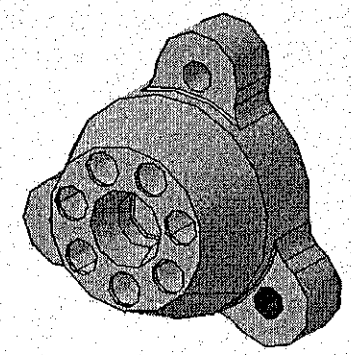
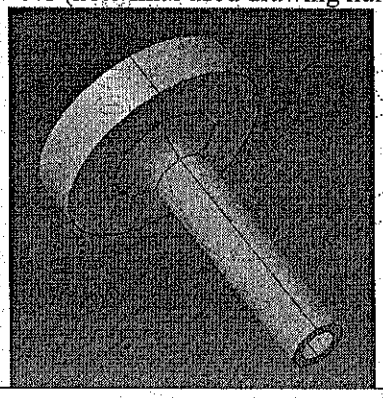
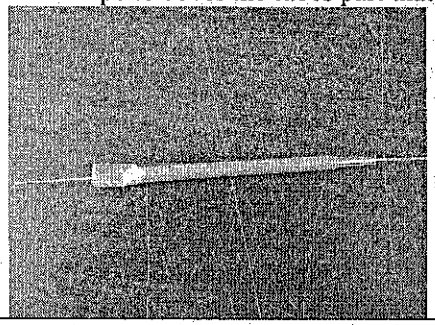
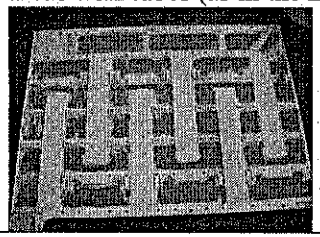
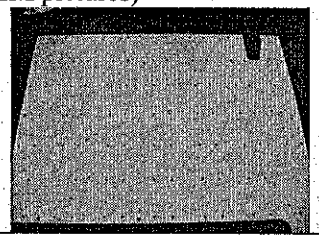
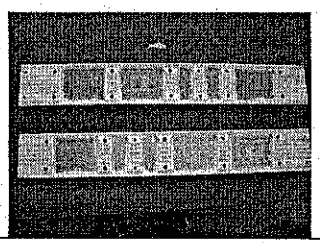
4.2 Manifold Integration and Brazing procedure in steps

Test sample indication:	Test engineer:	Test Date: 8/15 . 2008
Step	**Action to be taken**	**Result**
1.	Condenser manifold test sample number /Condenser QM or FM	FM4
	Record material specification	
2.	Material part 2.1 & Material part 3.1 (note final used drawing numbers here)  	2.1 : SS 316L 3.1 : SS 316L
3.	Filter material	SS 316 L
4.	Capillary condenser tube material	INCONEL 718
5.	Brazing plate material (N.A for test sample)	SS 304
6.	Record stop off agent material used (N.A for test sample)	NICROBRAZ WALL COLMONOY CORPORATION TYPE II
7.	Check brazing and binder material (requirement: AMS4787 powder(85~90%) will be combined with	ok

	binder(10~15%)(Wall Colmonoy Nicrobraz cement510) and Acetone(as require)	ok
8.	Record vacuum oven used (type and serial number)	
9.	Use a tape to cover the tubes part that will not experience the nickel plating process. Record the tape type. 	ok tape : 3M CORE SERIES 4-100
10.	Close the entrance of the tube to avoid the nickel plating flow inside the tubes (use something like a wire)	ok
11.	Perform nickel plating on tubes area that will be in contact with brazing material (i.e. manifold side) according to AMS 2403L	ok
	Apply stop-off agent (N.A for test sample)	
12.	Apply stop off agent on bottom&top brazing plates and bottom&top brazing strain relieves in the contact areas with tubes (as in the EM pictures)   	ok
13.	Apply stop off agent on brazing fasteners	ok and on jig brackets

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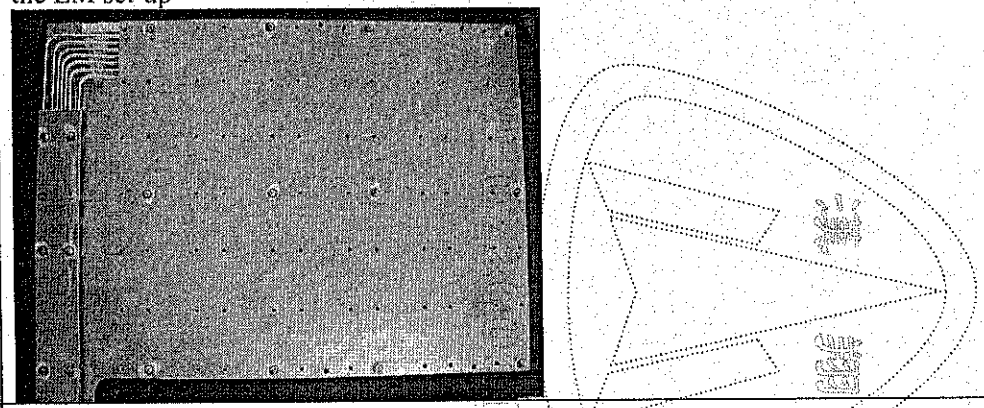
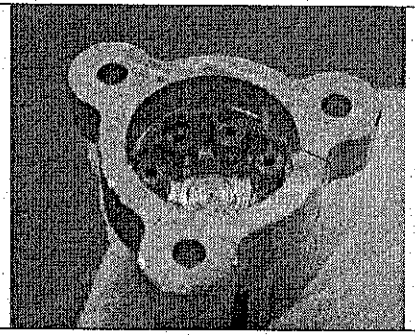
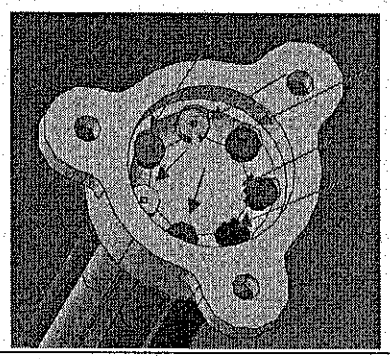
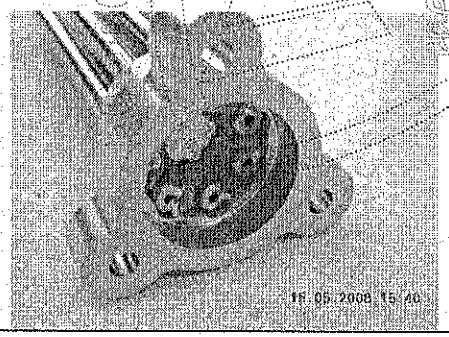
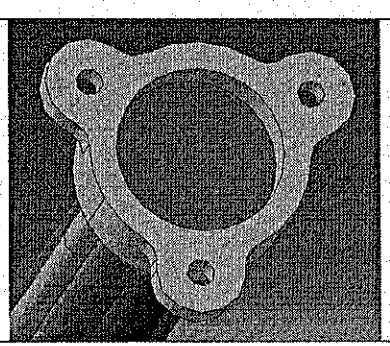
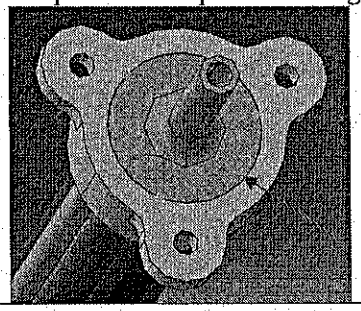
14.	Install brazing plates(bottom, top and strain relieves) on brazing and transport jig using brazing bolts as in the EM set-up 	ok
	Brazing preparations and manifold filter integration	
15.	Clean Manifold parts according to AMSTR-NLR-PR-039 QM/FM Condenser Cleaning Procedure	ok
16.	Use clean gloves when handling the clean manifolds during spot welding	ok
17.	Spot weld 7 (condenser or sample) tubes to part 2.1 .Use Argon Tig Welding without weld material. Leave 1 mm length of tube inside part 2.1. Spot Weld as far away as possible from the brazing area to avoid oxidation problem. Write down spot welding equipment and main parameters.	ok

		
18.	Put brazing material at brazing positions. Apply brazing material into the edge between tube & part 2.1(RED arrow).No necessary to cover the central area with the brazing material.  	OK
19.	Remove manifold bracket from the transport& brazing Jig (N.A for test sample)	OK
20.	Put filter into part 2.1	OK

		
21.	Make digital pictures of the filter set-up and store it digitally	ok
22.	IT IS NOT ALLOWED TO USE STOP-OFF AGENT on manifold area	
23.	Fix part 3.1 into part 2.1 Using argon welding without weld material (see green points) 	ok
24.	Apply solder material into edge between part 2.1 and part 3.1	ok

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	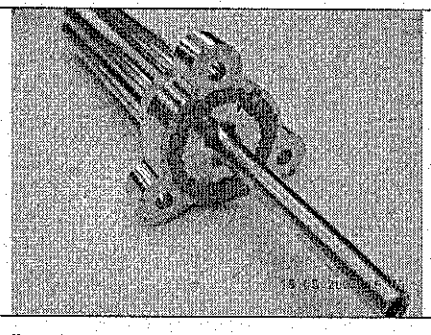	
	Perform temperature cycle as indicated in Figure 4-1 and Figure 4-2 with oven	
25.	Put set-up in vacuum oven together with reference sample	ok
26.	Apply vacuum to oven	ok
27.	Perform temperature profile as indicated in Figure 4-1. Pay attention: Last slope of Figure 4-1 is applied by cooling with Argon to ambient temperature	ok
28.	Inspect visually the brazing product	ok
29.	Make picture from the brazing product (note picture file name)	ok
30.	Apply vacuum to oven	ok
31.	Perform temperature profile as indicated in Figure 4-2 .	ok
32.	Inspect visually the brazing product	ok
33.	Make picture from the brazing product (note picture file name)	ok
34.	ONLY FOR TEST SAMPLE: Close/seal the 7 tube ends hermetically to withstand (240 bar).Seal the end of 7 small tube using Argon welding(TIG) with weld material CRES347(MSRR9500/207) .030"Dia. FOR TEST AND QM/FM: close end of manifold with plastic bag	ok
35.	Transport to AIDC Taichung facility	ok

36.	Perform Helium leak test according to : AMSTR-NLR-PR-002 ISSUE 2.0 MAY 2007 : for TEST SAMPLES AMSTR-NLR-PR-040: for QM & FM condenser assembly Remark: Swagelok couplings for leak testing	ok.
37.	Perform Proof Pressure test to test sample up to 240 bar with N2 according to: Addendum to AMSTR-NLR-PR-002 ISSUE 2.0 MAY 2007 : for TEST SAMPLES AMSTR-NLR-PR-040- : for QM & FM condenser assembly	ok
38.	Inspect visually the brazing product	ok
39.	Make picture from the brazing product (note picture file name)	ok
40.	Perform Helium leak test according to : AMSTR-NLR-PR-002 ISSUE 2.0 MAY 2007 : for TEST SAMPLES AMSTR-NLR-PR-040- : for QM & FM condenser assembly	ok
41.	ONLY FOR TEST SAMPLE: Perform Brazing check according to AMSTR-NLR-PR-005 ISSUE 2.0 December 2007	
42.	**General remarks and notes**	

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3.3 Condenser Manifold parts cleaning sheet

Manifold Indication: FM 4	**Test Engineer:** Sherk	**Test Date:** 8/15 . 2008
Step	**Action to be taken**	**Results**
1.	Type condenser (Primary RAM/ Primary Wake/Secondary RAM/ Secondary Wake)	
2.	Record model type	QM / FM FM 4
3.	Record Purity IPA	99 %
4.	Use an Ultrasonic bath preliminary cleaning of components	ok
5.	Put the components in a stainless steel (316 or glass) box with IPA	ok (glass)
6.	Put the stainless steel/glass box with parts in an ultrasonic bath for 2 hours Remark: In this way the bath can contain water and the parts only contact IPA	ok
7.	Put the components on polyethylene membrane	ok
8.	Dry the component naturally	ok
9.	Check components under a magnifier with magnification 30x	ok
10.	If no oil contamination and particles are found go to the next step. Otherwise repeat step 2-6	ok
11.	Put component in a clean bag. Seal the bag and store in visibly clean room for storage prior to manifold brazing	ok
12.	**General remarks**	

18.	Collect/recycle the IPA	
19.	Circulate clean/new IPA through the tube for 15 minutes to wash away remnant IPA of step 17	ok
20.	Repeat step 15 to 19 for the number of tubes to be cleaned	ok
21.	Connect 0.45 micrometer filter at end of a gaseous nitrogen (N_2)	ok
22.	Limit the pressure of the gaseous nitrogen to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	ok
23.	Direct after the filter the hose is connected to the tube part (other side of the tube is left open)	ok
24.	Clean and dry the tube with gaseous N_2 by running it through the tube for at least 15 minutes	ok
25.	Check with a mirror whether no mist is formed at the outlet	ok
26.	If mist is present at the mirror repeat step 24-25	ok
27.	Seal the two ends of the tubes with flexible hose cap	ok
28.	Clean outside of the tube with nylon/cotton cloth with toluene/MEK until it is visibly clean and no oil contaminant is visible on the outside	ok
29.	Seal the two ends of the tubes with flexible hose cap	ok
30.	Place the tubes inside the visibly clean environment for storage prior to manifold brazing	ok
31.	**General remarks**	

表面處理施工說明書

OPERATION INSTRUCTION SHEET OF SURFACE TREATMENT

規範(Spec. No.): C5041R,CLASS II / AMS-QQ-P-35(May 1998),TYPE VI

用途(Application): 耐熱耐蝕合金之表面清洗及鈍化處理
(Surface Cleaning and Passivation of Corrosion- and Heat-Resistance Alloys)

件號(Part Number): General Working Instruction

件號名稱(Part Name): N/A

材料(Material): 201, 301, 304, 304L, 304H, 310, 314, 316, 316L, 316H, 321, 321H, 347, 347H, etc.

工作號碼(Op No.): N/A

相關文件(Appliable Document):
WI-6L0-S03 不銹鋼鈍化處理工作指導說明
(Corrosion-Resistant Steel Passivation Treatments Working Instruction)

DOCUMENT APPROVAL (文件核可)

Prepared (擬定): 黃琨笙	**Date (日期):** 2003/09/25	**Customer Approval(顧客核准)**
Approved (核准): 林秉毅	**Date (日期):** 2003/10/03	N/A
QA (品保核准): 羅建平	**Date (日期):** 2003/10/03	

AEF-AIDC	表面處理施工說明書 OPERATION INSTRUCTION SHEET OF SURFACE TREATMENT	OIS. No. : C-009 Rev: J , Issue Date: 2003/09/25 Customer: HONEYWELL

工作號碼(OP NO):　　工作部門(DEPT NO): 6L0

件號: PART NO.	General Working Instruction	材料: BASE MATERIAL	見頁次1(See Page 1)	規範: SPEC NO.	C5041R, CLASS II / AMS-QQ-P-35(May 1998),TYPE VI

用途(APPLICATION): 耐熱耐蝕合金之表面清洗及鈍化處理 (Surface Cleaning and Passivation of Corrosion- and Heat-Resistance Alloys)

程序 SEQ. NO.	說明 DESCRIPTION	裝備 EQUIPMENT	溶液 SOLUTION	溫度(℃) TEMPERATURE	時間(分) TIME(MINUTES)	備註 REMARKS
(1)	溶劑除油 SOLVENT DEGREASE	#00	M.E.K. or Acetone	室溫 Room Temperature	10秒以上 10 SEC min.	( )視需要 If required
2	熱鹼脫脂 HOT ALKALINE DEGREASE	#3 or #4	DIAKITE CLD-9061B 23-60 g/L	71-88℃ 160-190°F	5-15 分 5-15 MINUTES	
3	冷水沖洗 SPRAY WASH	#6	自來水 TAP WATER	室溫 Room Temperature	30秒以上 30 SEC min.	
4	噴水並測試工件表面是否斷水紋,如不乾淨,重複程序2&3 WATER SPRAY AND CHECK FOR WATER BREAK FREE, IF UNCLEAN, REPEAT SEQ. NO. 2 AND 3					
5	鈍化處理 PASSIVATION TREATMENT	#33	25-45 v/v% HNO_3	21-32℃ 70-90°F	30分 30 MINUTES	注意!不可損傷到工件 CAREFULLY! NOT TO DAMAGE THE PARTS
6	清水漂洗 COLD WATER RINSE	#34	自來水 TAP WATER	室溫 Room Temperature	15秒以上 15 SEC MIN.	
(7)	冷水沖洗 SPRAY WASH	#21	純水 DEIONISED WATER	室溫 Room Temperature	15秒以上 15 SEC MIN.	
8	除水份 REMOVE MOISTURE	空氣槍 AIR GUN	純淨壓縮氣 Clean,dry,oil-free Comp. Air	室溫 Room Temperature	視需要 As required	
(9)	烘乾 OVEN DRY	烤箱 OVEN	AIR	100±15℃ 212±25°F	30-60 分 30-60 MINUTES	
10	檢驗 INSPECTION	目視: 須檢驗所有另件. 表面須無鐵金屬或其他外物污染而可能影響另件的使用、壽命. 另件須為清潔, 無腐蝕, 無蝕點, 無外物. 但輕微變色則可允許. Visual: All parts shall be visually inspected. Parts shall be free of iron contamination or other foreign material which would adversely affect the suitability, use, or life of the part. Parts shall be clean and show no etching or pitting. A slight discoloration is allowed.				

AEF-AIDC	表面處理施工說明書 OPERATION INSTRUCTION SHEET OF SURFACE TREATMENT	OIS. No. : C-009 Rev: J , Issue Date: 2003/09/25 Customer: HONEYWELL

工作號碼(OP NO): 工作部門(DEPT NO): 6L0

件號: PART NO. General Working Instruction	材料: BASE MATERIAL 見頁次1(See Page 1)	規範: SPEC NO. C5041R, CLASS II / AMS-QQ-P-35(May 1998),TYPE VI

用途(APPLICATION): 耐熱耐蝕合金之表面清洗及鈍化處理 (Surface Cleaning and Passivation of Corrosion- and Heat-Resistance Alloys)

文件修訂記錄(DOCUMENT REVISION STATUS):

REV. 版期	DESCRIPTION 修定內容	REVISER 擬訂者	DATE 發佈日期
I	---	李昭興	1999/09/21
J	1.更改OIS格式(Change OIS Form.)。	黃琨笙	2003/09/25