

## Special Process: Heat Treat System Assessment

Facility Name: Sumeeko Industries Co., Ltd.

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Number of Heat Treat Employees at this Facility:

10

Internal (Captive) Heat Treater (Y/N): Y

Commercial Heat Treater (Y/N): Y

Date of Assessment: 14-May-2020

Date of Previous Assessment: 20-May-2019

### Type(s) of Thermal Processing at this Facility:

#### Process Table A - Ferrous

Carburizing

Carbonitriding

Carbon Restoration

Neutral Hardening  
(Quench and Temper)

X

Austempering / Martempering  
Tempering

Precipitation Hardening / Aging



#### Process Table B - Ferrous

Nitriding (Gas)

Ferritic-Nitrocarburizing (Gas or  
Salt)

#### Process Table C - Aluminum

Aluminum Heat Treatment

#### Process Table D - Ferrous

Induction Heat Treating

#### Process Table E

Annealing

Normalizing

Stress-Relieving

#### Process Table F

Low Pressure Carburizing

#### Process Table G

Sinter Hardening

#### Process Table H

Ion Nitriding

Current Quality Certification(s): IATF-16949, ISO-90010, ISO14001, ISO17025

Date of Re-assessment (if necessary):

### Personnel Contacted:

Name:	Title:	Phone:	Email:
曾士協	Rep. Management	08-7518889	wang.chen-wei@sumeeko.com

### Auditors/Assessors:

Name:	Company:	Phone:	Email:
Tseng Wei Chun	SUMEEKO	+886-7-788-9168	jaj@sumeeko.com

Number of "Not Satisfactory" Findings: 0

Number of "Needs Immediate Action" Findings: 0

Number of "Fail" Findings in the Job Audit(s): 0

				Assessment			
Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
Section 1 - Management Responsibility & Quality Planning 管理責任與品質規劃							
1.1	Is there a dedicated and qualified heat treat person on-site? 現場是否有專門且資格符合的熱處理技術人員？	To ensure readily available expertise, there shall be a dedicated and qualified heat treat person on site. This individual shall be a full-time employee and the position shall be reflected in the organization chart. A job description shall exist identifying the qualifications for the position including metallurgical and heat treat knowledge. The qualifications shall include a minimum of 5 years experience in heat treat operations or a combination of a minimum of 5 years of formal metallurgical education and heat treat experience. [1] 為了確保隨時可取得專業知識，現場需要一位專門且合格的熱處理技術人員。[2] 此位人員需是全職員工，且其職位需被列入組織圖中。[3] 該職位的工作職掌需有冶金與的熱處理相關知識的描述及資格鑑定方式。[4] 工作職掌需包含具有熱處理作業五年以上經驗，或綜合正式的冶金教育與熱處理工作共五年以上經驗。	JW Wang has 15-year experience of heat treatment line management. He owns certificate issued by Metal Industries  Research & Development Centre. Besides JW, Eric Wu(General Manager), SH Tseng(QA engineer), WJ Teseng(QA engineer), are both experienced engineer.  Sumeeko have a "proficiency matrix" that shows qualifications of employees associated to the heat treatment process 熱處理課王振璋先生有15年以上熱處理經驗並有金屬中心熱處理訓練證書 吳森富總經理、品管工程師曾士協&曾章鈞也有熱處理的經驗 世德有一個"熟練矩陣"證明熱處理線上所有作業員的資格		X		
1.2	Does the heat treater perform advanced quality planning? 熱處理廠是否執行先期品質規劃？	The organization shall incorporate a documented advance quality planning procedure. A feasibility study shall be performed and internally approved for each part. Similar parts can be grouped into part families for this effort as defined by the organization. After the part approval process is approved by the customer, no process changes are allowed unless approved by the customer. The heat treater shall contact the customer when clarification of process changes is required. This clarification of process changes shall be documented. [1]公司文件應納入"先期品質規劃"之程序。每一零件應進行可行性評估和公司內部審核。[2] 公司可以將相似的零件定義為同一類型的產品進行可行性評估。[3] 生產性零組件核准程序 在客戶審核通過後，除非客戶同意，否則不允許改變任何程序。[4] 當製造程序需要改變時，熱處理廠需與客戶連絡要求審核。[5] 這個確認製造程序變更的紀律需被記錄歸檔	We use Procedure : "SQD-8302-00 APQP Job Descriptions" to establish the necessary steps to ensure that the product meets customer needs and expectations.  Engineering and Sales and R&D, internal manufacturing drawings are created for each part.  我們使用工作指導 ( SQD-8302-00 APQP ) 建立必要的步驟，以確保產品滿足客戶的需求和期望 工程和銷售和研發部，為每個部件創建內部製造圖紙。		X		
1.3	Are heat treat FMEA's up to date and reflecting current processing? 熱處理 PFMEA是否為最新的且反應出目前的製程？	The organization shall incorporate the use of a documented Failure Mode and Effects Analysis (FMEA) procedure and ensure the FMEA's are updated to reflect current part quality status. The FMEA shall be written for each part or part family or they may be process-specific and written for each process. In any case, they shall address all process steps from part receipt to part shipment and all key heat treat process parameters as defined by the organization. A cross-functional team shall be used in the development of the FMEA. All special characteristics, as defined by the organization and its customers, shall be identified, defined, and addressed in the FMEA. 公司文件應納入製程失效模式 (PFMEA)程序，並確保 PFMEA適時更新以反映出目前產品品質狀況。每一零件或同一類型的零件應有其 PFMEA。在所有情況下，FMEA應說明從零件收料至零件出貨的每一程序，及註明公司所有主要熱處理程序的參數。PFMEA的展開應由包括操作員在內的跨功能團隊，及其各項RPN數據應每年評估更新。所有公司與客戶認定的重要或關鍵的特性應被鑑別、定義、及註明在 PFMEA裡。	Yes,Summeko has an internal approved Control and FMEA as follows: Heat treat Control Plan & FMEA Revision "HT-10B21-8.8 M6 PFMEA" Approval Date 2017/07/27  是的，Summeko有一個內部批准的控制和FMEA如下： 熱處理控制計劃和FMEA修訂版"HT-10B21-8.8 M6 PFMEA" 批准日期2017/07/27		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.4	Are heat treat process control plans up to date and reflecting current processing? 熱處理製程管制計劃是否為最新的且反應出目前的製程？	<p>The organization shall incorporate the use of a documented Control Plan procedure and ensure the Control Plans are updated to reflect current controls.</p> <p>The Control Plans shall be written for each part or part family or they may be process-specific and written for each process. In any case, they shall address all process steps from part receipt to part shipment and identify all equipment used and all key heat treat process parameters as defined by the organization.</p> <p>A cross-functional team, including a production operator, shall be used in the development of Control Plans, which shall be consistent with all associated documentation such as work instructions, shop travelers, and FMEA's. All special characteristics, as defined by the organization and its customers, shall be identified, defined, and addressed in the Control Plans. Sample sizes and frequencies for evaluation of process and product characteristics shall also be addressed consistent with the minimum requirements listed in the Process Tables, Sections 3.0 and 4.0.</p> <p>[1] 公司文件應納入管制計劃，並確保管制計劃適時更新，以反映出目前產品管制狀況。 [2]每一零件或同一類型的零件應有其管制計劃。 [3] 管制計劃可採製程描述方式以紀錄每一製程。在所有情況下，管制計劃應說明從零件收料至零件出貨的每一步驟及其使用設備，並註明公司所制定的所有主要熱處理程序之參數。 [4]管制計劃的展開應由包括操作員在內的跨功能團隊，並應相關的文件：如作業標準書、作業流程、和 PFMEAs等，取得一致性。 [5]所有公司與客戶認定的重要或關鍵的特性應被鑑別、定義、及註明在管制計劃裡。針對製程與產品特性的評估，其取樣數目與頻率也應與所附流程表， 3.0 和 4.0中所列出的最低要求一致。</p>	<p>Sumeeko Procedure : "SQD-8302-01 Prepare Job Descriptions"documented procedure for Management to periodically each year regularly review current control plans</p> <p>Sumeeko程序：“SQD-8302-01準備工作說明”文件化管理程序，每一年定期審查當前控制計劃</p>		X		
1.5	Are all heat treat related and referenced specifications current and available? For example: Industry and customer specific specifications such as SAE, AIAG, ASTM, ISO, EN, JIS, General Motors, Ford, and Chrysler. 是否有最新的所有熱處理相關的參考規範？例如:SAE, AIAG, ASTM, 通用, 福特, 和VW60250。	<p>To ensure all customer requirements are both understood and satisfied, the organization shall have all related heat treat and customer referenced standards and specifications available for use and a method to ensure that they are current. Such standards and specifications include, but are not limited to, those relevant documents published by SAE, AIAG, ASTM, ISO, EN, JIS, General Motors, Ford, and Chrysler. The organization shall have a process to ensure the timely review, distribution, and implementation of all customer and industry engineering standards / specifications and changes based on customer-required schedule. Timely review should be as soon as possible and shall not exceed two working weeks. The organization shall document this process of review and implementation, and it shall address how customer and industry documents are obtained, how they are maintained within the organization, how the current status is established, and how the relevant information is cascaded to the shop floor within the two-week period. The organization shall identify who is responsible for performing these tasks. [1]為了確保所有客戶的要求是被理解和滿意的，公司應具有所有有關熱處理和客戶參考規範以供使用， [2]並且應具有一方法以確保這些標準與規範是符合當時最新的。這些規格與規範包括（但不局限於） SAE, AIAG, ASTM, 通用, 福特, 及克萊斯勒等所出版的相關文件。</p> <p>[3]公司應有一程序來確保適時的檢視、分發、及實施所有客戶和工業相關的規格與規範。 [4]這方法應盡快地執行並且間隔期不應超過兩個星期。 [5] 公司應將 這個審視與執行的程序文件化，並且註明客戶與工業文件是如何取得的，這些文件是如何在組織中被維護，最新的文件狀態是如何被確定的，相關的資訊是如何在兩週內提供給工作現場。 [6]公司應明定執行這些工作的責任單位。</p>	<p>Sumeeko Procedure : "SQD-7503-00 Data Management Approach"stipulate R&amp;D and Quality maintains standards and documents reviews every 6 months.</p> <p>Standards are stored in share drive location : "X:\各部門資料區\研發部(Develop)\公司共用資料(Develop Public Data)\工程規範(ENGINEERING STANDARDS)"</p> <p>Sumeeko程序：“SQD-7503-00資料管理辦法”規定研發和品管每6個月保持標準和文件審查。並儲存在“X:\各部門資料區\研發部(Develop)\公司共用資料(Develop Public Data)\工程規範(ENGINEERING STANDARDS)"</p>		X		
1.6	Is there a written process specification for all active processes? 所有目前製程是否有書面的規範？	<p>The heat treater shall have written process specifications for all active processes and identify all steps of the process including relevant operating parameters. Examples of operating parameters include process temperatures, cycle times, load rates, atmosphere or gas flow settings, belt speeds, quench agitation speeds, etc. Such parameters shall not only be defined, they shall have operating tolerances as defined by the organization in order to maintain process control.</p> <p>All active processes should have a written process specification.</p> <p>These process specifications may take the form of work instructions, job card, computer-based recipes, or other similar documents.</p> <p>熱處理廠所有製程應有書面規範並且明定包括相關的操作參數的所有步驟。例如：操作參數包括製程溫度、製程時間、裝載率、大氣或氣體流量的設定、輸送帶速度、淬火液攪拌速度等。這些參數應不只有被定義，它們應有公司所明定的操作公差來維持製程管控。所有實施中製程應有書面的規範。這些製程規範可以是作業標準書、流程管制卡、電腦程式單、或其他類似文件。</p>	<p>The heat treatment process is documented and there is a copy of the heat treatment office.</p> <p>Process specifications (parameters) are stored electronically in the heat treat system, and cannot be altered without approved management personnel access using a key.</p> <p>Heat treat magement works with Engineering prior to any changes.</p> <p>熱處理相關製程以文件化,熱處理辦公室中存有複本過程參數以電子方式存儲在熱處理系統中，如果沒有經過</p>		X		

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1.7	Has a valid process capability study been performed initially and after process equipment has been relocated, or had a major rebuild? 設備的遷移或重新裝設時，是否有重新安置前後的製程能力分析？	To demonstrate each process is capable of yielding acceptable product the organization shall perform process capability studies for the initial validation of each process, after relocation of any process equipment, & after a major rebuild of any equipment. The organization shall define what constitutes a major rebuild. Initial process capability studies shall be conducted for all heat treat processes per furnace line defined in scope of work & in accordance with customer requirements. A furnace line may include a combination of equipment that is integrated in the performance of a heat treatment process, e.g., hardening, quenching, and tempering. Capability study techniques shall be appropriate for the heat treat product characteristics, e.g., tensile strength, case depth, hardness. Any specific customer requirements shall be met. In the absence of customer requirements, the organization shall establish acceptable ranges for measures of capability. An action plan shall exist to address the steps to followed in case capability indices fall outside customer requirements or established ranges. [1] 為了證明每一製程有能力產出可接受的產品，公司應在任一製程設備重新安置或重裝之初期，執行產品初期製程能力確認。 [2] 公司應明定什麼情況構成設備重新設定。初期產品製程能力分析可針對每一爐的所有熱處理製程來分析，定義其作業範圍與今後之年度分析。 [3] 一熱處理製程的績效表現可能包括數種設備的組合，例如，硬化、淬火、回火，其製程能力的分析技術須符合該產品的特性例如抗拉強度、外層硬化深度、硬度。 [4] 所有客戶的特殊要求必需要被吻合。若客戶沒有特殊要求時，公司應設立製程能力測量的可接受範圍。 [5] 當外部客戶要求或內部製程有能力規範無法達到時，須有一應變計畫，指示應依循的處理步驟。	Every year before the New Year will be suspended for equipment maintenance, after new year the equipment must be the process capability analysis The process capability was analyzed when the machine was restarted at 2017/02/04 a valid process capability study has been performed after the process equipmen had a major rebuild  過年前會停機進行設備維修,新年後設備開機必須進行製程能力分析 於2018/02/歲休後重新開機時進行製程能力分析 熱處理設備有重大維修後也需要對設備進行製程能力分析		X		
1.8	Does the heat treater collect and analyze data over time, and react to this data? 是否有全時程收集分析資料及對此資料做對應？	The analysis of products and processes over time can yield vital information for defect prevention efforts. The organization shall have a system to collect, analyze, and react to product or process data over time. Methods of analysis shall include ongoing trend or historical data analysis of product or process parameters. The organization shall determine which parameters to include in such analysis. 全時程收集產品及製程的分析能對獲致預防不良品的重要訊息。公司應有一個系統來收集、分析、和對應長時程收集的產品或製程資料。分析的方法應包括進行中趨勢線，或重要的產品或製程參數之歷史資料分析。公司應決定哪一些重要的參數應包含在此分析裡。	All heat treatment QC records are stored in "X:\各部門資料區\品管實驗室(QC Laboratory)\公司共用資料(QC Laboratory Public Data)\士協熱處理品保檢驗區"  Quality control personnel use this data to analyze the process and products 所有熱處理品管檢驗數據都儲存在X:\各部門資料區\品管實驗室(QC Laboratory)\公司共用資料(QC Laboratory		X		
1.9	Is management reviewing the heat treat monitoring system every 24 hours? 主管是否是每24個小時檢視熱處理監控系統？	Management shall review the furnace monitoring systems at intervals not to exceed 24 hours. The heat treat monitoring system includes but is not limited to temperature strip charts, atmosphere strip charts, computer data logs, furnace and operator logs, etc. The management review shall include efforts to detect out-of-control conditions or alarm conditions. The process of reviewing the furnace data shall be documented and this requirement also applies to computerized data. 主管應時常檢視熱處理爐之監視系統其間隔不可超過24小時。熱處理監視系統包括(但不受限於)溫度報表、大氣溫度表、電腦記錄表及操作者記錄表等。管理審查應包括積極檢視所有偏離失控或警報情況 確保異常狀況均已正確處理完畢 嫌疑工件產品均已依規定處置。熱處理爐數據的檢視程序須加以文件化，並且這個要求也適用於電腦化的數據文件。	Heat treatment operators review and document furnace stability every 2 hours in "S09-8F-10-00",and heat treatment supervisors daily review The documentation can be found in the heat treatment control room. 熱處理操作員每2小時檢查和記錄爐穩定性，熱處理監督員每日審查 文檔可以在熱處理控制室中找到。		X		
1.10	Are internal assessments being completed on an annual basis, at a minimum, using AIAG HTSA? 如果遵照AIAG HTSA 為標準,那麼每年至少都要進行一次內部評審。	The organization shall conduct internal assessments on an annual basis, at a minimum, using the AIAG HTSA. 公司每年至少有一次根據AIAG HTSA 的要求內審，相關記錄應包含矯正預防措施	Yes,it was done in May 2020		X		

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1.11	Is the OEM customer notified when parts are reprocessed? 當重工時，OEM 客戶將被通知	<p>The OEM shall be notified when parts are reprocessed in the heat treat operation. It is preferred that the notification be on a case-by-case basis. However, it is understood that some reprocessing (such as but not limited to re-tempering operations) may be pre-approved during the APQP or PPAP phase. To be pre-approved for reprocessing, the heat treater shall meet the following requirements:</p> <ul style="list-style-type: none"> <li>The heat treater shall submit for approval by the OEM customer the reprocessing procedure and this procedure shall be referenced in the heat treater's FMEA and process control plan</li> <li>The procedure shall describe product characteristics for which reprocessing is permissible as well as those characteristics for which reprocessing is not permissible.</li> <li>Any reprocessing activity shall require a new processing control sheet issued by qualified technical personnel denoting the necessary heat treat process modifications.</li> <li>Records shall clearly indicate when and how any material has been reprocessed.</li> <li>The Quality Manager or a designee shall authorize the release or reprocessed product.</li> </ul> <p>零件在重工處理時，應通知OEM。依個案通知客戶較佳。然而，據了解，一些重工處理（例如，但不僅限於重新回火作業）可在APQP或PPAP進行中預先核准。熱處理廠進行重工處理的預先核准，應當符合下列要求：</p> <ul style="list-style-type: none"> <li>熱處理廠應提供重工程序給OEM客戶核准，並且此程序應放在熱處理廠的FMEA和過程控制計劃</li> <li>程序書應描述哪些產品特性是允許重工處理，以及哪些特性是不允許重工處理。</li> <li>任何重工處理活動應當需要一個新的製程控制表，並由合格的技術人員，進行必要的熱處理工藝修改。</li> <li>記錄應明確表明產品何時以及如何被重工。</li> <li>品保經理或指定人應批准放行或再重工產品。</li> </ul>	<p>Sumeekeo Procedure : "SQD-8701-00 nonconforming product management" provided that heat treatment can not reworked.</p> <p>世德程序"SQD-8701-00不合格產品管理"規定熱處理不能返工"</p>		X		
1.12	Does the Quality Department review, address, and document customer and internal concerns? 品質部門是否檢討、指出及文件化所有來至客戶回饋及內部問題？	<p>The quality management system shall include a process for documenting, reviewing, and addressing customer concerns and any other concerns internal to the organization. A disciplined problem-solving approach shall be used.</p> <p>品質管理系統應包括一個文件化、能檢視及指出所有來至客戶回饋及公司內部問題的程序。一種有系統的問題解決方法應被採用。</p>	<p>Yes, we do it based on "SQD-8701-00 nonconforming product management"</p> <p>依照"SQD-8701-00不合格產品管理實施</p>		X		
1.13	Is there a continual improvement plan applicable to each process defined in the scope of the assessment? 是否每個評鑑範圍內的製程均有持續改善之計畫？	<p>The heat treater shall define a process for continual improvement for each heat treat process identified in the scope of the HTSA. The process shall be designed to bring about continual improvement in quality and productivity. Identified actions shall be prioritized and shall include timing (estimated completion dates). The organization shall show evidence of program effectiveness.</p> <p>熱處理廠應該在HTSA規定的範圍內對熱處理的每個程序定義持續改進計畫，對過程應該進行設計以便在品質和生產力方面能夠得到持續改進。首先要說明採取的措施，其中包括估計的完成時間。公司應該出示改進計畫項目有效性的證據。</p>	<p>There are seven missing internal audits on 2018/5/28. For related missing records, please see CQI-9 Audit_2017.05.28 Corrective Actions Plan</p> <p>2019/5/20有1項內部審計缺失。有關相關缺失記錄，請參閱CQI-9 Audit_2019.05.20糾正措施計劃</p>		X		
1.14	Does the Quality Manager or designee authorize the disposition of material from quarantine status? 品管經理或指定人員是否授權處置隔離區中的可疑物料？	<p>The Quality Manager is responsible for authorizing and documenting appropriate personnel to disposition quarantine material.</p> <p>品管經理負責授權及發文合適的人員去處理隔離區中的可疑物料</p>	<p>In accordance with the "SQD-8701-00 non-conforming product management" provides that by the laboratory to determine suspicious material handling methods</p> <p>Suspected lot will be labeled in yellow &amp; reported to supervisor.</p> <p>Defected lot would be labeled in red, and move to quarantined area.</p> <p>根據"SQD-8701-00不合格產品管理"規定，由實驗室確定可疑物料處理方法</p> <p>可疑批次將標記為黃色並報告給主管。缺陷的批次將被標記為紅色，並移動到隔離區。</p>		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.15	Are there procedures or work instructions available to the heat treat personnel that define the heat treating process? 操作員是否可拿到整個熱處理製程的操作手冊或程序書?	There shall be procedures or work instructions available to heat treat personnel covering the heat treating process. These procedures or work instructions shall include methods of addressing potential emergencies (such as power failure), equipment start-up, equipment shut-down, product segregation (See 2.8), product inspection, and general operating procedures. These procedures or work instructions shall be accessible to shop floor personnel. 涵蓋所有熱處理製程的操作手冊應提供給熱處理人員。手冊將包括所有製程的工作指導書，指示潛在緊急狀況 (例如停電)、設備啟動、設備停止、產品分隔 (參考 2.8)、產品檢查及一般操作步驟。工作指導書將涵蓋從產品進料至產品出貨之所有操作步驟，並且基層現場人員將容易取得這些程序或工作指導書。	Yes, All heat treatment related documents can be found in the control room		X		
1.16	Is management providing employee training for heat treating? 管理者是否為員工提供了熱處理培訓。	The organization shall provide employee training for all heat treating operations. All employees, including backup and temporary employees, shall be trained. Documented evidence shall be maintained showing the employees trained and the evidence shall include an assessment of the effectiveness of the training. Management shall define the qualification requirements for each function, and ongoing or follow-up training shall also be addressed. 公司應提供給員工所有熱處理操作的訓練。所有職員，包括儲備人員或臨時人員將被訓練。員工的訓練和訓練的成效評估將被紀錄且所紀錄的文件將被維護。管理者將定義每一職位的資格要求，並且也著重持續或後續的職能訓練。	All heat treatment staff were trained. skill matrix is published in heat control room 所有熱處理工作人員都接受了培訓。熱控制室有貼技能矩陣一覽表		X		
1.17	Is there a responsibility matrix to ensure that all key management and supervisory functions are performed by qualified personnel? 是否有責任矩陣來確認主要的經營與管理職能由合格人員執行?	The organization shall maintain a responsibility matrix identifying all key management and supervisory functions and the qualified personnel who may perform such functions. It shall identify both primary and secondary (backup) personnel for the key functions (as defined by the organization). This matrix shall be readily available to management at all times. 公司應該保持有一個責任矩陣來確保從事關鍵管理和監督職能的人員是合格的。同時對關鍵職能的主要負責人和代理應區別開來。這種矩陣在管理體系中應該一直存在且能讓管理人員易於遵循使用。	All heat treatment staff were trained. skill matrix is published in heat control room 所有熱處理工作人員都接受了培訓。熱控制室有貼技能矩陣一覽表		X		
1.18	Is there a preventive maintenance program for all heat treat equipment? Is maintenance data being utilized to form a predictive maintenance program? 是否有維修計畫，並且維修資料是否可被延伸來作為預期保養計畫的執行參考?	The organization shall have a documented preventive maintenance program for all heat treat process equipment. The program shall be a closed-loop process that tracks maintenance efforts from request to completion to assessment of effectiveness. Equipment operators shall have the opportunity to report problems, and problems shall also be handled in a closed-loop manner. Company data, e.g., downtime, quality rejects, first-time-through capability, recurring maintenance work orders, and operator-reported problems, shall be used to improve the preventive maintenance program. Maintenance data shall be collected and analyzed as part of a predictive maintenance program. 針對主要製程設備，公司應提供一個定期保養方案。方案將是一個閉路循環過程，此過程是追蹤從維護請求、保養完成，到對效果的評估。設備操作員將有機會提報問題，並且問題也將以閉路循環方式處理。公司數據，例如：停機時間，品質報廢物料，製程一次合格率，再發的維護工單，及操作員報告的問題，將被使用於改善預防性保養計畫。熱處理爐和氣體電磁閥將依據公司規定的頻率安排燒碳 (參見參考流程表，表1)。維修的紀錄將被收集與分析，作為保養計劃的一部份。	Yes, we have daily (S09-8F-00-50), monthly (S09-8F-00-60), and quarterly (S09-8F-00-70) maintenance programs. 是的，我們有每日 ( S09-8F-00-50 )、每月 ( S09-8F-00-60 ) 和季度 ( S09-8F-00-70 ) 維護計劃。		X		
1.19	Has the Heat Treater developed a critical spare part list and are the parts available to minimize production disruptions? 是否有關鍵零件備品表並可取得以期降低斷線危機	The heat treater shall develop and maintain a critical spare parts list and shall ensure the availability of such parts to minimize production disruptions. 熱處理者將建立並且維護一份重要備用零件清單，並且保證這些零件的可取得性，使生產線中斷危險減到最低	The spare parts list has been recorded at "S09-8F-00-90" 備件列表已記錄在"S09-8F-00-90"		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.20	<p><i>Is material from different steel mill heats or metals which may preclude achieving the specified metallurgical properties prevented from being processed together?</i></p> <p><i>對不同的鋼材爐號或金屬，為了達到指定的冶金性能，是否有分開處理？</i></p>	<p><i>Different steel mill heats or metals which require different heat treat parameters, such as but not limited to, austenitizing, quenching, or tempering times and/or temperatures shall be processed separately in order to achieve specified metallurgical properties.</i></p> <p><i>不同的鋼材爐號或金屬需要不同的熱處理參數，例如，但不局限此，奧斯田鐵化，淬火或回火時間和/或溫度就應分開處理，以達到指定的冶金性能。(這一點需要對盤元線材之球化熱處理廠 特別查核叮嚀)</i></p>	<p>In the Sumeeko procedure: "SQD-8504-41 Heat Treatment Operation Management Method"</p> <p>1. Requires different batches of the same material that need to be spaced greater than 2 meters</p> <p>2. Must wait for the previous material to be completely out of the furnace No other material before entering the furnace</p> <p>在Sumeeko程序中：“SQD-8504-41熱處理操作管理方法”</p> <p>1.需要相同材料的不同批次，需要間隔大於2米</p> <p>2.必須等待前面的材料完全脫離爐子進入爐子之前沒有其他材料</p>		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
Section 2 - Floor and Material Handling Responsibility 線場與物料管理責任							
2.1	Does the facility ensure that the data entered in the receiving system matches the information on the customer's shipping documents? 廠方是否確保收料系統的資料與客戶託運文件上的資料相符合?	It is critical that all customer requirements and lot identification be adequately transferred to internal heat treat documents. The facility shall ensure that the data entered in the receiving system match the information on the customer's shipping documents. Documented processes and evidence of compliance shall exist, e.g., shop travelers, work orders, etc. Sometimes the material received does not precisely correspond to customer shipping documents. The facility shall have a detailed process in place to resolve receiving discrepancies. The requirements stated above also apply to captive heat treat departments. This process refers to receiving and shipping the parts in and out of the heat treat department. 將客戶的所有要求與生產批號，恰當的移轉到內部熱處理文件上是非常重要的。廠方應確保收料系統裡面的數據要與客戶託運的文件相符。過程的文件化與符合的證據應存在，例如，流程管制卡，工令單等。有時接收到的材料與客戶託運文件上的材料並不完全吻合。廠方應有一個恰當的程序以解決所接收材料的差異。上述的需求也適用於監管熱處理部門，這個流程可看出接收與託運貨物進出熱處理部門的狀況。	In "SQD-8504-41 heat treatment operation management method" in the provisions of the need to receive heat treatment materials need to do the feed inspection Each lot contains a unique series no. issued from ERP. 在"SQD-8504-41熱處理操作管理方法"中規定需要接受熱處理材料時需要做進料檢查 每一批都包含一個由ERP系統產出獨力工號		X		
2.2	Is product clearly identified and staged throughout the heat treat process? 產品是否在整個熱處理過程中被清楚的分段辨識處理?	Procedures for part and container identification help to avoid incorrect processing or mixing of lots. Appropriate location and staging within the facility also help to ensure that orders are not shipped until all required operations are performed. Customer product shall be clearly identified and staged throughout the heat treat process. Non-heat treated, in-process, and finished product shall be properly segregated and identified. All material shall be staged in a dedicated and clearly defined area. 零件和料筐的標識程序有助於避免批次搞混以及錯誤的加工。公司正確的位置和分段運輸有助於滿足訂單要求之後再發貨。在熱處理過程中客戶的產品應該清楚的標識和區分。沒有經過熱處理的產品和正在熱處理的產品以及成品都應正確的隔開並標識好。所有的料都應該專門的分出並定義區域。	In "SQD-8505-00 Warehousing management approach" provides various stages of materials (including semi-finished products, nonconforming goods) storage location is identified and phased. 在"SQD-8505-00倉儲管理辦法"中規定各種階段物料(包含半成品,不合格品)存儲位置被識別和分階段		X		
2.3	Is lot traceability and integrity maintained throughout all processes? 在整個流程當中是否能維持貨物批號的追蹤與完整性?	Out-going lot(s) shall be traceable to the incoming lot(s). The discipline of precisely identifying lots and linking all pertinent information to them enhances the ability to do root cause analysis and continual improvement. 出貨的批號應可被追蹤到進貨的批號。精確辨識批號與連結到適當的資訊，可增加做真因分析與持續改善的能力。	Each lot contains a unique series no. issued from ERP for traceability and integrity,		X		
2.4	Are procedures adequate to prevent movement of non-conforming product into the production system? 流程的運作是否適當能避免不符合的產品進入生產系統?	The control of suspect or non-conforming product is necessary to prevent inadvertent shipment or contamination of other lots. Procedures shall be adequate to prevent movement of non-conforming product into the production system. Procedures shall exist addressing proper disposition, product identification, and tracking of material flow in and out of the hold area. A non-conforming hold area shall be clearly designated to maintain segregation of such material. 有疑慮或不符合的產品的管控能避免疏忽下的出貨或是與其他批次的貨物混料。流程能適當地避免不符合的產品進入生產系統。流程中應存在著適當的處置指示、產品識別及在進、出貨管制區域原料流動的追蹤。一個不合格品管制區域應清楚的標示將此類原料隔離。	In accordance with the "SQD-8701-00 non-conforming product management" provides that by the laboratory to determine suspicious material handling methods Suspected lot will be labeled in yellow & reported to supervisor. Defected lot would be labeled in red, and move to quarantined area. 根據"SQD-8701-00不合格產品管理"規定，由實驗室確定可疑物料處理方法 可疑批次將標記為黃色並報告給主管。缺陷的批次將被標記為紅色，並移動到隔離區。		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
2.5	Is there a system to identify trap points in the entire heat treat process to reduce risk of mixed parts (inappropriate, non-heat treated, or improperly heat treated parts)? 是否有一個可鑑別整個熱處理流程中卡料點的系統以減少工件混料的風險？(外來物、未加工的工件或是熱處理失敗的工件)	Heat-treating furnaces and other processing equipment contain areas that have a risk of trapping or holding parts. Such trapping of parts can lead to damage, improperly processed parts or lot mixing/contamination. A system shall exist to identify trap points in the entire heat treat process to reduce risk of mixed parts (inappropriate, non-heat treated, or improperly heat treated parts). The heat treater shall have documented procedures to identify and monitor trap points for each process/equipment. Monitoring of potential trap points shall occur for every part changeover. 熱處理爐與其他製程的設備軍有可能堵塞或卡住滯留工件產品之風險。如此工件的堵塞會導致設備損傷、殘留不當製程的工件或是工件的混料。系統應存有能夠辨識整個熱處理流程中的卡料點，以降低工件混淆的風險 (外來物、未加工的工件或是熱處理失敗的工件)。熱處理廠應有文件化的流程去辨認與監察每個流程/設備的堵塞點。每次生產批的更換前均應檢查並清除潛在的堵塞點。	1. Computer will request 2 meter as gap for the same material from different lot. As to different material, computer will request 10-meter as gap. 2. We have stopper mechanism for inspection 3. We check the tank before filling parts & leave record.		X		
2.6	Are containers free of inappropriate material? 箱子（爐子）是否沒有外來料？	Containers handling customer product shall be free of inappropriate material. After emptying and before re-using containers, containers shall be inspected to ensure that all parts and inappropriate material have been removed. The source of inappropriate material shall be identified and addressed. This is to ensure that no nonconforming heat treated parts or inappropriate material contaminate the finished lot. 容器中客戶的產品應避免外來的材料。容器中應檢驗無外來的材料及若有外來的材料須留意來源。在倒空及再次使用容器之前，應確實檢查容器是空的。這是確保無未熱處理產品與完成熱處理產品間的混料。	In "SOP-6301-PF-638 Heat treatment tank cleaning instructions" 1. We'll dump parts upside down to remove all parts. 2. We'll use magnet to make sure for remaining parts 3. Inspection result will be recorded in "S09-6F-01-00" 在"SOP-6301-PF-638熱處理爐清洗說明書" 1.我們將倒置零件，倒掉所有零件。		X		
2.7	Is furnace loading specified, documented and controlled? 熱處理爐承載量是否明確說明、文件化及被管控？	Furnace loading parameters shall be specified, documented, and controlled. Examples include feed rate, belt speed, number of parts per fixture, and load weight. Refer to Process Tables, Section 3.0, for frequency of checks. 熱處理爐承載參數應明確說明、文件化及被管控。例如包括供料率、輸送帶速度、每套夾具的工件數量與裝載重量。參見製程表第 3.0部分之檢查頻率。	1. We follow control plan "HT-35ACR-109 M6 PCP" 2. We record the data in FORM S09-8F-00-21 1.我們遵循控制計劃"HT-35ACR-109 M6 PCP" 2.我們將數據記錄在FORM S09-8F-00-21中		X		
2.8	Are operators trained in material handling, containment action and product segregation in the event of an equipment emergency including power failure? 操作員是否做訓練對斷電等的設備故障突發事件之材料採取控管、防阻行動與產品隔離措施？	Unplanned or emergency downtime greatly raises the risk of improper processing. Operators shall be trained in material handling, containment action, and product segregation in the event of an equipment emergency including power failure. Training shall be documented. Work instructions specifically addressing potential types of equipment emergencies and failures shall be accessible to and understood by equipment operators. These instructions shall address containment actions related to all elements of the heat-treating process, e.g., loading, austenitizing, quenching, tempering. 無計畫或緊急的停工會大幅提高不當製程之風險。[1]操作員應接受對斷電等的設備故障突發事件之材料採取控管、防阻行動，與產品隔離措施的訓練。[2] 訓練記錄應文件化。[3] 明確的指出設備突發狀況與失敗的潛在類型的工作指導書應讓設備操作員容易取得與了解。[4] 這些指導書應指出有關於所有熱處理單元之防堵行動，例如：進爐、沃斯田鐵化、淬火與回火。	Heat treatment personnel in accordance with "SQD-8504-49 heat treatment emergency response" for internal education and training 熱處理人員依照"SQD-8504-49熱處理緊急應變說明"進行內部教育訓練		X		
2.9	Is the handling, storage and packaging adequate to preserve product quality? 搬運、儲存與包裝是否能維持產品品質？	Handling, storage, and packaging shall be adequate to preserve product quality. The heat treater's furnace loading system, in-process handling, and shipping process shall be assessed for risk of part damage or other quality concerns. Some equipment includes conveyors and other moving components that may not be able to handle all part configurations. Other practices such as stacking of overloaded containers can also increase the risk of part damage. 搬運、儲存與包裝過程都需要適當的來保護產品品質。熱處理的上下料系統，製程中的搬運與運輸部應要指出產品損壞或其他品質問題的風險。有些設備雖包含了輸送帶和一些搬運機構，但可能無法處理全程工件的放置。其他的補助做法如將堆積滿載的儲存桶，會增加工件損壞的風險。	1. We follow SOP: SQD-8505-00 (storage) & SQD-8507-00 (material handling) 2. The material BINS has line for max height. 3. There could have max. 3 stacked BINS. 1.依照"SQD-8505-00 倉儲管理辦法"&"SQD-8507-00 搬運管理辦法"規定實施作業 2.船桶有裝載高度警戒線 3.船桶堆疊最高3層		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
2.10	housekeeping, environmental and working conditions conducive to control and improved quality? 工廠的清潔度、管理、環境和工作條件是否有利於品質改進？箱子（爐子）是否沒有外來料？	Plant cleanliness, housekeeping, environmental, and working conditions shall be conducive to controlling and improving quality. The heat treater should evaluate such conditions and their effect on quality. A housekeeping policy shall be clearly defined and executed. The facility shall be reviewed for conditions that are detrimental to quality processing such as loose parts on floor, oil around quench tanks, inadequate plant lighting, smoke, etc. 工廠的清潔度、管理、環境和工作條件應該有利於改進品質。熱處理負責人應該評估這些條件以及這些條件對產品品質帶來的影響。明確執行和定義管理方針。應該評估對品質處理有害的設施條件，比如把零件亂放在地板上，淬火槽四周沾滿油，工廠燈光不夠亮，煙塵等等。	1. "SQD-6301-00 6S movement management approach" has been established 2. Daily cleaning was conducted  1."SQD-6301-00 6S運動進行管理辦法"已建立 2.進行每日清潔		X		
2.11	Are parts free from contaminants that would be detrimental to the heat treatment of the product? 工件是否可以避免一些不利於熱處理的污染物？	Many heat-treated parts are subjected to surface finish or appearance operations such as plating or coating after heat treatment. Parts shall be free from contaminants that are detrimental to subsequent processes or the product. Pre-wash (if applicable) and post-wash parameters shall be monitored and documented. Oils and other contaminants or residues can be difficult to remove once subjected to the heat treatment process. Review the chemical supplier's recommendation for cleaning the system. Parts shall be free of rust, burrs, chips, detrimental amounts of drawing compound, cutting fluids, rust preventing oils, lubricants, etc., prior to heat treat. Note: Refer to the appropriate heat treater's requirements and specifications to determine acceptability. Refer to Process Table, Section 5.0, for frequency of checking washer solutions. 許多熱處理工件通常被要求在熱處理之後要做如電鍍層或塗層的表面處理。工件上不應該有不利於後續製程或產品本身的污染物。預先清洗(若可能)與製程後清洗參數應該被監督與文件化。當工件到達熱處理的程序，油污與其他污染物或殘渣是很難清除的，此時應審視化學品供應商針對系統清洗的建議。在熱處理前工件上不應該有生鏽、毛刺、碎片、不利於工件的抽製化學粉末、切削液、防鏽油、潤滑劑等等。備註：參考適當的熱處理廠要求與規範以確定可接受性。參考流程表，第五部分，檢查清洗溶液之頻率。	1. Wash the workpiece before the first wash with hot water, clean the surface of the workpiece oil or residue 2. After quenching the workpiece after the wash with hot water surface residual quenching oil 3.Cleaning tank hot water concentration is not clearly recorded  1.料件作業前回先用熱水前清洗淨，清潔工件表面油污或殘渣 2.工件淬火後會後用熱水洗淨工件表面殘餘淬火油 3.清洗槽熱水的濃度並明確記錄		X		
2.12	Is the quenching system monitored, documented, and controlled? 淬火系統是否被監控、文件化監控和管制？	The quenching system shall be monitored, documented, and controlled. The temperature, agitation, level, concentration (if applicable), time in the quenchant, and additions shall be controlled to the heat treater's specifications. Refer to Process Tables, Sections 3.0 and 5.0, for frequency of checks. Computer-monitoring equipment, with alarms and alarm logs, satisfy the verification requirement. Quench delay tolerance and alarm is required for furnaces with integral quench tanks.  Temper delay time shall be specified by the heat treater for parts that are quenched and tempered, e.g., carburizing, carbonitriding, neutral hardening, solution treating and aging. 淬火系統應該要被監控、文件化和管制。溫度、攪動、油位、濃度(若適用)，淬火的時間與添加物應該要控制在熱處理廠之技術規範內。檢查頻率參考流程表，3.0 與 5.0。備有警報與警報記錄器的電腦監控設施可滿足此確認需求。整個淬火槽的淬火延遲公差與警報裝置是必需的(箱式爐)。熱處理廠針對淬火與回火工件的回火延遲時間應該有所規範(針對非連續爐)，例如：滲碳、碳氮化、調質熱處理、固溶化與時效硬化。	1. Computer 24 hours at any time to monitor the quenching system 2. Manual check every 2 hours, and record the data in "S08-4F-42-01 "  1.電腦24小時隨時監控淬火系統 2.每兩個小時巡檢並記錄於"S08-4F-42-01 熱處理每日巡檢紀錄"		X		
2.13	Is soluble oil or other rust preventive monitored and controlled if applicable? 是否有實施可溶性油或其他防鏽油監控和管制？	Parts are often dipped in or sprayed with rust preventive solutions immediately after the heat treating process. Soluble oil solutions or other rust preventive solutions shall be monitored and controlled, if applicable. The heat treater shall have and maintain documented tolerances for the solutions. Refer to Process Tables, Section 5.0, for frequency of checks. 在熱處理之後，工件通常要浸泡或噴上防鏽油。如果有防鏽製程，可溶性油或其他防鏽油必須予以監控和管制。熱處理廠應將可溶性油使用之狀況文件化並加以維護。檢查頻率參考流程表 5.0。	Not every batch of heat treatment workpieces should be added anti-rust oil (because the process can not have oil)  When the product heat treatment after the need to add anti-rust oil, before the operation in accordance with the measurement of anti-rust oil concentration(handle refractometer) and recorded in the "S09-8F-11-00", and in accordance with "SQD-8504-45 quenching oil management approach" to add anti-rust oil  There is a monitoring system to monitor the anti-rust oil temperature  熱處理工件並非每一批都要防銹(因為後製程不可有潤滑油),當產品熱處理後需要防銹,作業前依照量測防銹油濃度(手持折光儀)並紀錄在"S09-8F-11-00",並依照"SQD-8504-45淬火油管理辦法"添加防銹油 有一監控系統監控防銹油溫度		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
2.14	Are process control parameters monitored per frequencies specified in Process Tables? 製程控制的參數是否依製程表所載之頻率監督？	Process control parameters shall be monitored per frequencies specified in Process Tables. Refer to Process Tables, Section 3.0. Computer monitoring equipment with alarms and alarm logs satisfy the verification requirement. A designated floor person shall verify the process parameters, e.g., by initialing a strip chart or data log. Management review is required per Question 1.9. 製程控制的參數應依製程表所載之頻率監督，參照流程表 3.0。備有警報與警報記錄器的電腦監控設施可滿足此項確認需求。特定的操作者應確認流程參數，例如在帶狀圖表或數據日誌上簽名。如同 1.9 需要管理者階層確認。	1.Heat treatment operators conduct 2 hour monitoring, and document the data in "S09-8F-10-00" 2.Alarm is in place  1.熱處理作業員進行2小時監控，並將數據記錄在"S09-8F-10-00" 2.報警已就位		X		
2.15	Are In-Process / Final Test Frequencies performed as specified in Process Tables? 製程中與最後測試頻率是否依流程表上所載實施？	In-Process / Final Test Frequencies shall be performed as specified in Process Tables. Refer to Process Tables, Section 4.0. 在製程中與最後測試頻率應依流程表上所載實施，參照流程表4.0。	They follow the inspection frequency specified in the SQD-7514-00 heat treatment operation management approach  他們遵循SQD-7514-00 熱處理作業管理辦法中規定的檢查頻率		X		
2.16	Is product test equipment verified? 產品測試設備是否有認證？	Product test equipment shall be verified. Test equipment shall be verified/calibrated per applicable customer-specific standard or per an applicable consensus standard such as those published by ASTM, DIN, EN, ISO, JIS, NIST, SAE etc. Verification/calibration results shall be internally reviewed, approved, and documented. Refer to Process Tables, Section 1.0, for frequency of checks. [1]產品測試設備應要通過認證。[2]測試設備應透過適用的客戶指定標準或被公認標準來認證或校正，例如已經頒布的ASTM, DIN, EN, ISO, JIS, NIST, SAE等等。[3]認證/校正結果應要應過內部審核、認可及文件化。[4]檢查頻率參照流程表 1.0。	1. In accordance with the "SQD-7601-00 measurement equipment management approach" recorded in the "S11-1Q-00-10 measurement management resume card" 2. Daily verification for test equipment is performed per:  1.依照"SQD-7601-00 量測設備管理辦法"記錄在"S11-1Q-00-10量測管理履歷卡"		X		
Section 3 - Equipment 設備							
3.1	Do furnaces, generators, and quench systems have proper process control equipment? 熱處理爐、氣體電磁閥及淬火系統是否有適當的流程控制設備？	The heat-treat equipment including furnaces, generators, and quench systems shall have proper process controls and related equipment. Examples include temperature, carbon potential/dew point, gas flows, quench monitoring system including agitation, temperature control, etc. as listed in the applicable Process Tables, Section 1.0. 熱處理爐、氣體產生器及淬火系統應有適當的流程控制與相關設備。例如包括溫度、碳勢/dew point (露點)、氣體流量、淬火監測系統包括攪拌、溫度控制與淬火油料分析等等...如列在適用的流程表有列出，第一部分。	Heat treatment line has a control room control heat treatment all operating parameters (temperature, carbon potential, time, oil temperature.. etc.) All parameters are saved by computer monitoring  熱處理線具有控制室控制熱處理所有工作參數(溫度、碳勢、時間、油溫等) 通過計算機監控保存所有參數		X		
3.2	Are process equipment calibrations and/or verification certified, posted, and current? 流程設備校正與/或證明是否有認證、張貼，目前狀況？	The calibration and certification of the process equipment shall be checked at regular specified intervals. Refer to the applicable Process Tables, Sections 1.0 and 2.0, for equipment calibration or certification time tables. 流程上的量儀及設備的校正與證明必需在正常的指定區間內檢驗。參照可適用之流程表，第一部分與第二部分，設備校正與認證時間表	Follow the frequency requirements in the SQD-7514-04 heat treatment atmosphere, furnace temperature, oil temperature operating instructions for calibration. 遵循SQD-7514-04 熱處理氣氛、爐溫、油溫作業說明中的頻率要求進行校準。		X		
3.3	Are thermocouples & protection tubes checked or replaced per Process Tables? 電熱偶與保護管是否有參照各製程表的要求，確實檢驗或更換？	The thermocouples and protection tubes shall be checked or replaced in compliance to a preventive maintenance schedule. Refer to the applicable Process Tables, Section 2.0. 電熱偶與保護管應照保養計劃表來執行檢驗或更換。參照可適用的流程表，第二部分。	Follow the frequency requirements in the SQD-7514-04 heat treatment atmosphere, furnace temperature, oil temperature operating instructions for calibration.  遵循SQD-7514-04 熱處理氣氛、爐溫、油溫作業說明中的頻率要求進行校準。		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
3.4	Are temperature uniformity surveys performed per requirements in Process Tables? 均溫測試 (TUS) 是否依流程表的需求執行?	Temperature uniformity surveys shall be conducted per the requirements in the applicable Process Tables, Section 2.0. Certain furnace designs, e.g., rotary retorts & <i>some continuous pusher furnaces preclude direct temperature profiles. Alternate test methods per Section 3.4.5 are acceptable for furnaces where temperature uniformity studies are not possible. TUS studies are not required for Ion Nitriding. Refer to Process Table H Item # H2.4 for specific requirements.</i> 均溫測試(TUS) 需參照合適的流程表的第二部分裡執行。特殊熱處理爐設計，例如旋轉式乾鍍爐 & 一些連續推桿式爐子無直接溫度分佈。針對無法做均溫研究的熱處理爐，替代測試方法依 CQI-9 手冊 section 3.4.5 是可接受的。滲氣熱處理不要求 TUS 研究。具體要求參照流程表 Process Table H 項目 H2.4	Follow the frequency requirements in the SQD-8504-44 heat treatment atmosphere, furnace temperature, oil temperature operating instructions for calibration.  Temperature uniformity surveys are performed by Chuang Yung in 2017/01 and the test report is stored in the physical laboratory of the Pingtung factory  遵循SQD-8504-44熱處理氣氛、爐溫、油溫作業說明中的頻率要求進行校準。 壯勇於2017/04年度進行溫度均勻性調查，測試報告存放在屏東工廠的實驗室		X		
3.5	Is the variation of the furnace controlled thermocouple from set point within the requirements in the Process Table? 熱處理爐的熱電偶，實際溫度與設定值之變異是否符合流程表要求?	The variation between the furnace control thermocouple value and the set point temperature shall be within the limits defined in the applicable Process Tables, Section 2.0. <i>For Ion nitriding refer to Process Table H Item # H2.5 for specific requirements.</i> 熱電偶實際溫度與設定值之變異需要被控制在指定的範圍內，依適用的流程表第2.0指定。而滲氣熱處理的具體要求參照流程表的#H2.5中。	Follow the frequency requirements in the SQD-8504-44 heat treatment atmosphere, furnace temperature, oil temperature operating instructions for calibration. Observe the actual temperature and set temperature difference of the 2 ~ 6 area of the quenching furnace are not more than 7 degrees Observe the actual temperature and set temperature difference of the 2 ~ 6 area of the tempering furnace are not more than 5 degrees  遵循SQD-8504-44熱處理氣氛、爐溫、油溫作業說明中的頻率要求進行校準。 觀察淬火爐2~6區域的實際溫度和設定溫差不超過7度 觀察回火爐2~6區域的實際溫度和設定溫差不超過5度		X		
3.6	Are the process & equipment alarm checks being tested <i>for proper function</i> ? 過程及設備的警報系統，是否測試運作正常？	The heat treater shall have a list of heat treat process and equipment alarms <i>that, if not properly working, may have a high probability of producing non-conforming product.</i> These alarms shall be checked quarterly at a minimum or after any repair or rebuild. <i>Other alarms, including but not limited to safety-related, shall be checked per heat treater's requirement.</i> These alarm checks shall be documented. 熱處理廠需有列出熱處理製程和設備的相關警報清單，這些警報如果不能正常運作，很可能生產不合格產品。這些警報，應至少每季檢查確認或每次有任何修復或重建之後。 其他警報，包括但不限於與安全有關的，則依每個熱處理廠的需求做檢查。 這些警報檢查，應當記錄備查。	Operators checks & document that alarms function daily		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
3.7	Are generators and furnace atmospheres continuously monitored, automatically controlled, and documented? <b>NOTE: This requirement is specific to Process Tables A, B, E, F, and G; Sections 1.0 and 3.0.</b> 發電機和熱處理爐的氣氛有連續監測，自動控制和記錄？註：此要求是給特定的製程表A、B、E、F、G，第1.0和3.0。	Generator and furnace atmosphere carbon potential/dew point shall be continuously monitored, automatically controlled, and documented. <b>Recorded carbon potential shall be controlled within +/- 0.05 of the set point. Recorded dew point shall be controlled within acceptable limits specified in the control plan or internal procedures.</b> <b>NOTE: For rotary retort and shaker furnaces that preclude in situ control and monitoring, the method described in Section 3.4.5 "Property Surveys" shall be used.</b> <b>If generators are not used, the flow rates of the supplied atmosphere gases shall be monitored and controlled.</b> <b>The automatic and continuous atmosphere control system shall consist of sensors such as oxygen probes or on-line Infrared (IR) gas analysis.</b> The heat treater shall also have a back-up method of checking the carbon potential/dew point. Examples are dew point, electrical wire resistance, gas analysis, shim stock, carbon bar, etc. <b>See Process Tables, Sect. 3.0 for verification frequencies of primary and back up method.</b> 氣體產生器和爐內氣氛碳勢/露點應連續監測，自動控制，並記錄。紀錄的碳勢與設定點的應控制在+/- 0.05內。紀錄的露點需於控制計劃或內部程序中規定並應控制在可接受的範圍內。 註：For rotary retort and shaker furnaces，排除就地控制和監測，在第3.4.5 節中描述的方法“特性調查”，應使用之。如果不使用氣體產生器，則管路所提供的氣氛氣體的流速應監測和控制。 自動和連續的氣氛控制系統應包括的感應器如氣探測或線上的紅外線（IR）氣體分析。熱處理廠，還應當有一個備用的方法，檢查的碳勢/露點。例如露點，電線電阻，氣體分析，shim stock, carbon bar等。請看製程表3.0 部分中的核對頻率主要的和備用的方法。	1. Computer monitors 24 hours per day automatically 2. Heat treatment operator verify every 2 hours & record on "S08-4F-42-01"  1.電腦每天24小時自動監控 2.熱處理作業員每2小時驗證一次並記錄在“S08-4F-42-01”		X		
3.8	A back up verification of the atmosphere is required. When the back-up verification check of the atmosphere does not correlate within pre-established limits with the primary control method (carbon potential/dew point reading), is correlation of the carbon-bearing atmosphere to the primary control method re-established? <b>NOTE: This requirement is specific to Process Tables A, B, E, F, and G; Sections 1.0 and 3.0.</b> 氣氛驗證是必要的。當驗證檢查的氣氛不符合原先設定管制公差（碳勢/露點讀數）時，則氣氛是否需重新建立主控制方法的相關性？（當檢查的數據與實際數據不符時，有無一個	When the back-up verification check of the atmosphere does not correlate within pre-established limits with the primary control method (carbon potential/dew point reading), the heat treater shall resolve the out-of-limit discrepancy. The back-up atmosphere monitoring system reading and the automatically controlled atmosphere dew point/carbon potential reading shall be maintained within the correlation limits specified in the control plan or internal procedures. These range tolerances vary with the specific heat treat process and the equipment used. The heat treater shall make appropriate technical adjustments and then re-establish/demonstrate the correlation of the actual atmosphere carbon potential/dew point reading to the primary control and back-up atmosphere reading. The range tolerances for correlation between the two readings shall be in the control plan or internal procedures. The back-up carbon potential/dew point reading shall be established using one or more of the following methods: • Carbon bar, slug, or surface carbon of part • Shim stock • 3-gas analyzer • Dew point • Hot wire resistance 當驗證檢查的氣氛不符合原先設定的控制公差（碳勢/露點讀值），熱處理廠應解決超出原設定的原因。氣氛監測系統讀數和自動可控氣氛的露點/碳勢讀數應保持在控制計劃或內部程序中。這些所要求的公差範圍隨不同的熱處理過程和所用設備而有不同。熱處理廠應作出適當的技術性調整，然後將重新建立/說明實際氣氛碳勢/露點讀數於控制計劃或內部程序中。這些驗證碳勢/露點讀數的系統建議選擇使用一個或多個下列方法： [a]Carbon bar or slug [b] Shim stock [c] 3-gas analyzer [d]Dew point [e] Hot wire resistance 補充說明：[1]這個“氣氛控制”議題於 Process Table section 1 中指摘出來。[2] 當檢驗的結果與日常監控的結果有差異時，熱處理者需要解決這個差異。[3]兩個方式的讀值都應該符合規範或工單的要求 [4]所要求的公差範圍隨著不同熱處理與設備而變化 [5] 熱處理者需要做適當的調整與修正，並且重新確定兩個系統的正確性。	Gas atmosphere analyzer will confirm the atmosphere every week, but according to PROCESS TABLE A is required daily 每日會用氣體分析儀確認氣氛		X		
3.9	Are all ammonia lines equipped with a fail-safe method to prevent	One of these fail-safe methods shall be used to prevent ammonia to leak into the furnace: • A quick disconnect or physical separation of the lines • Three-valve ammonia "fail-safe" vent system is permitted. See the definition "Three Valve Fail-Safe Vent" and diagram in Ammonia pick-up can be undesirable in parts and heat treat processes not specifying/requiring ammonia as an addition.	N/A				
3.10	Is there a minimum of 3 hour purge of the furnace atmosphere when switching from an	The heat treater shall perform a minimum 3 hours purge prior to processing product not requiring ammonia as an addition. Reduction of 3 hours purge requires conclusive test data of the atmosphere to show no significant amount of residual ammonia is present in the furnace atmosphere.	N/A				
3.11	Do all atmosphere furnaces and generators have flow scopes or flow meters for all gases? 所有氣體爐及發電器是否有流動範圍或流量計？	All atmosphere furnaces and generators (output trim/adjustment gas) shall have flow scopes or flow meters for all gases. Flow scopes and meters shall be periodically serviced per the heat treater's preventive maintenance program. Cleaning and proper re-assembly procedures shall be documented. 所有氣體爐及氣體產生器（輸出微調/調整氣體）應有流量控制儀或流量計。保養計畫中應週期性檢查流量控制儀與流量計。清洗及適當重組程序應有文件化。	Yes, metered by flow scopes. Major cleaning will be contracted by an outside party.  是的，由流量範圍計量。 主要清潔工作將由外部承包商承包。		X		

Question Number	Question	Requirements and Guidance	Objective Evidence	N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
3.12	Is there a rigorous fail-safe at the front of the furnace to prevent non-uniform loading of parts? In absence of a rigorous fail-safe, are all continuous belt furnaces equipped with sight glass inspection ports and infrared temperature pyrometers at discharge end of the hardening furnace?  是否在爐前有一嚴謹的失誤安全機制以避免不均勻	In absence of a rigorous fail-safe at the front of the furnace to prevent non-uniform loading of parts (this includes the combustion system maintenance/adjustments to ensure proper efficiencies and physical limitation for part loading), then the heat treater shall have an infrared temperature pyrometer at the exit end.  The infrared temperature pyrometers are required at the exit end of continuous belt furnaces to monitor for under temperature parts. The temperature alarm shall be within 28°C (50°F) of the furnace set point temperature. Results shall be strip charted or continuously data logged. Infrared temperature pyrometers shall be calibrated annually at a minimum and certified. All sight glasses shall be cleaned per the preventive maintenance schedule. [1] 當爐內前端沒有一個預防不均勻的承載量進入爐體之機制時(這包括加熱系統維護/調整,以確保產品下料之正確性和物理限制),熱處理爐必須在網帶出口處(要落至淬火槽)裝設紅外線溫度計來監控工件的溫度。[2] 紅外線溫度測試儀應裝在連續爐的出口處監控溫度不足的產品。溫度警報應設定在熱處理爐設定溫度差距28C (50oF)的範圍內。[3] 監控結果應條列或持續性的資料數據。[4] 紅外線(IR)高溫器應至少每年校正一次且被認證。[5] 所有的淬火槽上視鏡應依照保養計劃來定期清潔。	System infrared inspection is in place.  Sight glass cleaning is performed by periodical maintenance at minimum.  系統紅外線檢測到位。 定期清洗&維護視鏡。		X		
3.13	Is salt chemistry in the austenitizing salt bath monitored? Note: This is applicable to salt bath heat treating processes listed in	The heat treater shall check the salt chemistry in the austenitizing salt bath, or part decarburization, daily. Refer to the applicable Process Tables, Section 3.0, for frequency of checks. 熱處理廠應每日檢查austenitizing鹽浴中的鹽化學成分,或是部份脫碳。參照適用的流程表,第三部分,檢查頻率。	N/A				
3.14	Is the quenching medium analyzed? 淬火媒介是否分析?	The heat treater shall periodically have the quenching medium analyzed for specific quenching characteristics, e.g., cooling curve, water content, salt concentration, as specified in the applicable Process Tables, Section 5.0. This does not include Process Table G & H. • The quench media characteristic tolerances shall be specified by the quench medium supplier or the heat treater. • Analysis shall be reviewed for conformance by the heat treater. This review shall be documented. [1]熱處理廠應週期性的為淬火特性分析淬火媒介,例如,冷卻曲線、水含量、鹽濃度,如指定於適用的流程表,第五部分。不包括製程表G及H。[2]淬火媒介特徵公差應被淬火媒介供應商或熱處理廠所指定。[3]分析應由熱處理廠監督,結果應文件化。	1.Supplier checks the quenching oil every month. 2.Results are reviewed & stored in our office per: SQD-8504-45 Quenching oil management  1.供應商每月檢查淬火油。 2.結果按照SQD-8504-45淬火油管理辦法進行審查並儲存在我們的辦公室		X		

## Section 4 - Job Audit

**Job Identity:** \_\_\_\_\_  
**Customer:** 2DEWUR  
**Shop Order Number:** S2002142-01  
**Part Number:** 991 490 075  
**Part Description:** 6 LOBE PAN WASHER HD M/S M6\*12  
**Material:** 10B21 CL 8.8  
**Heat Treat Requirements:** Neutral Hardening調質(Quench and Temper)

Question #	Job Audit Question	Related (對應到1-2部分之條文) HTSA Question #	Customer or Internal Requirement (客戶或熱處理內部規定)	Job (Shop) Order or Reference Documentation Requirement (工作令 現場 SOP或流程表規定)	Actual Condition (Objective Evidence) 實際狀況(具體證據)	Pass / Fail / N/A
4.1	Are contract review, advance quality planning, FMEA, control plans, etc., performed by qualified individuals? 合約審視, APQP, PFMEA, 控制計劃等等是否被稱職人員來執行?	1.2 1.3 1.4 1.17	Internal	SQD-8302-00 SQD-8101-00 SQD-8302-01	HT-M6-10B21-8.8 FMEA HT-M6-10B21-8.8 CP	PASS
4.2	Does the heat treat facility have the customer specifications for the part? 熱處理廠是否有符合這個產品的客戶規範/要求?	1.5	Customer	B1M6ZXXM060C00C0XF1	HT-M6-10B21-8.8 CP	PASS
4.3	Is a shop traveler created to meet customer requirements? 熱處理流程標示卡(工作流單)上之標示是否與顧客要求相符?	1.6 2.1	Internal	B1M6ZXXM060C00C0XF1	ERP FORM : W_SFC_3_0002	PASS
4.4	Is material identification (part numbers, lot numbers, heat numbers, contract numbers, etc.) maintained throughout the heat treat process? 材料的鑑定(件號, 批號, 爐號, 合約號, 等)在熱處理過程中是否維持不變?	2.2 2.3 2.4	Internal	HT-M6-10B21-8.8 CP	ERP FORM : W_SFC_3_0002	PASS
4.5	Is there documented evidence of Receiving Inspection? 是否有接收檢驗的文件記錄證明?	2.1	Internal	SQD-8503-00	B1M6ZXXM060C00C0XF1	PASS
4.6	Are the Loading / Racking requirements identified? 裝載率(進料量)或裝載方式 裝架方式的要求是否有鑑定且符合?	1.6 2.7 2.9	Internal	HT-M6-10B21-8.8 CP	S09-8F-00-02	PASS

4.7	Is the proper recipe or process specification (cycle times, temperature, atmosphere, etc.) used? Refer to Process Tables, Section 3.0, for specific parameters. List parameters that were verified in this audit in the spaces provided below.是否選用適當的參數配方或製程說明(週期，溫度，碳勢等.)？參見流程表所列的Section3.0所列參數。在下面提供的空間列出在這次審查中被稽核產品所使用的參數。	1.5 1.6 2.1 2.14 2.15	Internal	HT-35ACR-109-PCP	S09-8F-00-02	PASS
4.8	What are the product inspection requirements?產品規範的要求為何？	2.15				
4.8.1	Requirement: (1)	Core Hardness	Core Hardness	Core Hardness	Core Hardness	
	Test Method:測試方法	Rockwell hardness tester	Customer	SIP-04	SIP-04	PASS
	Test frequency or quantity: 頻率及抽樣數	4 pcs/each lot	Internal	SQD-8504-41	4PCS	PASS
	Selection of samples:抽樣方式	Random	Internal	SQD-8504-41	Random	PASS
	Specification:規範要求值	Spec. in drawing	Customer	22~32 HRC	25.1~27.2 HRC	PASS
4.8.2	Requirement: (2)	Tensile Strength				
	Test Method:測試方法					
	Test frequency or quantity: 頻率及抽樣數					
	Selection of samples:抽樣方式					
	Specification:規範要求值					
4.8.3	Requirement: (3)	Proof Load				
	Test Method:測試方法					
	Test frequency or quantity: 頻率及抽樣數					
	Selection of samples:抽樣方式					
	Specification:規範要求值					
4.8.4	Requirement: (4)					
	Test Method:測試方法					
	Test frequency or quantity: 頻率及抽樣數					
	Selection of samples:抽樣方式					
	Specification:規範要求值					
4.8.5	Requirement: (5)					
	Test Method:測試方法					
	Test frequency or quantity: 頻率及抽樣數					
	Selection of samples:抽樣方式					

	Specification:規範要求值					
4.8.6	Requirement: (6)					
	Test Method:測試方法					
	Test frequency or quantity: 頻率及抽樣數					
	Selection of samples:抽樣方式					
	Specification:規範要求值					
<b>Operator or Inspector Responsibilities 操作員 或 檢驗員 的 責任</b>						
4.9	Were appropriate process steps signed off? 適當的處理流程是否有簽認?	1.4 2.2 2.3 2.14	Internal	SQD-8504-42	The quality assurance unit passes the inspection, the qualified label will be posted on the container.	PASS
4.10	Were all inspection steps, as documented in the control plan performed?所有在Control Plan 的檢驗步驟 是否有被執行?	1.2 1.4	Internal	HT-35ACR-109-PCP	YES	PASS
4.11	Were steps/operations performed that were not documented in the control plan? 是否有執行在Control Plan未被確認的檢驗步驟?	1.2 1.4 1.6	NA	NA		
4.12	If additional steps were performed, were they authorized?如果額外的步驟被執行，他們是否被批准了?	1.2 1.4 1.6 1.11 1.17	NA	NA		
4.13	Does the governing specification allow reprocessing or rework?管理規定中 是否准許再加工或重做?	1.11	Internal	SQD-8701-00	no rework prodction	PASS
4.14	If the order was certified, did the certification accurately reflect the process performed?如果工令(訂單)被確認，確定的製程查檢記錄檢驗紀錄是否都符合客戶之要求及熱處理廠的規定?	2.14 2.15	Internal	SQD-8504-41	YES	PASS
4.15	Was the certification signed by an authorized individual?上述相關之查檢記錄 檢驗紀錄的確認是否為具授權人員所簽認?	1.17	Internal	SQD-8504-41	YES	PASS
4.16	Are the parts and containers free of inappropriate objects or contamination?產品與桶子有無混雜到其他物品或工件	2.6 2.11	Internal	SQD-8504-41	Sampling 10 empty containers, no foreign objects found	PASS

Packaging Requirements 包裝要求						
4.17	Are packaging requirements identified? 包裝的要求是否被定義?	2.9	Internal	SQD-8504-41		PASS
4.18	Are parts packaged to minimize mixed parts (for example, parts packed over height of container)? 零件是否選用最不可能被混料的包裝方式(e.g. 零件是否裝載太滿, 高過容器滿載線)	2.9	Internal	SQD-8504-41 SQD-8507-00	Loaded with different color containers before and after heat treatment 熱處理前後用不同顏色容器裝載	PASS
Shipping Requirements 出或要求						
4.19	Were the parts properly identified? 產品是否適當地被標示	2.3 2.9	Internal	SQD-7509-02	The quality assurance unit passes the inspection, the qualified label will be posted on the container.	PASS
4.20	Were the containers properly labeled? 這個承裝桶是否被適當的標示	2.3 2.9	Internal	SQD-7509-02	The quality assurance unit passes the inspection, the qualified label will be posted on the container.	PASS

## PROCESS TABLE A - Carburizing / Carbonitriding / Carbon Restoration / Neutral Hardening / Austempering / Martempering / Tempering / Precipitation Hardening - Aging

<p>All requirements given below are subordinate to customer specific requirements.</p> <p>以下的要求均需以客戶特殊要求為最先前提</p> <p>The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify heat treater is conforming to the customer's requirements.</p> <p>客戶可能有特殊的要求, 當執行工作稽核時, 稽核員必須以客戶要求作為稽核依據</p> <p>Continuous furnace frequencies are per lot (work order) or as specified, whichever is more frequent.</p> <p>連續爐的頻率為每批 或者是指定 (以頻率最高者為之)</p> <p>OK - Complies to requirement</p> <p>NOK - Does not comply to requirement (Explain noncompliance in 'Related HTSA Question #')</p> <p>NA - Requirement not applicable</p>			
Item #	Related HTSA Question #	Category/Process Steps	
PROCESS AND TEST EQUIPMENT REQUIREMENTS			OK / NOK / NA
1.0			
A1.1	3.1 3.7	All furnaces, generators and quench systems shall have temperature indicating instruments. 所有的熱處理爐、氣體產生機、淬火系統均須有溫度指示儀器	OK
A1.2	3.1 3.7	Continuous strip charts and/or data loggers are required for temperature and carbon monitoring unit, e.g., dew point, oxygen probe, IR gas analyzer, etc.溫度及碳勢監視器 (露點、氧氣探測、紅外線氣體分析器...)、須具備可連續紀錄的條形圖表紙記錄器及資料記錄系統	OK
A1.3	1.18	A program for furnace and generator burnout is required (applies to carbon bearing atmospheres). 熱處理爐跟氣體產生器均須有燒碳計畫 (對有碳氣氛者)	OK
A1.4	3.2	Furnace weigh scales shall be verified quarterly and calibrated annually at a minimum. 熱處理爐之磅秤 最少需 每季驗證且每年校正。(入料量 承載量)	NA
A1.5	3.2	Dew pointers, 3-gas analyzers, spectrometers, and carbon IR combustion analyzers (shim stock analysis), used to verify carbon potential in furnaces, shall be calibrated annually at a minimum. 用來測試爐內碳勢的裝置如露點計、3 氣體分析儀、分光儀、碳燃燒分析儀 至少需年度性的校正	OK
A1.6	3.2	Verification of calibration of spectrometers, and carbon IR combustion analyzers, shall be checked daily or prior to use. 有關分光儀與碳燃燒分析儀的矯正之核對須於每日或於使用前時檢查	NA
A1.7	3.2	Verification of calibration of 3-gas analyzers with zero gas and span gas shall be performed weekly at a minimum. 氣體分析儀須以零幅氣 (目的: 歸零) 及全幅內標準氣體 (目的: 使用刻度範圍內) 每週檢測至少一次 ==> 確認 儀器 OK	OK
A1.8	3.2	Oxygen probe controllers shall be calibrated <i>quarterly (single-point or multi-point calibration) or semi-annual (multi-point calibration only; single-point calibration not allowed).</i> 氧氣探測儀之控制器需每一季做校正 (可選擇單點或多點校正); 若半年校正則僅適用於多點校正	OK
A1.9	2.16	All hardness test equipment (for each scale used) shall be calibrated <i>annually</i> minimum, and verified daily or prior to use, per the applicable ASTM standard, <i>ISO standard, JIS standard, or approved standard.</i> 所有的硬度測試設備 需 <i>每年</i> 校正一次, 且須遵照 ASTM/ISO/JIS 或經確認的標準 做每日查驗	OK
A1.10	2.16	Files for testing hardness shall be verified <i>per the Customer requirement.</i> 硬度比較挫刀須依照 <i>客戶標準查驗</i>	NA
A1.11	3.2	Refractometers (typically used to check polymer quenchants and washer solutions) shall be verified <i>prior to use</i> (with distilled water) and calibrated annually (per manufacturer's requirements) at a minimum. 折光計 (一般使用於聚合物水基淬火介質及清洗槽內水) 需 <i>使用前</i> 查驗 (使用蒸餾水) 及每年 (看生產者的需求) 校正	OK
2.0		PYROMETRY	OK / NOK / NA
A2.1	3.2 3.3	Thermocouples and calibration of thermocouples shall conform <i>to Section 3.1 (+/- 0.4% or 1.1C)</i> 熱電偶與熱電偶的校驗需符合 <i>CQI-9 手冊 Section 3.1 要求</i>	OK
A2.2	3.2 3.3	Pyrometry Instrumentation and Calibration of instrumentation shall conform <i>to Section 3.2</i> 依照 <i>CQI-9 手冊 Section 3.2</i> 執行儀表校驗	OK
A2.3	3.2 3.3	CQI-9 requires a System Accuracy Test (SAT) check of the control thermocouple in the Qualified Work Zone per Section 3.3 CQI-9 要求依照 <i>CQI-9 手冊 Section 3.3</i> 做 SAT 比對工作區內的控制熱電偶	OK
A2.4	3.4	TUS shall be performed annually and after major rebuild per Section 3.4 Temperature uniformity tolerance for hardening furnaces shall be <i>+/- 15°C</i> (or +/- 25°F). Temperature uniformity tolerance for tempering furnaces shall be <i>+/- 10°C</i> (or +/- 20°F). 均溫測試: 須遵照 <i>CQI-9 手冊 Section 3.4</i> 指示。此調查之頻率為每年或是主要重建之後。 在硬化爐內溫度均勻性需為 <i>+/- 15 C</i> (25 F), 在回火爐內溫度均勻性需為 <i>+/- 10 C</i> (20 F) 視為進入溫度區域 另外 浴熱時間建議在30分鐘以上 (VW要求10.9級以上之預熱時間至少35分鐘)	OK
A2.5	3.5	Recorded temperature(s) for austenitizing processes shall be controlled within <i>+/- 10°C</i> (or +/- 15°F) of the set point as evidenced by continuous recording pyrometers. Furnace temperature shall be controlled with soak times starting at the lower tolerance limit (as defined above). <b>For Continuous Furnaces, this requirement applies to the Qualified Work Zone.</b> [1] 奧斯田鐵化製程控制的溫度控應以 <i>+/- 10C</i> (or +/- 15F) 為限 [2] 從達到最低基本溫度開始, 在規定的浴熱時間內, 爐內的溫度都必須要是在受控的 <b>對於連續爐, 這項規定適用於具備必要條件的工作區。</b>	OK
A2.6	3.5	Recorded temperature(s) for tempering and precipitation hardening processes shall be controlled within <i>+/- 5°C</i> (or +/- 10°F) of the set point as evidenced by continuous recording pyrometers. Furnace temperature shall be controlled with soak times starting at the lower tolerance limit (as defined above). <b>For Continuous Furnaces, this requirement applies to the Qualified Work Zone.</b> [1] 回火爐溫控應以 <i>+/- 5 C</i> 為限 [2] 從達到最低基本溫度開始, 在規定的浴熱時間內爐內的溫度都必須是受控	OK
A2.7	3.2	Infrared pyrometers shall be calibrated annually <i>using proper calibration methods or an approved manufacturer's procedure.</i> [1] 紅外線測定儀每年校正一次 [2] 採用適當的校正法或是經供應廠商確認的程序	NA

3.0		PROCESS MONITOR FREQUENCIES 製程監控頻率	Batch Furnace 批次爐	Continuous Furnace 連續爐	Atmosphere Generation 氣體產生機	OK / NOK / NA
A3.1	1.4 2.14	Monitor primary temperature control instrument(s). 監控主要溫度之管制設備。	Continuous recording with sign-off every 2 hours or each batch for processes under 2 hours. Alarm systems (if set per limits in A2.5 and A2.6) satisfy the sign-off requirement. 每 2 小時記錄(持續生產時) 或 每批記錄一次 (少於 2 小時生產). 警報系統 (若依 A2.5 & A2.6 設定) 滿足簽核需求。	Continuous recording with sign-off every 2 hours or each lot for processes under 2 hours). Alarm systems (if set per limits in A2.5 and A2.6) satisfy the sign-off requirement 每 2 小時記錄(持續生產時) 或 每批記錄一次 (少於 2 小時生產). 警報系統 (若依 A2.5 & A2.6 設定) 滿足簽核需求。	Sign-off required for each shift for generators. 發生器檢查, 每班確認簽核一次	OK
A3.2	1.4 2.14 3.7	Monitor atmosphere generation as applicable. 監控氣體產生機的適當性。			Generators shall be continuously monitored and alarmed. Other systems, such as nitrogen-methanol systems, may either be continuously monitored and alarmed, or sign-off every 2 hours. 氣體電磁閥必須持續監控與警報。其它系統, 如甲醇控制系統, 可以持續監控或每 2 hrs 確認簽核。	NA
A3.3	1.4 2.14 3.7	Monitor primary furnace atmosphere control(s) 監控主要爐子氣氛, 常見是 O2 sensors	Continuous recording with sign-off every 2 hours or each batch for processes under 2 hours. Alarm systems (if set per acceptable limits) satisfy the sign-off requirement. 每 2 小時記錄(持續生產時) 或 每批記錄一次 (少於 2 小時生產). 警報系統 滿足簽核需求。	Continuous recording with sign-off every 2 hours or each lot for processes under 2 hours). Alarm systems (if set per acceptable limits) satisfy the sign-off requirement 每 2 小時記錄(持續生產時) 或 每批記錄一次 (少於 2 小時生產). 警報系統滿足簽核需求。		OK
A3.4	1.4 2.14 3.7 3.8	Verify primary furnace atmosphere control method by back-up method 使用備用的方法(例如 3-Gas 氣體分析儀)查驗碳勢)來查驗主要氣氛的控制方法	Daily 每天	Daily 每天		OK
A3.5	1.4 2.14 3.13	For austenitizing salt baths: Salt chemistry (soluble oxides) or decarburization on the parts shall be checked. 鹽浴: 每天 檢查鹽浴中鹽分的化學物質或是產品脫碳狀況	Daily 每天			NA
A3.6	1.4 2.12	<b>Quench Media Process Parameters</b> <b>淬火液製程參數</b>				
		Temperature 溫度	Continuous recording with sign-off every 2 hours or each batch for processes under 2 hours. Alarm systems (if set per acceptable limits) satisfy the sign-off requirement. 每 2 小時記錄(持續生產時) 或 每批記錄一次 (少於 2 小時生產). 警報系統 滿足簽核需求。	Continuous recording with sign-off every 2 hours or each lot for processes under 2 hours). Alarm systems (if set per acceptable limits) satisfy the sign-off requirement 每 2 小時記錄(持續生產時) 或 每批記錄一次 (少於 2 小時生產). 警報系統 滿足簽核需求。		OK
		Quench Level 淬火槽液面高度	Continuous monitor with alarm or daily verification. 以警報系統持續監控或每日驗證。			OK
		Agitation 攪拌	Daily visual check, or monitor the agitation during the quenching operation with alarm systems set at acceptable limits. 每日目視檢查, 或以警報系統設定可接受範圍內來監控淬火作業中的攪拌。			OK
A3.7	1.4 2.14	Monitor time in furnace, cycle time or belt speed. 監視在爐內的時間, 循環時間或是網帶速度	Each batch 每批	Twice/shift & after any change in the belt speed. 每班 2 次, 每次更換網帶速度時必須查驗一次。		OK
A3.8	1.4 2.7	Monitor load size or fixturing or loading rate as applicable. 監視入料量或是適用的承載率	Each batch 每批	Twice/shift & after any change in loading rate. 每班 2 次, 每次更換入料量必須查驗一次。		OK

A3.9	1.4 2.12	Quench Delay Time - Quench delay time shall be based on the time that the furnace door starts to open to the time the load is at the bottom of the quench tank. 淬火延遲時間 - 所依據之時間應該工件自開爐到進入淬火槽底的時間	Each batch 每批	Each basket for pusher-type continuous furnaces where the loaded basket is quenched.  Not applicable for belt, shaker, or pusher furnaces where parts free-fall into the quench. 推桿式連續爐適用, 確認每一籃工件都有淬火。 不適用網帶, 振動篩, 推桿式的爐子		OK
A3.10	1.4 2.12	Temper Delay Time - The maximum delay time between quenching and tempering shall be specified on the control plan and monitored. 回火延遲時間 - 淬火和回火之間的最大延遲時間應定義於管制計劃並且需監控。	Each batch 每批	Each load 每次下料		OK
4.0		IN-PROCESS/FINAL TEST FREQUENCIES 製程中/成品檢驗頻率	Batch Furnace	Continuous Furnace		OK / NOK / NA
A4.1	1.4 2.15	Microstructure <i>shall be checked at a minimum magnification of 100x and, 400x or above 400x. Microstructural visual references shall be available.</i> 金相組織 應在最低放大倍率100X, 與400X 或以上400X 做檢查。	Each batch 每批	Daily per furnace 每爐每天一次		OK
A4.2	1.4 2.15	Surface hardness 表面硬度	Each batch 每批	Every 2 hours 每兩小時		OK
A4.3	1.4 2.15	Core hardness (when specified) 心部硬度 (指定時)	Each batch 每批	Every 4 hours 每四小時		OK
A4.4	1.4 2.15	Case depth (when specified) 滲碳深 (指定時)	Each batch 每批	Every 4 hours 每四小時		OK
5.0		QUENCHANT AND SOLUTION TEST FREQUENCIES 淬火與油品的檢查頻率	Batch Furnace	Continuous Furnace		OK / NOK / NA
A5.1	2.12 3.14	Polymer Quench Media 聚合物淬火介質 Concentration 濃度 <i>Cooling Curve Analysis 冷卻曲線分析</i>	Daily 每日 Semi-annually(半年一次)	Daily 每日 Semi-annually(半年一次)		NA NA
A5.2	2.12 3.14	Water Quench Media 水淬 Suspended solids 懸浮固體	Semi-annually(半年一次)	Semi-annually(半年一次)		NA
A5.3	2.12 3.14	Salt Quench Media 鹽淬火介質 Analysis & Contaminants 分析及污染物	Semi-annually(半年一次)	Semi-annually(半年一次)		NA
A5.4	2.12 3.14	Brine or Caustic Quench Media 鹽水或腐蝕性(Caustic)淬火介質 Concentration and/or Specific Gravity. 濃度/比重 Suspended solids 懸浮固體	Daily 每日 Semi-annually(半年一次)	Daily 每日 Semi-annually(半年一次)		NA NA
A5.5	2.12 3.14	Oil Quench Media 淬火介質--油淬 Water content, suspended solids, viscosity, cooling curve, total acid, and flash point. 水中成分, 懸浮固體, 黏度, 冷卻曲線, 總酸 & 閃火點	Semi-annually(半年一次)	Semi-annually(半年一次)		Ok
A5.6	2.13	Rust Preventive - Soluble Oil 可溶防銹油 Concentration 濃度	2x / week 兩週一次	2x / week 兩週一次		NA
A5.7	2.11	Washers 清洗劑 Concentration of cleaner 清洗液的濃度 Temperature of solution (required if temperature is specified to be above ambient temperature). 清洗槽 水溫管制(當要求的水溫高於室溫時)	Daily 每日 Each shift 每班次	Daily 每日 Each shift 每班次		OK OK