SAFRAN
Snecma

Department Materials and Process – Corbeil Plant

Site d'Evry-Corbeil
Rue Henri Auguste Desbruères - BP 81
91003 Evry Cedex - France

O/Ref. : YQL/Basile 03605/14 LM

Phone : (33) 01.69.87.98.10

Evry, the April 3, 2014

Your contact : Mrs Marie-Noëlle HINARD
Mail : marie-noelle.hinard@snecma.fr

ELECTRON BEAM PROCESSES

Unit 4 Octimum

WOKING GU21 5SF

ROYAUME UNI

For the attention of Mr Raf ENGLEY
Chief Inspector

Subject : **Laboratory approval (FAL n° 644)**

Dear Mr,

After review of your quality organisation, technical capabilities and the survey of your Laboratory conducted by Mrs Marie-Noëlle HINARD the 19 of November 2013, we are pleased to confirm you the qualification of your laboratory for the test defined on the Special Processes Qualification Certificate (FAL n° 644) enclosed with the audit report and the Corrective Action Request n° CARs n° 200007353 (1) and 200007354 (2) closed.

Continuance of the laboratory qualification depends on conditions outlined in the Snecma procedures GRP-0087 and GRM-0092.

We would like thank you for the organization of this visit and for your cooperation.

Receive best regards.

The Auditor

Marie-Noëlle HINARD

The Quality Assurance Manager

Michel BIDEAU

Enclosed.: *FAL 644*
Audit report YQL n° 03605/14
CAR n° 200007353 (1) and 200007354 (2) closed
Nadcap Certificate
PXV 25521

SAFRAN
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Attestation de Qualification des Procédés Spéciaux

Special Processes Qualification Certificate

N° AQPS :
MDM503377
CODE FOURNISSEUR 023871-00
SUPPLIER NUMBER

FAL 644

SNECMA

Prononce la qualification du fournisseur suivant GRP-0087-GRM0092
Approval on the supplier qualification according to GRP-0087- **GRM0092**

ELECTRON BEAM PROCESSES
Unit 4 Octimum
WOKING GU21 5SF
ROYAUME UNI

Pour les procédés spéciaux suivant,
For the following special processes

Safran Process N°	**Procédés** *Processes*	**Référentiel Technique** *Technical Specification*	**Statut**	**Restrictions techniques** *Technical limitation*	**Fin de Validité** *Expiration Date*
L1e	Micrographie optique autres/ Other metallographic optical		**Qualification**	Micrographie des cordons de soudure FE suivant DMP 43002 et DMF Pièces	31/12/2017

N° de rapport *Report n°*	**Observations** ***Remarks :***
BASE @DOC BASILE N° YQL 03605/14	Qualification provisoire prononcée sur l'audit Snecma/Qualification prononced on Snecma audit

Auditeur/Responsable de la Qualification *Auditor/Qualification Leader*		
April 3, 2014	Marie-Noëlle HINARD - Michel BIDEAU	

SAFRAN Snecma	**DEMANDE D'ACTION(S) CORRECTIVE(S)** *(Corrective Action Request C.A.R)*	DAC N° 1 20000 7352 *[Identification CAR nr]*
Intervention effectuée le : *(Intervention date)*	**19/11/2013**	Référence courrier: YQL n° 03605/14
Origine :	**Initial audit**	*[Ref.letter]* Date : **19/11/2013** *(Date issued)*
Sujet : *(subject)*	**Qualification Laboratory**	
Nom et site du Fournisseur: *(Supplier's name and site)*	**Electron Beam Processes ltd**	N° Fournisseur: 023871_00 *(Supplier Purchase code number)*

Description de la non-conformité *(Non-conformance description)*

Thème ISO [ISO Them] ***17025 §5.6***

The magnifications of the two microscopes (Zeiss Axio and Leica M60) used for the metallographic welding inspection are not calibred

Classement : **Ma**	**C** :critique(*critical*) **Ma** : majeure(*major*) **mi** : mineure(*minor*)	
Nom émetteur : **YQL** *(Assessor)*	**Marie-Noëlle HINARD**	A répondre pour le : 06/01/2014 (Due date)

CAUSES racines *(Root causes)*	**Méhodologie** *(Method)*
Although the microscopes were calibrated when the systems were set up and at each occasion when the software was up graded, they were not in the recall calibration system checks carried out against the certified master graticule was accepted by all other audit authorities and was deemed to be satisfactory. **1**	**Inspection** **1.1**
ACTIONS CORRECTIVES *(Corrective actions)*	Application *(Implementation)* / Date réalisation prévue *(planned completion)*
Microscopes identified with S/N's EBP1004 & EBP1005. Microscopes now in the calibration system recall frequency set at 6Months calibration certs for microscopes and master graticule enclosed.	**12/12/2013** **3**

Nom du représentant de la société: Raf Engley *(Organization representative name)* **4**	Signature :	Date : 12/12/2013 *(Current Date)* **6**

Vérification de la réalisation des actions par le Fournisseur

(Verification of the implementation of the completed corrective actions by the Supplier)

Nom du représentant de la société: Raf Engley *(Organization representative name)* **7**	Signature :	Date : 20/01/2014 *(Current Date)* ***9***

Vérification des actions correctives par l'émetteur / Commentaires :
(verification of the completed corrective actions by the assessor / Comment)

Date : *(Verification Date)*	Soldée Date : April 4, 2014 / Clôturée Date : April 4, 2014	Nom : HINARD M.N. *(Name)* :	Signature : *(Signature)*

CERTIFICATE OF CALIBRATION

Issued by

DERA CALIBRATION LABORATORIES

Part of DERA Defence Metrology Services

Date of Issue: 15 March 2001 Certificate Number: 200102525

UKAS CALIBRATION

0013

DERA

Defence Evaluation and Research Agency
DERA Calibration Laboratories
Johnson House
Risley
Warrington WA3 6AT

Tel: +44 (0) 1925 253229
Fax: +44 (0) 1925 252343

APPROVED SIGNATORY

Chris Miller/Brian Bowden

Customer	:	Pyser SGI Limited
Address	:	Kent, TN8 6HA
Order Number	:	66886
Date Received	:	13 March 2001
Date Calibrated	:	14 March 2001
Manufacturer	:	Graticules
Type	:	S78
Serial Number	:	SC 610
Description	:	Stage Micrometer Glass Scale
Calibrated By	:	B Bowden

REPORT

1 The Glass Scale was calibrated on the MUL 214B Measuring Machine with Hewlett Packard Laser Interferometer attached (Cert No. 08A 011/9117 NPL).

2 The results are tabulated on page 2.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standard laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

DERA is an Agency of the UK Ministry of Defence

E.B.P. CALIBRATION REPORT

CERTIFICATE No EBP CAL 1000

MICROSCOPE S/N EBP1004
MASTER GRATICL S/N SC610
CALIBRATED AGAINST 1000µm REFERENCE DIMENTION (M.P.E. 5%)

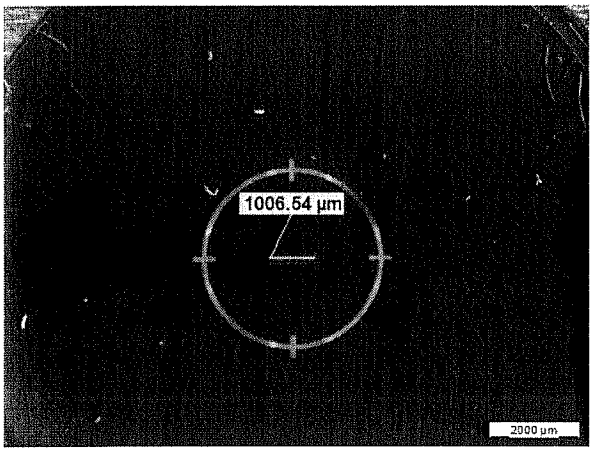


Image No. Calibration - 20110302_000018
Comment:
CALIBRATION IMAGE 1.0 - 12.12.2013

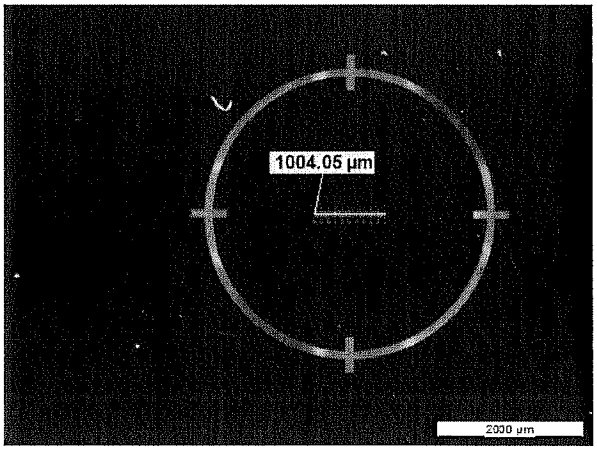


Image No. Calibration - 20110302_000019
Comment:
CALIBRATION IMAGE 1.6 - 12.12.2013

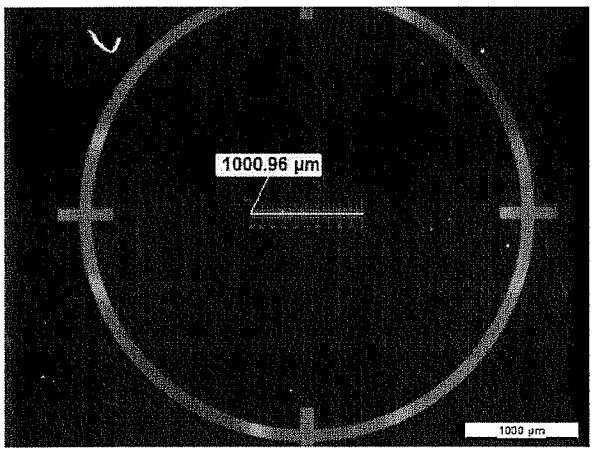


Image No. Calibration - 20110302_000020
Comment:
CALIBRATION IMAGE 2.5 - 12.12.2013

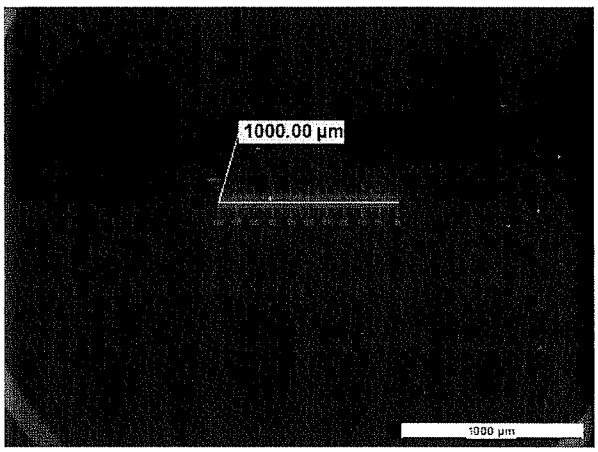


Image No. Calibration - 20110302_000021
Comment:
CALIBRATION IMAGE 4.0 - 12.12.2013

CALIBRATION DATE : 12/12/2013
DUE DATE :12/06/2014
CALIBRATED By Raf Engley

E.B.P. CALIBATION REPORT

CERTIFICATE No EBP CAL 1001

MICROSCOPE S/N EBP1005
MASTER GRATICL S/N SC610
CALIBRATED AGAINST 1000µm REFERENCE DIMENTION (M.P.E. 5%)

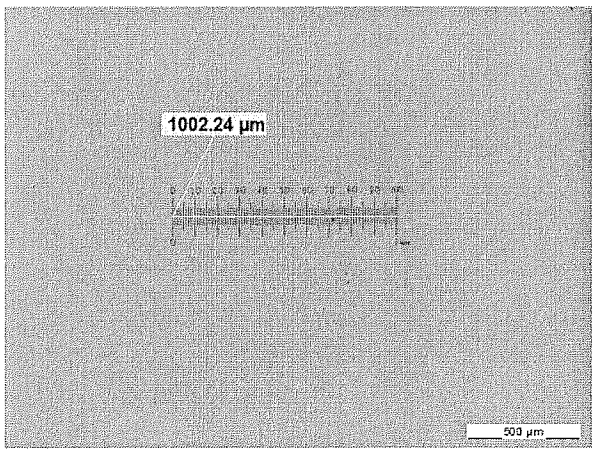


Image No. Calibration - 20110302_000023
Comment:
CALIBRATION IMAGE 5X - 12/12/2013 = 1000µm

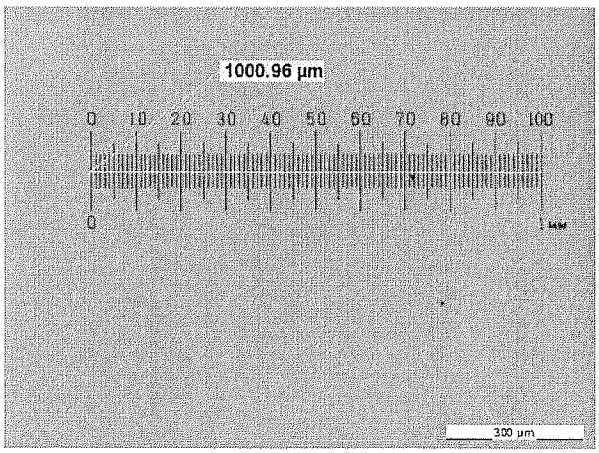


Image No. Calibration - 20110302_000024
Comment:
CALIBRATION IMAGE 10X - 12/12/2013 = 1000µm

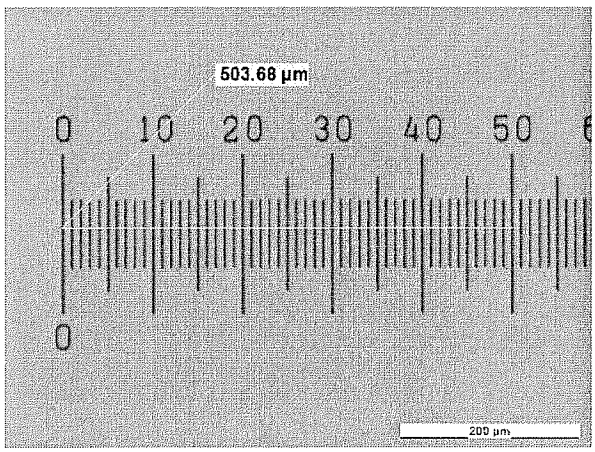


Image No. Calibration - 20110302_000025
Comment:
CALIBRATION IMAGE 20X - 12/12/2013 = 500µm

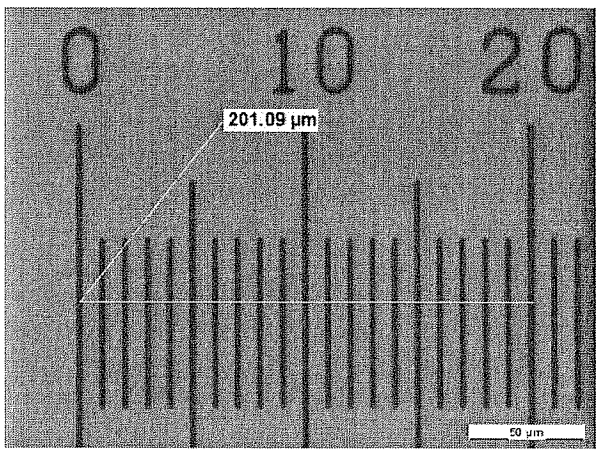


Image No. Calibration - 20110302_000026
Comment:
CALIBRATION IMAGE 50X - 12/12/2013 = 200µm

CALIBRATION DATE : 12/12/2013
DUE DATE :12/06/2014
CALIBRATED By Raf Engley

Process and Procedure Instruction No: 8610	
Title: Calibration of Microscopes Electron Beam Processes Limited	

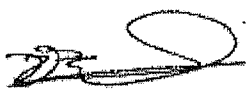
Equipment

Inspection master graticule Serial No.SC610

Method

1. **Using Imagic software capture and image of the graticule scale and measure it over its 1000µm length or as long as the magnification allows.**
2. **Measurements to be taken at four set magnification levels to complete the calibration.**
3. **Create calibration report containing the four images and save in swap\Inspection\CALIBRATION\Calibration Records-Tools-Labels\EBP CAL CERTS.**
4. **Calibration frequency to no longer than six months.**

Approved:



SAFRAN Snecma	**DEMANDE D'ACTION(S) CORRECTIVE(S)** *(Corrective Action Request C.A.R)*	DAC N° 2 20007354 *[Identification CAR nr]*
Intervention effectuée le : *(Intervention date)*	**19/11/2013**	Référence courrier: YQL n°03605/14
Origine : **Initial audit**		*[Ref.letter]* Date : **19/11/2013** *(Date issued)*
Sujet : *(subject)* **Qualification Laboratory**		
Nom et site du Fournisseur: *(Supplier's name and site)*	**Electron Beam Processes ltd**	N° Fournisseur: 023871-00 *(Supplier Purchase code number)*

Description de la non-conformité *(Non-conformance description)*

Thème ISO [ISO Them] ***17025 §5.6***

For the inspection of the welding samples, EBP uses a form document (E/5535-5 : Batch control- linear test piece-case,HP turbine). In this document :

- **One criteria of the DMP43-002 is missing (Lmean-0,15 <L< Lmean+0,15)**
- **The is one mistake (DMD43-002 instead of DMP43-002)**
- **The documents for the preparation and inspection of the welding ("Inspection procedure for Snecma batch control parts"and "Production process- Silvercrest HP turbine case linear test piece" are not mentionned**
- **These both documents have no reference number and one of them "Production process- Silvercrest HP turbine case linear test piece" has no date and no issue**

Classement : **mi**	**C** :critique(*critical*) **Ma** : majeure(*major*) **mi** : mineure(*minor*)	
Nom émetteur : **YQL** *(Assessor)*	**Marie-Noëlle HINARD**	A répondre pour le : 06/01/2014 (Due date)

CAUSES racines *(Root causes)*	**Méhodologie** *(Method)*
Documents that were part of the job pack and therefore stored together were not deemed requreing of seperate indentifcation as they were not use with anything else. 1	**planning** **1.1**
ACTIONS CORRECTIVES *(Corrective actions)*	Application *(Implementation)* Date réalisation prévue *(planned completion)*
(Lmean-0.15<L<Lmean+0.15) included in report format Inspection procedure now identified as IP2010 on routing Production procedure-Silvercrest now identified on routing as SNECMA-PP-5535BLTP with date and issue. Copies of routings, procedures and report sample enclosed. 2	**20/01/2014** 3

Nom du représentant de la société: Raf Engley *(Organization representative name)* 4	Signature :	Date : 20/01/2014 *(Current Date)* 6

Vérification de la réalisation des actions par le Fournisseur

(Verification of the implementation of the completed corrective actions by the Supplier)

Nom du représentant de la société: Raf Engley *(Organization representative name)* 7	Signature :	Date : 20/01/2014 *(Current Date)* 9

Vérification des actions correctives par l'émetteur / Commentaires :
(verification of the completed corrective actions by the assessor / Comment)

Date : *(Verification Date)*	Soldée Date : April 4, 2014	Nom : HINARD M.N *(Name)* :	Signature : *(Signature)*
	Clôturée Date : April 4, 2014		

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Compte Rendu Qualification Procédés Spéciaux

Special Processes Qualification Report

Réf : YQL 03605/14 Ind 0

Date : April 3, 2014

FAL 644

COMPTE RENDU D'AUDIT

Nom du Fournisseur *Supplier*	**Electron Beam Processes**		**Code fournisseur** *Supplier nimber*	**023871-00**		
Adresse *Address*	**Unit 4 Octimum - WOKING GU21 5SF - United Kingdom**					
Activité Fournisseur *Supplier Activities*	**Beam welding supplier**					
Contact fournisseur *Supplier contact*	Nom **R. ENGLEY**		Function **Chief Inspector**			
	Adresse email Email adressa : **r.engley@ebpglobal.com**					
Nature Audit *Audit Purpose*	**Sur site** *On-site audit* ☒	**Sur Dossier(DQ)** *On DQ* ☐	**Date :**	**November 19th, 2013**		
	Evaluation *Evaluation* ☒	**Renouvellement** *Re-Approval* ☐	**Qualification initiale** *Approval* ☒	**Surveillance** *Folow up* ☐	**Autre*** *Other* ☐	
	***Si Autre préciser :** *If other detail :*					
Thème Audit *Scope of Audit*	**Lab audit**					

Equipe audit & auditées
Audit staff& auditees

Fonction *Title*	**Nom** *Name*	**Safran**	**Fournisseur** *Supplier*	**Catégorie de l'auditeur Safran** *Safran auditor level*
Responsable of the audit	Marie-Noelle HINARD			Safran auditor
Auditee	Raf ENGLEY		Chief inspector	
Auditee	Kenneth HOWLETT		Planning and quality Engineer	
Auditee	Jeff BOYES		Operations Executive	

Spécification(s) de l'audit
Audit Specification

Référentiels techniques Safran *Safran Technical Specification*	DMP 43-002
Autres référentiels *Other specification*	ISO 17025

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Compte Rendu Qualification Procédés Spéciaux

Special Processes Qualification Report

Réf : YQL 03605/14 Ind 0

Date : April 3, 2014

FAL 644

COMPTE RENDU D'AUDIT

Points Forts *Positive points*	**Points Faibles** *Weak points*
- EBP has a NADCAP approval. For the welding and NDT - Technical level of the tests is good - Every operator is qualified - Quality system (Management review - planning of audits management of the documents)	- **Calibration of the magnifications of the microscopes (CAR n° 200007353 (1) Major)** - **Documents on the batch control linear test piece (Car n° 200007354 (2) – minor)** - **Addition of one line on the form of the job order for the inspection of the batch sample** **Other points :** **<u>Point 1</u> :** **Before to give the qualification, Snecma ask to Smith the five last reports of the batch control linear test piece and the sample to perform the checking in his lab.** **Snecma will give the qualification :** - **After reception of the answers of the two findings** - **If there is a correlation between Snecma results and EBP results** **<u>Point 2</u> :** - Snecma will send to EBP :the DMC0090 for the metallographic inspection with the list of the reagents - The number of ASTM standard for the calibration of the microscope

Eléments analysés *Items reviewed*			
1	AQM-13 - Annual Quality Management review minutes – date 15/01/2013	6	Document : **Inspection procedure for Snecma batch control part**
2	EBP test report n°A01360_000204	7	
3	Quality manual	8	
4	Form document : E/5535-5	9	
5	Document : **Production process- Silvercrest HP turbine case linear test piece**	10	

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Compte Rendu Qualification Procédés Spéciaux

Special Processes Qualification Report

Réf : YQL 03605/14 Ind 0

Date : April 3, 2014

FAL 644

COMPTE RENDU D'AUDIT

Tableau des écarts *Deviation table*						
N° de l'écart *Deviation n°* jj	**Niveau** *Level*	**Procédé** *Process*	**Description de l'écart** *Non Conformance Report* Responsible	**Responsable** *Responsible*	**Délai** *Time limit*	**Statut** *Status*
DAC 200007353 (1)	M	Calibration of the microscope	***The magnifications of the two microscopes (Zeiss Axio and Leica M60) used for the metallographic welding inspection are not calibred***	Chief inspector	06th January 2014	
DAC 200007354 (2)	m	Checking of the welding following DMP 43-002	For the inspection of the welding samples, EBP uses a form document (E/5535-5 : Batch control- linear test piece-case,HP turbine). In this document : - One criteria of the DMP43-002 is missing (Lmean-0,15 <L< Lmean+0,15) - The is one mistake (DMD43-002 instead of DMP43-002) - The documents for the preparation and inspection of the welding ("Inspection procedure for Snecma batch control parts"and "Production process- Silvercrest HP turbine case linear test piece" are not mentionned - These both documents have no reference number and one of them "Production process- Silvercrest HP turbine case linear test piece" has no date and no issue	Chief inspector	06th January 2014	

m = mineur/ *minor* **M = majeur/** *major*

Tableau des Recommandations *Préventives table*		
N° de la recommandation *Preventive n°*	**Procédé** *Process*	**Description** *Description*
1	*Inspection of beam welding*	*Mention one line concerning the welding sample inspection on the work order to avoid any risk*
2	*Inspection of beam welding*	*Mention the reference number of the microscope on the report of the welding sample*

Audit Notes

1) Context

- Initial audit of qualification
- EBP has a NADCAP approval for electon beam welding

2) Results of the System Audit

- Le lab depends of the inspection department. The chief is Raf Engley
- Date of the last revision of the quality manual : QP7 – 06/12
- There is one management review per a year – date for the last one : 15/01/2013

Management of documents:

- A procedure exits – QM7
- A procedure "Process and procedure Instruction n° 8562" decribes the processing of enquiries and creation of production Paperwork

Management of supplier's documents:

- One computerized list of the SAFRAN documents exits. It is updated when a new document arrives - Example : DMP43-002 has the good issue

Audit :

- A planning of audits exits. The report of the last audit has been seen during the audit

Last NADCAP audit: *22 April 2013*

- 3 minor Cars but not for the lab

Management of the preventive actions, corrective actions and complains:

This point is mentioned by the quality manual – paragraph 8.5 and procedure QM 8.9 and Quality
One complain was seen during this audit.
There is no indicator on the non conformities but the management review mentions them

Subcontracting of tests and calibrations:

The calibration of the calipers that EBP used for the measurement of the welding samples is subcontracted every 6 months – Supplier Brunel

3) *Skills and qualification* :

Every operator and the chief were trained by Snecma

Survey of the implementation of the test

For the inspection of the welding samples, EBP uses a form document (E/5535-5 : Batch control- linear test piece-case,HP turbine). In this document :

- One criteria of the DMP43-002 is missing (Lmean-0,15 <L< Lmean+0,15)
- The is one mistake (DMD43-002 instead of DMP43-002)
- The documents for the preparation and inspection of the welding ("Inspection procedure for Snecma batch control parts"and "Production process- Silvercrest HP turbine case linear test piece" are not mentioned
- These both documents have no reference number and one of them "Production process- Silvercrest HP turbine case linear **test piece" has no date and no issue**

→ ***DAC n° 200007354 (2)***

An instruction procedure exits for the Snecma batch control . In this document it is explained in detail specially how to prepare the longitudinal sample.

If the result is good, the lab gives the green light for the welding parts but **on the work order, this is no line for the inspection of the welding sample → improvement : include a line on the work order for the checking of the welding sample**

During the audit, one sample was prepared and examined → satisfactory
For the longitudinal sample, a caliper is used. It is califred every 6 months – its certificate was seen during the audit

Calibration of the microscopes: The lab has a micrometer with a certificate but the magnifications of the two microscopes (Zeiss Axio and Leica M60) used for the metallographic welding inspection are not calibred → DAC n° *200007353* (1)

Archieving

After the checking of the welding samples, EBP sends them and the reports to Smith – Snecma supplier of the cases

Cross tests between EBP lab ans Snecma Corbeil lab : see PVX 25521

These cross tests were been done on four samples – see the list after

HPT case 14 and 15 : S/N DE952327-3 and DE952328-2 (report EBP n°A01360-000157)
- HPT case 16 and 17 : S/N DE952329-1 and DE952330-R (report EBP n°A01360-000190)
- HPT case 18 and 19 : S/N DE952331-P and DE952332-N (report EBP n°A01360-000204)
- HPT case 20, 23 and 24: S/N DE952333-M, DE952334-L and DE952335-K (report EBP n°A01360-000225

The results obtained by SNECMA laboratory are similar to the results obtained by EBP laboratory. The geometrical inspection and the checking for internal anomalies are in conformity with the requirements of the DMP43-002 index E.

Note: Great care should be taken to the identification of the samples. In fact, pen-writing was sometimes different to the marking engraved on the back side of the mounting