KEPIC 적용사례 : MH-C-216

(승인일자 : 2020. 5. 13.)

제목 : KEPIC-MHD 시험에 대한 Test Form 사용

질의 :

다음의 KEPIC-MHD 시험에 대해 적용 가능한 Test Form이 있습니까?

1. ACU 하우징 누설시험
2. ACU 하우징 구조적 내압력시험
3. ACU 공기유량 분배시험
4. 공기 에어로졸 혼합 균일성 시험
5. 헤파필터 뱅크 현장 누설시험
6. 흡착기 뱅크 현장 누설시험

답변 :

다음의 양식으로 사용 가능합니다.

붙임 1. ACU 하우징 누설시험 양식
    2. ACU 하우징 구조적 내압력시험 양식
    3. ACU 공기유량 분배시험 양식
    4. 공기 에어로졸 혼합 균일성 시험 양식
    5. 헤파필터 뱅크 현장 누설시험 양식
    6. 흡착기 뱅크 현장 누설시험 양식

KEPIC CODE CASE : MH-C-216

(Approval Date : 2020. 5. 13.)

Subject : Usage of Test Form related to the Test of KEPIC-MHD

Inquiry :

Are the applicable test form available for the following tests of KEPIC-MHD?

1. ACU Housing Leak Test
2. ACU Housing Structural Capability Test
3. ACU Airflow Distribution Test
4. Air-Aerosol Mixing Uniformity Test
5. HEPA Filter In-place Leak Test
6. Adsorber Bank In-place Leak Test

Reply :

Yes. The following test forms are available.

1. ACU Housing Leak Test Report
2. ACU Housing Structural Capability Test Report
3. ACU Airflow Distribution Test Report
4. Air-Aerosol Mixing Uniformity Test Report
5. HEPA Filter Bank In-place Leak Test Report
6. ACU Carbon In-place Leak Test Report

붙임 1. ACU 하우징 누설시험 양식

ACU HOUSING LEAK TEST FORM

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Customer		Spec. No.		Report No.	
Project No.		Equip. Name			
Procedure No.		Equip. No.		Test Date	

1. Test Conditions

Design Air Flow Rate	(　　　　) cmh (cfm)	Housing Volume	m³
Max. Operating Pressure (P)	(　　　　) Pa (in.w.g)		
Test Pressure (P × 1.25)	(　　　　) Pa (in.w.g)		ft³

2. Test Equipment

No.	Description	Serial No.	Cal. Due Date
1			
2			
3			

3. Test Data

Time [min]	Housing Pressure		Housing Temperature		Calculated Housing Leakage Rate	Re-marks
	[Pa]	[　　]	[°C]	[　　]	[KEPIC-MHD Appendix TA-III 4200]	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

(ft-lb unit)

(SI Units)

- = average leak rate, scfm(sm³/s) [air density =0.075 lb/ft³(1.2 kg/m³)]
- = volume within test boundary, ft³(m³)
- = initial pressure within test boundary, lb/ft² [Pa(absolute)]
- = final pressure within test boundary, lb/ft² [Pa(absolute)]
- = absolute temperature at start of test, °R(°K)
- = absolute temperature at end of test, °R(°K)
- = time difference (minutes)
- = time at start of test (minutes)
- = time at end of test (minutes)
- = gas constant for air; 53.35 ft-lb/lb-°R(0.286 kJ/kg-°K)

= _____ scfm(sm³/s)

4. Test Results   □ Acceptable   □ Unacceptable

Acceptance Criteria (Given Leakage Rate × Air Flow) : _____ × _____ = _____ (　　) cmh (cfm)

Tested by   : _____ Date : _____

Checked by   : _____ Date : _____

Approved by   : _____ Date : _____   Witnessed by : _____ Date : _____

붙임 2. ACU 하우징 구조적 내압력시험 양식

ACU HOUSING STRUCTURAL CAPABILITY TEST FORM

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Customer		Spec. No.		Report No.	
Project No.		Equip. Name			
Procedure No.		Equip. No.		Test Date	

1. Test Conditions

Design Air Flow Rate	( ) cmh (cfm)	□ Test Duration : Minimum 10 Minutes
Test Pressure (Max. Design Pressure × 1.25)	( ) Pa (in.w.g)	

2. Test Equipment

No.	Description	Serial No.	Cal. Due Date
1			
2			
3			

3. Test Data

Time [min]	Housing Pressure		Housing Temperature		Visual Inspection <Any distortion or breach>	Remarks
	[Pa]	[ ]	[℃]	[ ]		
0						
2						
4						
6						
8						
10						

4. Test Results   □ Acceptable   □ Unacceptable

Acceptance Criteria : No breach of integrity or Unacceptable distortion

Remark

Tested by	: _____ Date : _____	
Checked by	: _____ Date : _____	
Approved by	: _____ Date : _____	Witnessed by : _____ Date : _____

붙임 3. ACU 공기유량 분배시험 양식

ACU AIRFLOW DISTRIBUTION TEST FORM

Customer		Spec. No.		Report No.	
Project No.		Equip. Name			
Procedure No.		Equip. No.		Test Date	

1. Test Conditions

Design Air Flow Rate	( ) cmh (cfm)	Test Air Flow Rate	( ) cmh (cfm)

2. Test Equipment

No.	Description	Serial No.	Cal. Due Date
1			
2			
3			

3. Test Data   □ Moist Separator □ Prefilter Bank □ Post HEPA Filter Bank □ Adsorber Bank   [UNIT : m/s (fps)]

Row / Height	1	2	3	4	5	6	7	8	9	Remark
A										
B										
C										
D										
E										
AVG.										

4. Test Results

Acceptance Criteria		Within ± 20 %	Check the door position (√)
Velocity	Max.		
	Min.		
Deviation	(Max. Vel. / Avg. Vel.) × 100		
	(Min. Vel. / Avg. Vel.) × 100		

Test Results : □ Acceptable   □ Unacceptable

Remark

Tested by   : _____ Date : _____

Checked by   : _____ Date : _____

Approved by   : _____ Date : _____   Witnessed by : _____ Date : _____

붙임 4. 공기 에어로졸 혼합 균일성시험 양식

AIR-AEROSOL MIXING UNIFORMITY TEST FORM

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Customer		Spec. No.		Report No.	
Project No.		Equip. Name			
Procedure No.		Equip. No.		Test Date	

1. Test Conditions

Design Air Flow Rate	( ) cmh (cfm)	Test Air Flow Rate	( ) cmh (cfm)
Bank Differential Pressure (△P)	( ) Pa (in.w.g)	Challenge Aerosol	

2. Test Equipment

No.	Description	Serial No.	Cal. Due Date
1			
2			
3			

3. Test Data   □ HEPA Filter Bank   □ Post HEPA Filter Bank   [UNIT : %]

Row \ Height	1	2	3	4	5	6	7	8	9	Remark
A										
B										
C										
D										
E										
F										
AVG.										

4. Test Results

Acceptance Criteria		Within ± 20 %	Check the door position (√)
Concentration	Max.		
	Min.		
Deviation	(Max. Con. / Avg. Con.) × 100		
	(Min. Con. / Avg. Con.) × 100		

Test Results : □ Acceptable   □ Unacceptable

Remark

Tested by   : _____ Date : _____

Checked by : _____ Date : _____

Approved by : _____ Date : _____   Witnessed by : _____ Date : _____

붙임 5. 헤파필터 뱅크 현장 누설시험 양식

<table>
<tr><td colspan="7" align="center">IN-PLACE LEAK TEST FORM
(HEPA FILTER BANK)</td><td>Page   of</td></tr>
<tr><td>Customer</td><td></td><td>Spec. No.</td><td></td><td>Report No.</td><td></td></tr>
<tr><td>Project No.</td><td></td><td>Equip. Name</td><td></td><td></td><td></td></tr>
<tr><td>Procedure No.</td><td></td><td>Equip. No.</td><td></td><td>Test Date</td><td></td></tr>
</table>

1. Test Conditions

Design Air Flow Rate	( ) cmh (cfm)	Test Air Flow Rate	( ) cmh (cfm)
Bank Differential Pressure ($\triangle P$)	( ) Pa (in.w.g)	Challenge Aerosol	
Background Concentration	B_u (Upstream)	B_d (Downstream)	

2. Test Equipment

No.	Description	Serial No.	Cal. Due Date
1			
2			
3			

3. Test Data   □ HEPA Filter Bank   □ Post HEPA Filter Bank   [UNIT : %]

No.	Upstream Concentration (C_u) Reading <Range : _____>	Downstream Concentration (C_d) Reading <Range : _____>	Leakage Rate (%)	Remark
1st	%	%		
2nd	%	%		
3rd	%	%		
4th	%	%		
5th	%	%		
6th	%	%		
AVG.				

Leakage Rate formula: $\frac{\text{갑}}{\text{겹}} \times \frac{\text{갑}}{\text{겹}}$ .or $\frac{\text{갑}}{\text{겹}} \times$

Note : If background value is 0 or background reading is zeroed out.

4. Test Results   □ **Acceptable**   □ **Unacceptable**

Acceptance Criteria (Leakage Rate) : $\leqq 0.05\%$

Remark

Tested by : _____	Date : _____	
Checked by : _____	Date : _____	
Approved by : _____	Date : _____	Witnessed by : _____ Date :

IN-PLACE LEAK TEST FORM
(ADSORBER BANK)

Page   of

Customer		Spec. No.		Report No.	
Project No.		Equip. Name			
Procedure No.		Equip. No.		Test Date	

1. Test Conditions

Design Air Flow Rate	( ) cmh (cfm)		Test Air Flow Rate	( ) cmh (cfm)	
Bank Differential Pressure ($\triangle$P)	( ) Pa (in.w.g)		Type of Test	_____ Bank System	
Background Concentration	B_u (Upstream)		B_d (Downstream)		
Challenge Gas					

2. Test Equipment

No.	Description	Serial No.	Cal. Due Date
1			
2			
3			

3. Test Data

Pulse No.	Concentration Readings		Leakage Rate (%)	Remark
	Upstream (C_u)	Downstream (C_d)		
1st	ppm	ppb	$\frac{강}{겁}$ $\frac{강}{겁}\times$	
2nd	ppm	ppb	. or $\frac{강}{겁}\times$	
3rd	ppm	ppb		
4th	ppm	ppb	Note : If background value is 0 or background reading is zeroed out.	
5th	ppm	ppb		
AVG.	C_u : ppm	C_d : ppb	겂겂강 겁$\times$	

4. Test Results   □ Acceptable   □ Unacceptable

Acceptance Criteria (Leakage Rate) : $\leqq$ 0.05%

Remark   1. Test Method : □ Pulse   □ Continuous
2. Can use automatic log data of other equipment

Tested by   : _____ Date : _____

Checked by   : _____ Date : _____

Approved by   : _____ Date : _____   Witnessed by : _____ Date : _____