2ea bolts must be removed.
Cost	Worse competitive price (heavy body weight)	Better competitive price (light body weight)
Strength	Low pressure reliability (porosity in cast iron)	High pressure reliability (more durable and stronger)
Delivery	Long (60 days delivery time) - difficult to change the connection type (note 2)	Fast (30 days delivery time) - easy to change the connection type

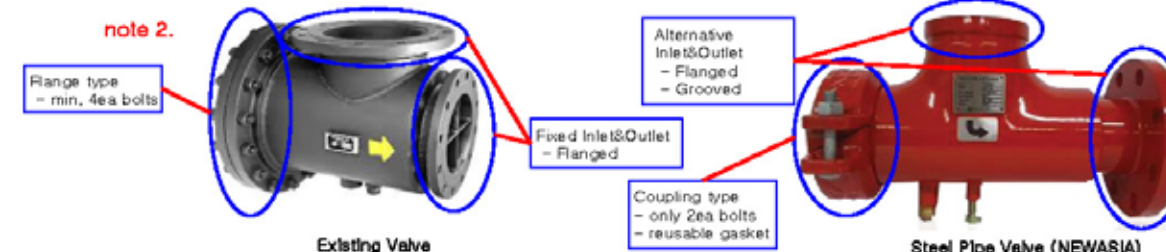
PRODUCT COMPARISON

3. Casting Valve VS Steel Pipe Valve

note 1. Wall thickness table

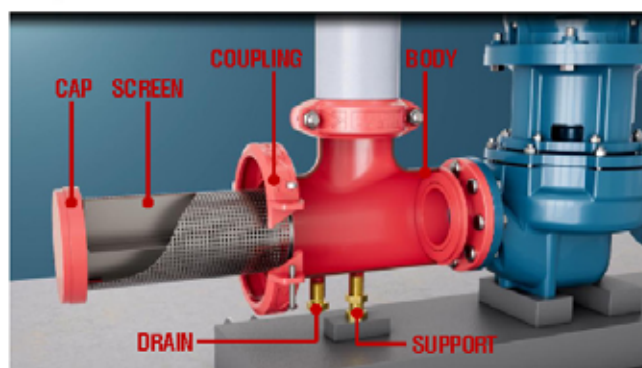
Size	KS B 2361 Cast steel flanged valves 10K (mm)	KS B 2361 Cast steel flanged valves 20K (mm)	KS B 2350 Gray cast iron valves 10K (mm)	KS D 3507 Carbon steel pipes for ordinary piping			KS D 3562 Carbon steel pipes for pressure service		
				SPP (mm)	Cast iron valve %	Cast steel 10K %	SPPS Sch.40 (mm)	Cast iron valve %	Cast steel 10K %
2"	8	9	7	3.65	52	45	3.9	55	43
2.5"	8	10	8	3.65	45	45	5.2	65	52
3"	8	10	9	4.05	45	50	5.5	61	55
4"	9	11	9.5	4.5	47	50	6	63	54
5"	9	12	10.5	4.85	46	53	6.6	62	55
6"	9	13	11	4.85	44	53	7.1	64	54
8"	10	16	14	5.85	41	58	8.2	58	51
10"	14.2	19.1		6.4		45	9.3		48
12"	16	20.6		7		43	10.3		50

* Valve's weight is 30~40% lighter since the wall thickness's difference is 40~50%



PRODUCT FEATURES

1. Suction Diffuser (Structural)



- 1. BODY**
 - Stronger than Cast Iron (Brittleness ↑, Impact ↓)
- 2. SCREEN**
 - Cross plate : stabilizing fluid flow (turbulent flow → laminar flow)
 - Protection from foreign substance.
- 3. CAP**
 - Easy to assemble & disassemble when cleaning (Coupling : Bolts 12" 2EA, 20" 4EA)
 - (Coupling : Bolts 12" 16EA, 20" 20EA)
 - long life than o-ring (reusable)
- 4. COUPLING & GASKET**
 - Excellent seismic performance
 - Gasket(EPDM) has a longer life than o-ring(NBR)
- 5. DRAIN**
 - Possible to drain by removing drain
- 6. SUPPORT**
 - Adjusting a suction diffuser's height to fit pump

PRODUCT FEATURES

2. 4 in 1 Check Valve (Functional)

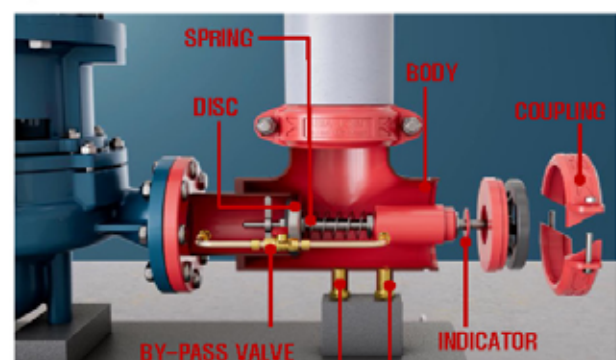
4 in 1 Check Valve : 4 valves into 1 valve

- 1. Check valve function**
 - Protect the pump by preventing backflow when the pump trip
- 2. Shut off valve function**
 - Stop the flow of fluid by using the handle
- 3. Balancing valve function**
 - Control the flowrate by using the indicator
- 4. By-pass valve function**
 - Protect the pump from vacuum or freezing by supplying the water



PRODUCT FEATURES

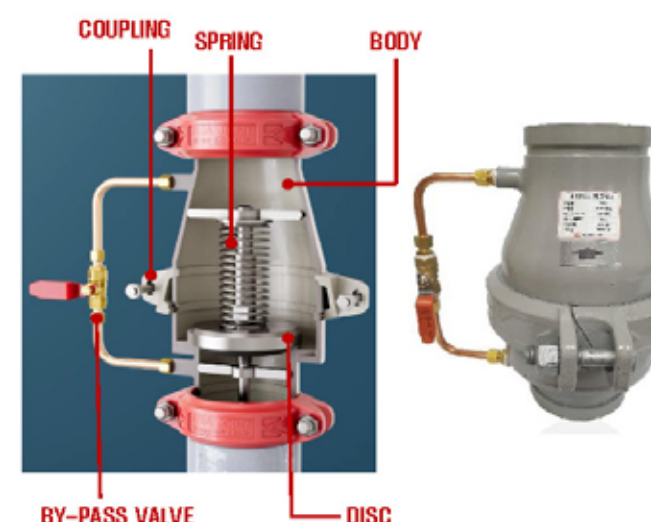
2. 4 in 1 Check Valve (Structural)



- 1. BODY**
 - Stronger than Cast Iron (Brittleness ↑, Impact ↓)
- 2. COUPLING**
 - Easy to disassemble inner parts(trim assembly) (ex. 300A coupling: bolts 2EA / flange: bolts 16EA)
 - long life than o-ring (reusable)
- 3. DRAIN (angle type)**
 - Drain water from a pipe
 - Easy to connect to the drain line
- 4. SUPPORT (angle type)**
 - Adjusting a suction diffuser's height to fit pump
- 5. INDICATOR**
 - Possible to check the stroke & flowrate
- 6. DISC**
 - Excellent sealing, Easy replacement
 - Standard: NBR, 80°C over: EPDM (option)
- 7. SPRING**
 - 304 stainless steel spring (corrosion resistance)
- 8. BY-PASS VALVE**
 - Return water to pump's outlet

PRODUCT FEATURES

3. Hammerless Check Valve (Structural)



- 1. BODY**
 - Stronger than Cast Iron (Brittleness ↑, Impact ↓)
- 2. COUPLING**
 - Easy to disassemble inner parts(trim assembly) (ex. 300A coupling: bolts 2EA / flange: bolts 16EA)
 - long life than o-ring (reusable)
- 3. DISC**
 - Excellent sealing, Easy replacement
 - Standard: NBR, 80°C over: EPDM (order made)
- 4. SPRING**
 - 304 stainless steel spring (corrosion resistance)
- 5. BY-PASS VALVE**
 - Return water to pump's outlet

PRODUCT FEATURES

3. Hammerless Check Valve (Functional)

Three(3) Advantages

1. Check valve function

- Protect the pump by preventing backflow when the pump trip

2. By-pass valve function

- Protect the pump from vacuum or freezing by supplying the water

3. Check valve function

- Excellent seismic performance through the coupling type



BENEFITS

Steel Pipe Valve's Benefits

Jumps to become a valve company that creates future value

■ Technical Aspect

- ▶ To compare the manufacturing period, the casting time of the existing product is more than 40 days and the molding time of the steel pipe valve is only 2 days. Quick delivery relieves user's inconvenience.
- ▶ Light weight, minimized piping load, and excellent price competitiveness
- ▶ Smooth market entry by securing delivery performance

■ Social Aspect

- ▶ Ensuring safety against earthquakes through application of seismic proofed products. In the event of an earthquake, additional problems such as fire and explosion are prevented by securing safety for buildings and firefighting valves.
- ▶ Import substitution effect through applying the steel pipe valve instead of imported valve
- ▶ Job creation by increased demand and environmental pollution reduction by replacing the casting