

# MOLTEN METAL SYSTEMS

## Quality Management System Manual

ISO 9001:2015

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Issue no. 05

<b>Section</b>	<b>Heading</b>	<b>Page</b>
1.	Purpose	3
2.	Scope	3
3.	Owner	3
4.	Vision, Strategy and Governance	3
5.	Quality Management System	8
6.	Planning	11
7.	Support	13
8.	Operations	14
9.	Performance Evaluation	14
10.	Improvement	15
11.	Appendix	16
	a. Interested Party Matrix	16
	b. Risk Analysis format	17

<b>Issue</b>	<b>Change Description</b>	<b>Date</b>
1	Initial Release of Group QM	15-Feb-07
2	Release of Group QM as per ISO 9001:2008	25-Oct-11
3	Release for Changes in Logo change of ISO certificate	10-Dec-13
4	Global Quality Manual reviewed, updated & issued to reflect ISO 9001:2015 requirements	01-Mar-17
5	Global Quality Manual reviewed, updated & issued As per Audit observation .	11-Oct-17

## 1. Purpose

The purpose of this document is to define:

1. The scope of the Morgan Molten Metal Systems (MMS) Quality Management System (QMS)
2. The management, core and support processes used by MMS to develop a sustainable business and achieve high levels of customer satisfaction
3. The requirements for site based management systems

## 2. Scope

All businesses within the MMS Global Business Unit (GBU) –

- Morgan Molten Metal System (Suzhou) co. Ltd. : Development Manufacture and Supply of Isostatically- Pressed Clay-Bonded Graphite Crucibles and Accessories.  
China
- Morgan Molten Metal System GmbH (Germany) : Development Manufacture and Supply of Clay-Bonded graphite Crucibles, Carbon-Bonded Silicon Carbide Crucibles, High Pressure Isostatically- Pressed Crucibles and Accessories
- Morganite Brasil Ltda,Brazil :Development, Manufacture and Supply of Carbon-Bonded Graphite, Carbon-Bonded Silicon Carbide and Clay-Graphite Crucibles, Foundry Products and Accessories.
- Morganite Crucible (India) Ltd Aurangabad, India : Development And Manufacture and Supply of Carbon- Bonded Silicon Carbide, Clay Bonded Graphite Crucibles, Accessories and Allied Products.
- Diamond Crucible Co. Ltd (India) Gujarat, India : Developments ,Manufacture and Supply of Clay-Bonded Graphite Crucibles and Accessories (IncludingHighAlumina Products).

## 3. Owner

MCIL Sr. Manager – Technical Services & Product Development

## 4. Vision, Strategy and Governance

### 4.1 Overview



Morgan Advanced Materials plc is a global material engineering company headquartered in Windsor, UK and is a world-leader in advanced materials science and engineering of ceramics, carbon and composites. The company operates in numerous markets that include healthcare, petrochemicals, transport, electronics, energy, security and industrial application.

The Molten Metal Systems business of Morgan Advanced Materials makes an extensive range of high performance crucibles and foundry consumables for non-ferrous and ferrous metal melting applications.

Our products provide melting solutions for foundries, die-casters and melting facilities working with zinc, precious metals, aluminum, copper / brass / bronze and other non-ferrous metals. Also our products provide melting solutions for Cast Iron, Stainless Steel, Ductile Iron, Grey Iron, etc. With our extensive applications experience and process knowledge we help customers put together the optimum system for their needs.

We work with customers in non-ferrous and ferrous castings, metal powder production, refining and recycling of precious metals and the production of pure aluminum for electronics applications. Our core strength is our ability to get to grips with individual customer requirements and provide optimum high performance solutions.

Our product range includes:

- Crucibles
- Foundry products & allied products
- Furnace

MMS manufacturing locations are:

- Morgan Molten Metal System (Suzhou) co. Ltd. ( China)
- Morgan Molten Metal System GmbH (Germany)
- Morganite Brazil Ltda (Sao paulo) – Brazi
- Morganit Crucible (India) Ltd – Aurangabad,India
- Diamond Crucible Co. Ltd (India) – Mahesana,India



A detailed overview of Morgan Advanced Materials and MMS is given in the Morgan Advanced Materials 'Business Overview' document with relevant interested parties who interact regularly with MMS given in the MMS - manufacturing site related 'Interested Party Matrix'.as per appendix QMS/IPM/01 for ref.only.

And Consider external & Internal by doing appropriate method like SWOT analysis , consider political , Economic, ,Technological ,Social , Legal & Enviornmental issue.

Considering Interested party requirements , external & internal issue for Risk Analysis using appropriate method, as per appendix QMS/RAO/01 for ref.only.

## 4.2 Core Values

MMS adheres to the Morgan Advanced Materials Core Values like ambitions, innovation, collaboration, and integrity and think SAFE Core Values statements which summaries the group commitment to the highest standards of corporate and individual behavior.

Both statements provide guidance to employees, helps them to understand the basic rules that should be followed and the personal responsibility that they have to ensure that personal actions do not compromise Morgan Advanced Materials' commitment to integrity and responsible practice.



### 4.3 Vision, Strategy and Execution Priorities

The MMS vision, business strategy and execution priorities are aligned with those of the Morgan Advanced Materials group, with the objective of being a world-leader in engineered solutions based on advanced ceramic and related materials.

#### Vision

The diagram features the Morgan Advanced Materials logo at the top left. The central text reads: "Our **Vision** is to be renowned for world-class Material science, Application Engineering and Customer focus". Below this, three interconnected pillars are shown: Material science (top), Application engineering (right), and Customer focus (bottom). Each pillar includes a list of key attributes. A central circle contains the text "Reliable problem solving" and "Ethically and Safety". The pillars are connected by a dotted line forming a triangle.

**Material science**

- Leading technologists
- Extensive institutional knowledge

**Application engineering**

- Passion for problem solving
- Culture of knowledge sharing & collaboration

**Customer focus**

- Customer obsession
- Deep market insight

**Reliable problem solving**  
Ethically and Safety

[www.morganadvancedmaterials.com](http://www.morganadvancedmaterials.com)

## **Strategy**

To focus on building three distinctive core capabilities: materials science, applications engineering and customer focus. The Group will apply these capabilities to a portfolio of scalable global businesses where technical expertise and differentiation is valued to solve challenging problems for its customers

### **Key Execution Priorities**

1. Move to a global business structure
2. Extend our technology leadership
3. Improve operational execution
4. Drive sales effectiveness and market focus
5. Increase investment in people management and development
6. Simplify the business

The MMS global business strategy and annual budget is developed in line with the Morgan Advanced Materials planning process with specific regional and functional strategies developed and deployed in line with the global strategy.

#### **4.4 Governance Systems and Policies**

Good governance is essential to the effectiveness of MMS in achieving its vision and strategy. The organizations governance system includes the policies, processes and people whereby decisions are made and implemented, policies enacted and authority delegated.

Corporate governance policies that need to be adhered to by all MMS businesses can be found on the Group Policies, Guidelines & Manuals page on MorgaNet.

The Quality Policy apply to all MMS businesses and shall be used to determine relevant business objectives and targets. It is defined in the section title 'Site Specific Quality Manual'.

#### **5. Quality Management System**

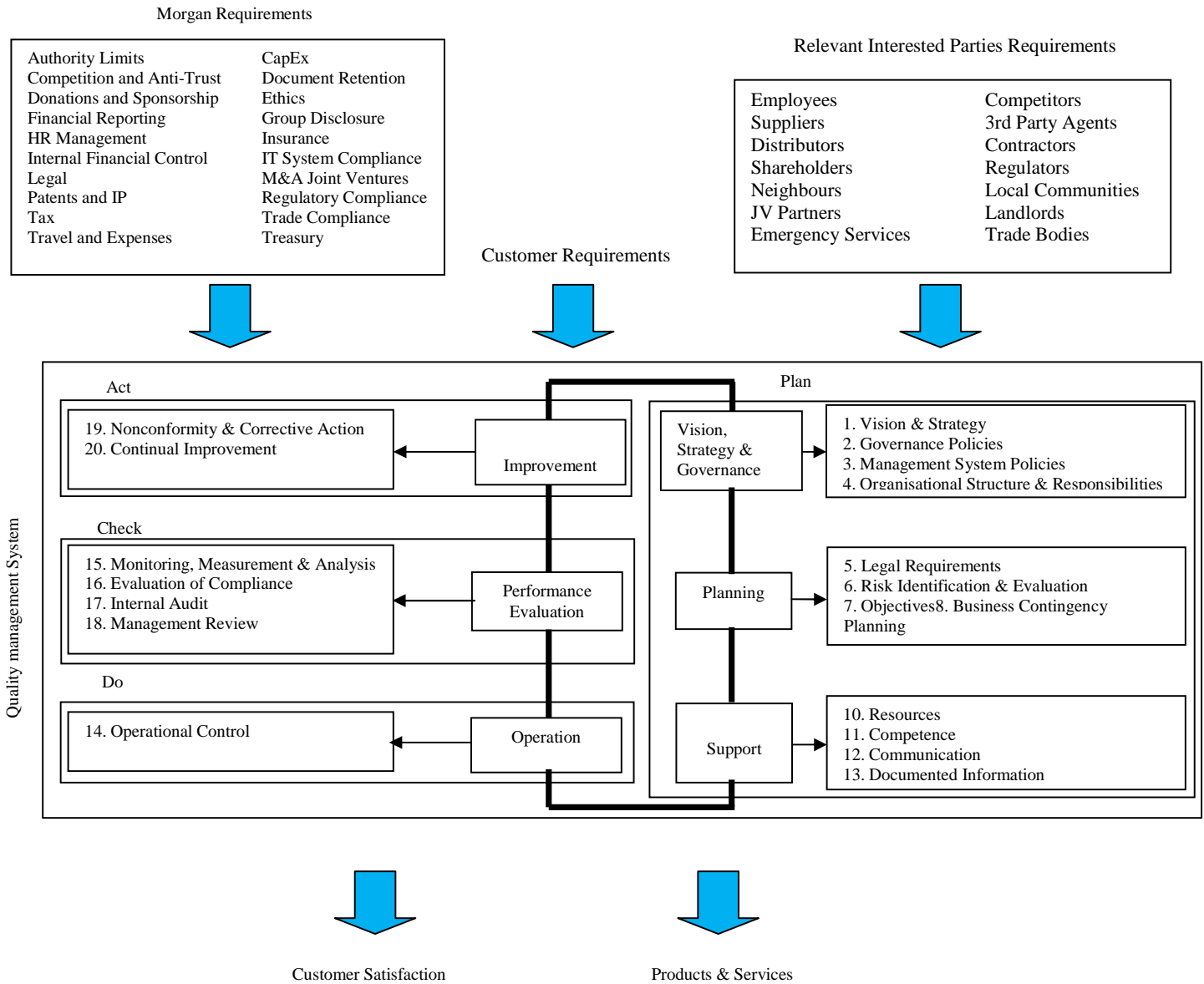
##### **5.1 Management System Requirements**

For MMS to realize its vision and strategy and to comply with all of its legal and governance obligations and Quality management system (QMS) approach has been taken for the management of the business.



**5.2 Structure**

The MMS QMS is based on the Plan-Do-Check-Act (PDCA) model (Figure 1.) and all management systems developed at a business unit level shall use a similar approach.



**Figure 1. MMS QMS Structure**

**5.3 Management System Certification**

To drive operational excellence throughout its businesses MMS takes the following approach to management system certification (Figure 2.)

Businesses covered by the MMS ISO certification programme are detailed in the 'Corporate Certificate of Registration'.

All businesses covered by the global certification programme shall be subject to audit by MMS's Certification Body Lucideon as detailed in the respective MMS Certification Audit Schedule (ISO9001).

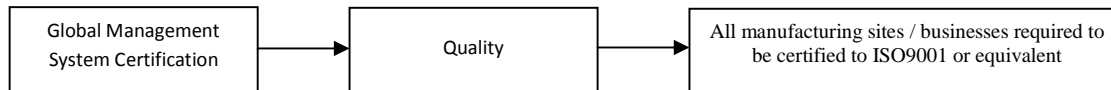
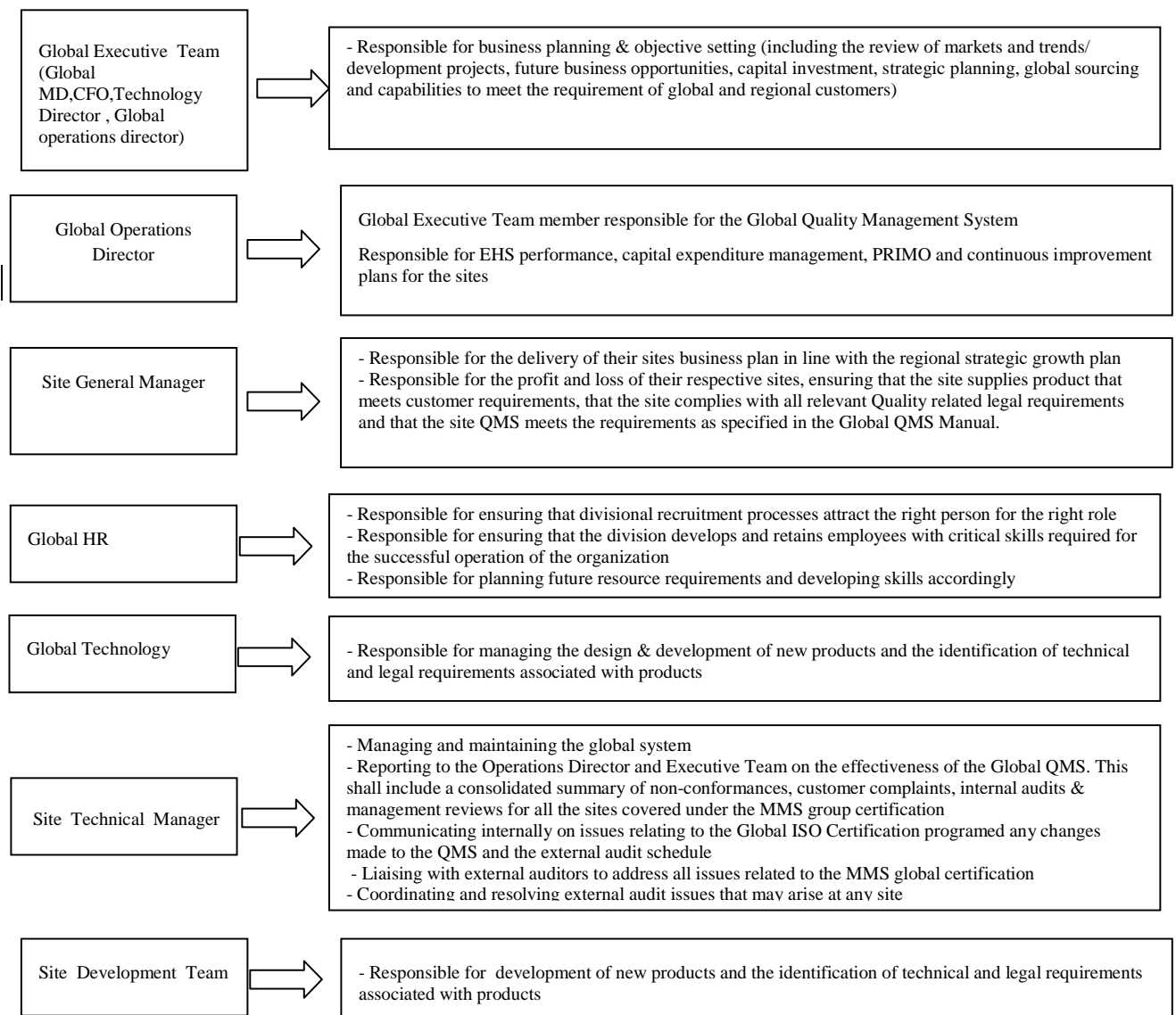


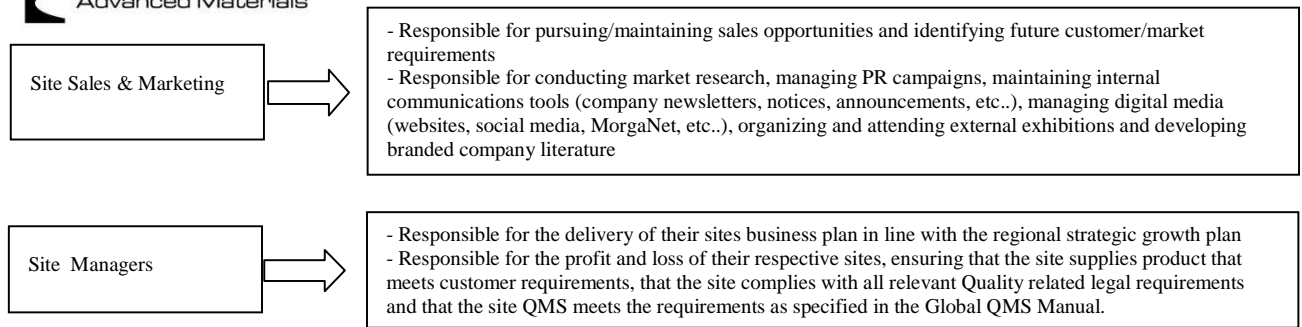
Figure 2. MMS Management System Certification Programme Approach

### 5.4 Organizational Structure, Roles & Responsibilities

The MMS GBU is structured with regional teams supported by global finance, HR, technology & site specific sales and marketing functions.

The organizational structure of the MMS Executive Team is detailed in the MMS-Global Executive Team Organization Chart and organizational responsibilities detailed in Figure 3.





**Figure 3. MMS Global, Regional and Site Responsibilities**

## 6. Planning

### 6.1 Legal Requirements

MMS businesses shall identify and document all relevant product related legal / regulatory requirements that they need to comply with.

MMS shall also comply with other requirements that are appropriate such as Morgan Advanced Materials policies (legal, RBP, HR, etc.) and industry product stewardship programme.

### 6.2 Risk Identification and Evaluation

All MMS regional management teams and businesses shall conduct regular business risk reviews using the appropriate Site related Risk Analysis methodology.

Specific risk reviews shall also be conducted using appropriate methodologies (Process FMEA, Project Risk Review, Risk Analysis etc..) to assess the risks associated with product quality. These risk reviews shall be documented and improvement actions monitored.

### 6.3 Business Objectives and Targets

Annual business objectives and targets, based on the GBU business plan, Quality policy and Morgan Quality targets shall be set by the MMS Global Executive and communicated to all sites.

Each MMS site shall set relevant business and Quality objectives and targets taking into consideration the Global objectives and Quality policy.

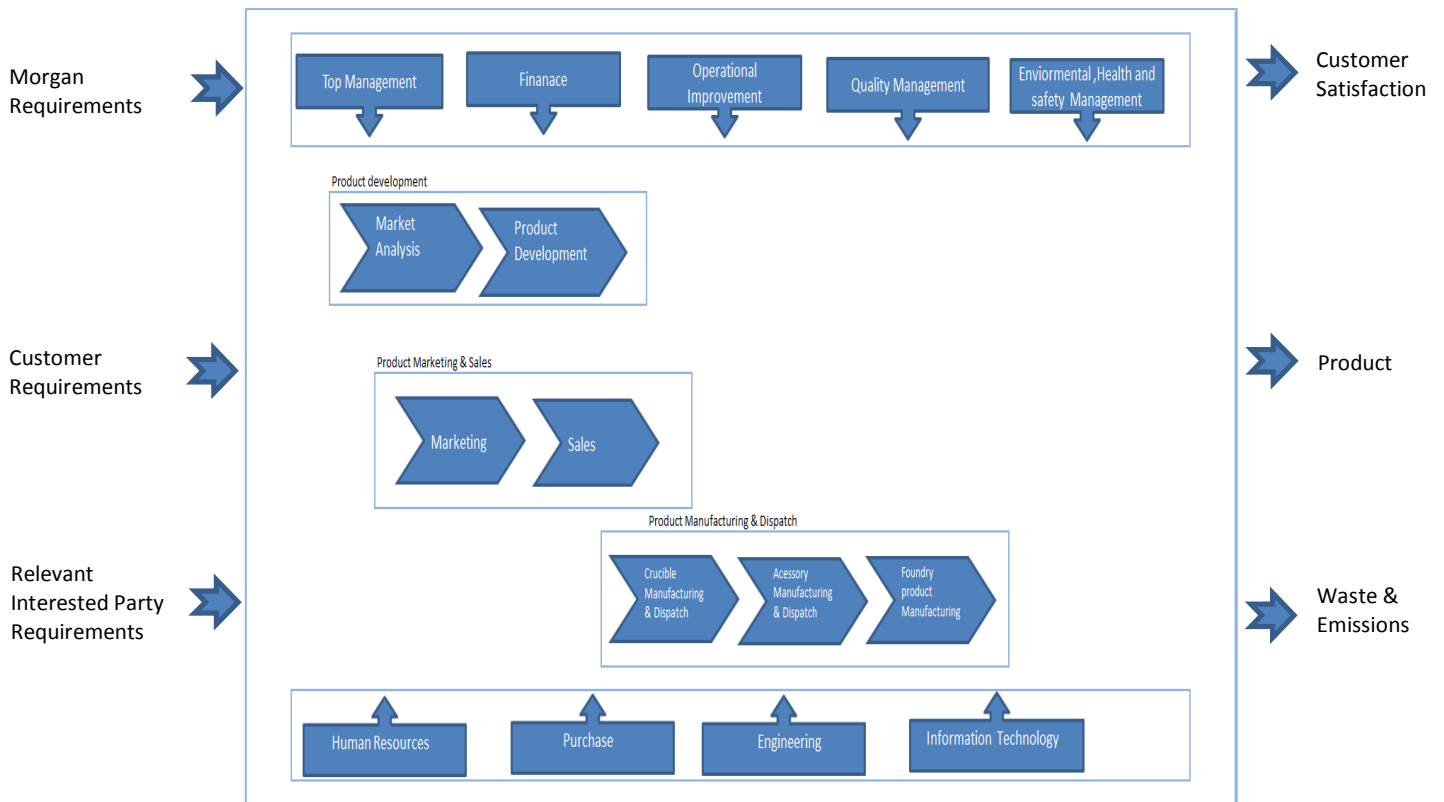
Improvement plans for objectives shall be documented using suitable format and actions monitored

### 6.4 Global Business System Process Map

The MMS Global Business System Process Map, (Figure 4) sets out the management, core and support processes used by the business to achieve objectives and satisfy customer requirements.

Management processes are direction setting activities that define organizational strategy, objectives, targets and operational control methods, core processes are activities that add value by transforming materials and

information to meet customer needs and support processes are activities that support the day to day operations of an organization by providing materials, resources and information.



**Management Processes**

Direction setting activities that define organizational strategy, objectives, targets and operational control methods

**Core Processes**

Activities that add value by transforming materials and information to meet customer needs

**Support Processes**

Activities that support the day to day operations of an organization by providing materials, resources and information operational control methods

All global management, core and support processes identified in the Global Business System Process Map, (Figure 4), shall have a documented high level Business Process Map detailing activities undertaken, inputs, outputs, resource, systems, procedures and measures used to control the activity.

**6.5 Business Continuity Planning**

All businesses to develop appropriate business continuity plans to ensure that key systems and resources are recoverable and disruption to business operations is minimized should a serious incident or crisis occur.



Business continuity plans are subject to internal audit to ensure that documentation is kept up to date and reflects the current business situation.

Business continuity plans shall be subject to annual testing to demonstrate that the plans are robust and to give employees an opportunity to practice business continuity activities. Non-conformance and opportunities for improvement shall be recorded as per the local corrective action system.

## **6.6 Management of Change**

All MMS businesses shall have an appropriate management of change process in place to ensure that risks associated with process, equipment and technology changes are managed to minimize disruption to business operations.

## **7. Support**

### **7.1 Resources**

MMS businesses shall ensure that plans, programs and budgets provide adequate resources to operate and control processes, achieve conformity of products and comply with applicable regulatory and internal requirements.

### **7.2 Competence**

MMS businesses shall implement processes to determine the required competence for tasks to be undertaken and ensure that all employees are competent to perform such tasks.

### **7.3 Communication**

MMS businesses shall implement processes to internally communicate QMS information to relevant levels and functions within the organization.

Processes shall also be established to communicate relevant QMS information to external parties when required.

### **7.4 Documented Information**

#### **7.4.1 Global Quality Manual**

The latest issue of the Global Quality Management System Manual, Global Business System Process Map, associated Business Process Maps and other Quality Management System documentation shall be held with related manufacturing site.

#### **7.4.2 Site Documentation**

Each business shall implement and maintain up to date documents that cover Quality Management Systems. These documents can be integrated or separate stand-alone documents, as decided by the business.

As a minimum the business management system documentation shall include or reference:

- Requirements as stated in the Global Quality Management System Manual, for those business processes applicable to the business
- Requirements as stated in ISO9001 (where certified)
- The MMS Manufacturing Site specific Quality Policy
- Business objectives and targets
- The sequence and interaction of relevant processes that apply to the business including the criteria and methods to ensure process operation and control
- Appropriate global requirements such as Global Product Specifications and RBP policies
- Responsibilities of personnel tasked with ensuring quality management systems meet the requirements as specified in the Global Quality Management System Manual and ISO9001 (where certified).
- A cross-reference matrix identifying how the businesses quality documentation meets the requirements of ISO9001 (where certified) and the Global Quality Management System Manual. All the latest issue global quality management system documentation shall be controlled.

## **8. Operations**

### **8.1 Operational Controls**

All MMS global management, core and support processes identified in the Global Business System Process Map, shall implement appropriate controls to ensure that output requirements as identified in their Business Process Map are met and associated risks minimized.

Each MMS business shall implement appropriate controls to ensure that stated product requirements are met and that identified QMS risks are minimized.

## **9. Performance Evaluation**

### **9.1 Monitoring, Measurement and Analysis**

#### **9.1.1 Process, Product Monitoring**

Appropriate processes for monitoring and measuring key process and product characteristics shall be implemented at each MMS site to ensure that all product requirements have been met prior to dispatch to customers are being adhered to.

Internal certification of specified global products shall be maintained in order to ensure the specification, quality, consistency and properties are met as set by the Global Technical group.

### **9.1.2 Customer Satisfaction**

Customer satisfaction shall be monitored by sites through the use of appropriate methodologies such as on-time delivery analysis, customer surveys, customer visit reports, corrective action reports, credit reasons/returns and analysis of the main global customer complaints

### **9.1.3 Key Performance Information**

All MMS sites shall implement relevant processes to capture, monitor and analyze key process, product and business performance data.

### **9.1.4 Management Review**

All MMS sites shall conduct an annual Management Review as per the requirements of ISO9001 .

## **10. Improvement**

### **10.1 Nonconformity and Corrective Action**

All MMS businesses shall implement relevant processes to ensure that non-conforming product is identified and controlled to prevent its unintended use or delivery to customers.

Processes shall also be implemented to ensure that all other QMS nonconformities are documented and actions taken to prevent reoccurrence of the issues identified.

### **10.2 Continual Improvement**



MMS is focused on continually improving its business processes and performance in line with its Quality policy, customer standards and requirements of ISO9001 (where certified).

MMS shall regularly benchmarks its core processes using relevant tools and methodologies such as internal audit, monitoring of KPI's and global benchmarking activities.

Process improvements shall be managed under a project-focused approach using the Plan – Do – Check - Act cycle as part of the MMS Operational Excellence program.





A. APPENDIX

1. Interested Party Matrix

		<b>MORGANITE CRUCIBLE (India) Ltd</b> B11, MIDC, WALUJ, AURANGABAD, 431 136												Document No : QMS/IPM/01					
														Revision Status : 0					
		Date: 01.03.17																	
MMS india Interested Party																			
Scope :- Morganite crucible (India) Ltd & Diamond Crucible Company Ltd.																			
Interested Party \ Process	Management Process					Core Process						Support Process							
	Topmanagement	Finance	Operational Improvement	Quality Management	Environmental, Health And Safety Management	Strategic Market Analysis	Product Development	Marketing	Sales	Crucible Product Manufacture	Foundry Product Manufacture	Crucible accessories Manufacture	Human Resources	Purchase	Engineering	Information Technology			
Customers	○	○	○	○	△	○	○	○	○	○	○	△	△	△	△				
3rd Party Agents	○	○	○	○	△	○	○	○	○	○	○	△	△	△	△				
Competitors	○	△	△	○	△	○	○	○	○	○	○	△	△	△	△				
Contractors	△	○	○	○	△	○	○	○	○	○	○	△	△	△	△				
Distributors	○	○	○	○	△	○	○	○	○	○	○	△	△	△	△				
Emergency Services	△	△	○	△	○	△	△	△	△	○	○	○	△	○	△				
Employees	○	○	○	○	○	△	○	○	○	○	○	○	△	△	△				
Insurance Companies	△	△	△	△	△	△	△	△	○	○	○	○	△	△	△				
JV Partners	○	○	○	○	△	○	○	○	○	○	○	△	△	△	△				
Governments / MIDC /GIDC	○	○	△	△	○	○	△	△	△	○	○	○	△	△	△				
Local Communities	△	○	○	△	○	△	△	△	△	○	○	○	△	△	△				
Morgan Group	○	○	○	○	○	○	△	△	△	△	△	○	△	△	△				
Neighbours	△	△	△	△	○	△	△	△	○	○	○	○	△	△	△				
Regulators	△	○	△	○	△	△	○	△	△	○	○	○	△	△	△				
Shareholders	○	○	△	○	△	△	△	△	△	△	△	△	△	△	△				
Suppliers	○	○	○	○	△	△	○	△	△	○	○	○	○	○	○				
Trade Bodies	○	○	△	△	△	○	○	○	○	△	△	△	△	△	△				
<b>Relationship</b>																			
Strong	○																		
Medium	○																		
Weak	△																		



## 2. RISK ANALYSIS

		MORGANITE CRUCIBLE (India) Ltd										Document No: QMS/RAO/01	
		B11, MIDC, WALUJ, AURANGABAD, 431 136										Revision Status : 0	
												Date: 01.04.17	
Risks and Opportunities for QMS													
Risks													
Description of Potential Risk	Potential Impact	Severity	Potential Cause(s)	Present Control(s)	Probability	Ranking	Actions decided	Responsibility	Target Date	Actual Date	Severity	Probability	Ranking
													0
Opportunities :													
Potential Opportunity	Potential Advantage	Actions decided		Target Date	Actual Date								
Severity : Scale factor 1 to 6 (1 – No/Slight Impact, 2 – Marginal Impact, 3 – Some Impact, 4 – Significant Impact, 5 – High Impact, 6 – very High Impact)													
↑ Severity	Very high (6)	6	12	18	24	30	36						
	High (5)	5	10	15	20	25	30						
	Significant (4)	4	8	12	16	20	24						
	Somewhat (3)	3	6	9	12	15	18						
	Marginal (2)	2	4	6	8	10	12						
	Slight (1)	1	2	3	4	5	6						
	Probability	→	1	2	3	4	5	6					
	- High Not acceptable ,Action Required												
	-Medium ,Action Required												
	-Low , No action required												