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TEST REPORT

Report No. : SGS-R24-0753-EN00
Order No. : DTRI2403000011SE
Applicant : DOO QOOM Corp., LTD.
Address : 17-17, Cheomdangwagi-ro 208beon-gil, Buk-gu, Gwangju, Republic of Korea
Product : 4 in 1 Check Valve with Steel Pipe
Model No. : AAC (80A X 65A_20K, 125A X 100A_10K)
Date of Test : November 20, 2019 ~ November 22, 2019
Standard : Seismic Test Method for Telecommunication Facilities
(National radio research agency notice 2015-14)
Test Result : Refer to 7. Test result
Use of Report : Quality Evaluation

This is certified that the above mentioned products have been tested for the sample provided by applicant.

Affirmation	Tested by		Technical Manager
	Name : Kim, Jongdae		Name : Seo, Deokwoo

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※ The test report is not related to our KOLAS accreditation.

April 09, 2024

SGS Korea Co., Ltd. Dongtan Laboratory



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3.4 Photograph

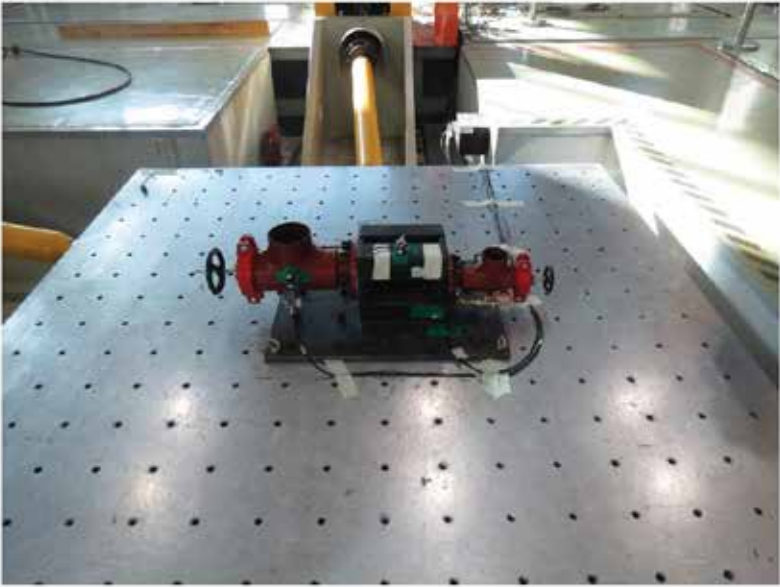


Fig 1. Specimen installation

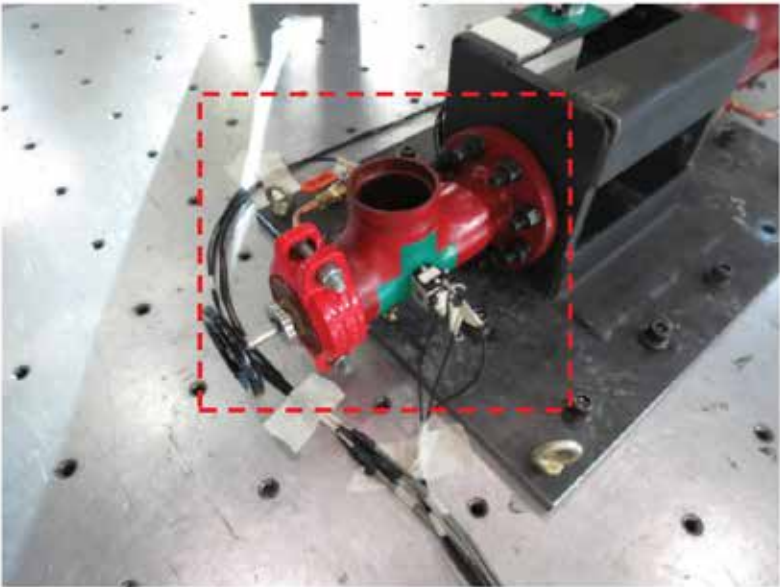


Fig 2. Specimen (80A x 65A_20K)

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4.2 System configuration

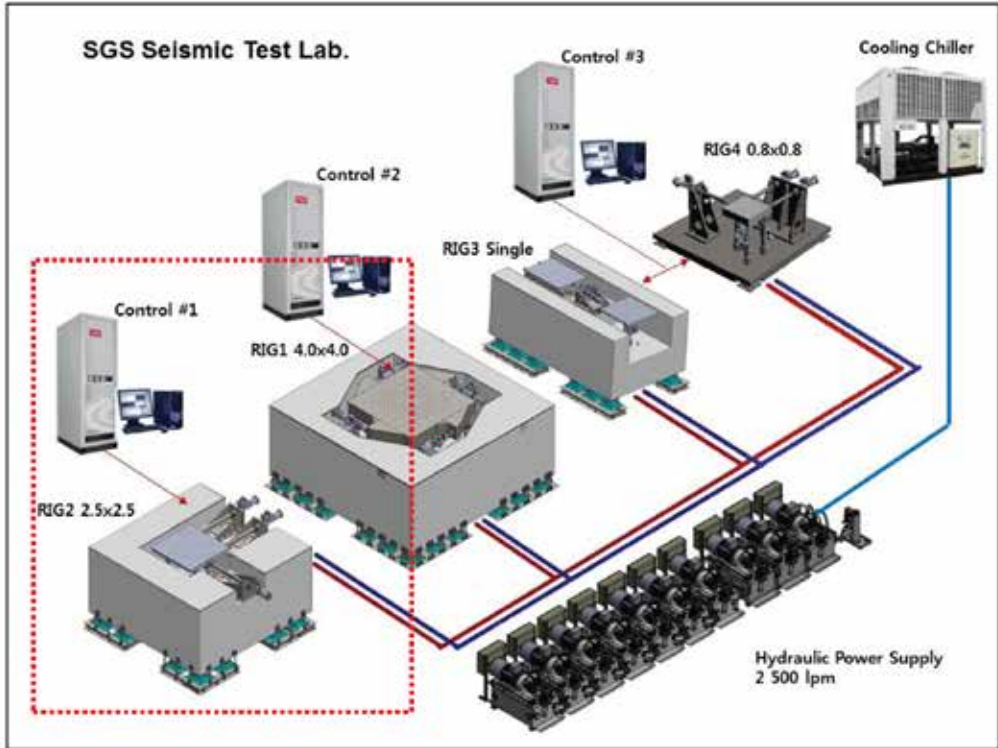


Fig 5. Test facilities system configuration



5. TEST VERIFICATION CRITERIA

5.1 Check list and acceptance criteria

Table 4. Check list and acceptance criteria

Check list	Acceptance criteria
Functional test before and after the seismic test.	Refer to table 5 and 6
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
Rollover of the specimen.	There is no rollover
Deviation or breakage of the fixed part of specimen should not occur.	There is no deviation or breakage
Deviation of installed components.	There is no deviation or breakage
Deformation or breakage of the specimen frame should not occur.	There is no deformation or breakage
The joint part of the floor facility shall not deviate or the shaking table fixed part shall not be detached.	There is no deviation or breakage
Cracks, deformation and cutting of the fixed device itself such as anchoring and bolt should not occur.	There is no crack, deformation and cutoff
Any other deformation or breakage that can be confirmed with the naked eye should not occur.	There is no deformation or breakage

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Table 5. Functional test method – Specimen (80A X 65A_20K)

Process	Evaluation	Test	Test Condition	Criteria
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
	Leakage	Check	Design Press.@outlet x 1.6 = 32 kg/cm ² (3.14 MPa)	Should be leak-free after 1 minutes
	Leakage	Shut off	Design Press.@inlet x 1.2 = 24 kg/cm ² (2.36 MPa)	Should be leak-free after 1 minutes
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
	Leakage	Check	Design Press.@outlet x 1.6 = 32 kg/cm ² (3.14 MPa)	Should be leak-free after 1 minutes
	Leakage	Shut off	Design Press.@inlet x 1.2 = 24 kg/cm ² (2.36 MPa)	Should be leak-free after 1 minutes

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

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Table 6. Functional test method – Specimen (125A X 100A_10K)

Process	Evaluation	Test	Test Condition	Criteria
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
	Leakage	Check	Design Press.@outlet x 1.6 = 16 kg/cm ² (3.14 MPa)	Should be leak-free after 1 minutes
	Leakage	Shut off	Design Press.@inlet x 1.2 = 12 kg/cm ² (2.36 MPa)	Should be leak-free after 1 minutes
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
	Leakage	Check	Design Press.@outlet x 1.6 = 16 kg/cm ² (3.14 MPa)	Should be leak-free after 1 minutes
	Leakage	Shut off	Design Press.@inlet x 1.2 = 12 kg/cm ² (2.36 MPa)	Should be leak-free after 1 minutes

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

5.2 Equipment used in the test

Table 7. Equipment used in the test

Equipment	Manufacturer / Model	Quantity	Remarks
Pressure Gauge (Dial type)	SAMSUNG / 15 MPa	1 EA	-





6. TEST PROCEDURE

6.1 Test Sequence

Table 8. Test Sequence

No.	Type test	Test date
1	Functional test before seismic test	November 20, 2019
2	Resonance search test _ Before the seismic test (Test sequence: X axis(Front to back), → Y axis (Side to side), → Z axis (Vertical))	November 22, 2019
3	1st Seismic test	November 22, 2019
4	2nd Seismic test	November 22, 2019
5	Resonance search test _ After the seismic test (Test sequence: X axis(Front to back), → Y axis (Side to side), → Z axis (Vertical))	November 22, 2019
6	Functional test after seismic test	November 22, 2019
7	Completion of the test	November 22, 2019



7. RESULTS

7.1 Summary of the test results

Table 11. Test results

Test date	Check list	Acceptance criteria	Result
2019. 11.20. ~ 2019. 11.22.	Functional test before and after the seismic test.	Refer to table 5 and 6	Refer to table 12, 13
	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
	Rollover of the specimen.	There is no rollover	No abnormalities
	Deviation or breakage of the fixed part of specimen should not occur.	There is no deviation or breakage	No abnormalities
	Deviation of installed components.	There is no deviation or breakage	No abnormalities
	Deformation or breakage of the specimen frame should not occur.	There is no deformation or breakage	No abnormalities
	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
	Cracks, deformation and cutting of the fixing device itself such as anchoring and bolt should not occur.	There is no crack, deformation and cutoff	No abnormalities
	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.

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Table 12. Summary of Functional test method – Specimen (80A 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.

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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.

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7.2 Seismic test results

Table 14. Seismic test results

Seismic test	TRS-RRS (TRS > RRS)	Coherence (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

7.3 Resonance search test results

Table 15. Resonance search test results

Type test		Before the test		After the test	
		Resonance frequency(Hz)	Amplitude(g/g)	Resonance frequency(Hz)	Amplitude(g/g)
X axis (Front to back)	Specimen (80A X 65A_20K)	No resonance (1~35)	-	No resonance (1~35)	-
	Specimen (125A X 100A_10K)	No resonance (1~35)	-	No resonance (1~35)	-
Y axis (Side to side)	Specimen (80A X 65A_20K)	No resonance (1~35)	-	No resonance (1~35)	-
	Specimen (125A X 100A_10K)	No resonance (1~35)	-	No resonance (1~35)	-
Z axis (Vertical)	Specimen (80A X 65A_20K)	No resonance (1~35)	-	No resonance (1~35)	-
	Specimen (125A X 100A_10K)	No resonance (1~35)	-	No resonance (1~35)	-

※ 1 g = 9.8 m/s²



7.4 Maximum acceleration result in seismic test

Table 16. Maximum acceleration results

Type test	Acceleration location	Test direction (unit: g)		
		X axis (Front to back)	Y axis (Side to side)	Z axis (Vertical)
1st seismic test	Fixture	0.70	0.86	0.37
	Specimen (80A X 65A_20K)	0.68	0.74	0.37
	Specimen (125A X 100A_10K)	0.71	0.74	0.35
2nd seismic test	Fixture	0.69	0.85	0.36
	Specimen (80A X 65A_20K)	0.68	0.74	0.37
	Specimen (125A X 100A_10K)	0.71	0.73	0.35

※ 1 g = 9.8 m/s²

End.

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