

Template No.
CEMILAC_FFGP_PCD_08

Process Control Document (PCD) for Mill forms/feed stock

Document No: <Document No>

Issue/Rev No: <Issue No>

Date: <Date of Issue>

<DESIGN AGENCY LOGO>	Document No.			
	Issue No./ Rev No. :	<00X>/	Issue Date :	<DD/MM/YYYY>
	Copy No. :	01 of N	No. of Pages :	< total no .of pages >
	Document Classification :	<input type="checkbox"/> Secret <input type="checkbox"/> Confidential <input type="checkbox"/> Restricted <input type="checkbox"/> Unrestricted		
Title:			Project/System :	
Process Control Document (PCD) for Mill forms/feed stock			< Project/System Name>	
			LRU/System Part No.	
			<No.>	
			Critical Level	
			<A/B/C/D/E>	
	Name & Designation		Signature	
Prepared By	<Design Rep Name>, < Designation> <Agency Name>			
Reviewed By	<Project Leader Name>, <Designation> <Agency Name> <AWG/QA HOD Name>, <Designation> <Agency Name>			
Approved By	<Project Leader Name>, <Designation> <Design Agency> <Officer_Name>, <Designation> RCMA <Name>			
<Design Firm Name & Address>				

Manufacturing Plant	
Company Name	
Material Specification	
Alloy Grade	
Alloy Type	
Supply condition	
Heat Treatment Condition	
Size range	
Application	Military Aircraft and Aero Engine Applications

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 3 of 14

Contents:

S No.	DESCRIPTION OF CONTENT	PAGE No.
01	SCOPE	
02	PROCESS ROUTE	

Note / Disclaimer:

- i. This Process Control Document template is applicable for materials like Mill forms/feed stock
- ii. If any details under the above headings/contents is IPR of the company, then an Internal control document shall be prepared and authenticated for those details by the company and the Internal document reference shall be mentioned in this Process control document (PCD).
- iii. CEMILAC/RCMA has the authority to delete or add /seek any relevant details as part of this PCD as per requirement.
- iv. This Document contains information pertinent to <company> unauthorized copy is strictly prohibited Any error or discrepancy in the process control document shall be the responsibility of the development agency (company name)

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
				Page No: 5 of 14	

1.0 SCOPE

This process documents covers process/manufacturing details for _____.

2.0 PROCESS ROUTE

S. No.	PROCESS	PROCESS / EQUIPMENT DETAILS
LIGHT ALLOYS (AL/MG ALLOYS)		
1.1	MELTING AND CASTING DETAILS	1. Make: 2. Capacity: 3. Refractory Used: 4. Melting: 5. Melting Rate: 6. Charging by: 7. Charging Machine 8. Typical Charge:
	<u>PROCESS SUMMARY:</u>	
1.2	ROTARY GAS INJECTOR (RGI)	1. Degassing: 2. Make:
	<u>PROCESS SUMMARY:</u>	
1.3	SPECTRO ANALYSIS (CHEMICAL ANALYSIS)	1. Make: 2. Calibration Frequency: 3. Std. Used:
	<u>PROCESS SUMMARY:</u>	

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 6 of 14

1.4	ALPUR DEGASSER	1. Make: 2. Degassing:	
	<u>PROCESS SUMMARY:</u>		
1.5	GRAIN REFINEMENT	1. Make: 2. Grain Refinement:	
	<u>PROCESS SUMMARY:</u>		
1.6	METAL FILTRATION	1. Make: 2. Filter:	
	<u>PROCESS SUMMARY:</u>		
1.7	HYDROGEN ANALYSIS		
	<u>PROCESS SUMMARY:</u>		
1.8	DIRECT CHILL CASTING	Make:	
	<u>PROCESS SUMMARY:</u>		
1.9	HOMOGENISING OF LOGS	1. Make: 2. Capacity: 3. Max Working Temp.: 4. Heating Chamber:	

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 7 of 14

		5. Soaking Temp. 6. Homogenisation 7. Schedule Cooling Facility:
	<u>PROCESS SUMMARY:</u>	
1.10	CUTTING OF LOGS	Make:
	<u>PROCESS SUMMARY:</u>	
1.11	TURNING AND CHAMFERING OF PARTED LOGS	1. Make: 2. Size:
	<u>PROCESS SUMMARY:</u>	
1.12	STAMPING OF BILLETS (PUNCH & HAMMER)	
	<u>PROCESS SUMMARY:</u>	
1.13	ULTRASONIC TESTING	
	<u>PROCESS SUMMARY:</u>	
1.14	SECONDARY PROCESSING (EXTRUSION /	1. Make: 2. Capacity: 3. Parameters:

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 8 of 14

	ROLLING / FORGING) OF BILLETS	
	<u>PROCESS SUMMARY:</u>	
1.15	Heat Treatment (Solutionising/Agin g)	1. Make: 2. Capacity:
	<u>PROCESS SUMMARY:</u>	
1.16	STRETCHING	1. Make: 2. Capacity:
	<u>PROCESS SUMMARY:</u>	
FERROUS/NICKEL ALLOYS		
2.1	AIR INDUCTION MELTING (AIM)	1. Make: 2. Model: 3. Capacity:
	<u>PROCESS SUMMARY:</u>	
2.2	ELECTRIC ARC	4. Make: 5. Capacity:

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 9 of 14

	FURNACE (EAF)	6. Refractory consumption: 7. Water cooled panels: 8. Oxygen Lance: 9. Post combustion: 10. De-dusting system: 11. Flow rate oxygen: 12. Slag forming addition: Dolo lime: Lime: 13. Charge mix up details: Hot Metal(HM): 14. Direct Reduced Iron (DRI): 15. Scrap (Returns): 16. Arc length: 17. Arc current:
	<u>PROCESS SUMMARY:</u>	
2.3	ARGON OXYGEN DECARBURIZATION (AOD)	1. Make: 2. Capacity: 3. No of Tuyeres: 4. Bottom flow: 5. Top Lance: 6. Process Gas type: 7. Arrangement of side wall nozzles:
	<u>PROCESS SUMMARY:</u>	
2.4	LADLE HEATING FURNACE (LHF)	8. Make: 9. Capacity: 10. Ladle diameter: 11. Electrode Diameter:

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 10 of 14

		12. Electrode length:																			
	<u>PROCESS SUMMARY:</u>																				
2.5	VACUUM DEGASSING (VD)	1. Make: 2. Capacity: 3. Automatic Wire feeding system 4. Automatic Ejector operating system 5. Vacuum level:																			
	<u>PROCESS SUMMARY:</u>																				
	<table border="1"> <tr> <td>Chemical Composition (wt. %)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Chemical Composition (wt. %)																		
Chemical Composition (wt. %)																					
2.6	ELECTRO SLAG RE-MELTING (ESR)	1. Make: 2. Ingot Dia Size: 3. Capacity: 4. Max. Ingot weight: 5. Vacuum Hood: 6. Slag feeder: 7. Furnace Head: 8. Protective gas: 9. Fully Co-Axial Design:																			
	<u>PROCESS SUMMARY:</u>																				
	VACUUM ARC RE-MELTING (VAR)	1. Make: 2. Ingot Dia Size: 3. Max Capacity: 4. Max. Crucible Dia: 4. Cooling Type 5. Furnace Head:																			

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 11 of 14

		6. Ultimate Vacuum: 7. Fully PLC Automatic Melting:
	<u>PROCESS SUMMARY:</u>	
2.7	REHEATING (If applicable)	1. Make 2. Reheating of Furnace: 3. Calibration of Furnace:
2.8	SECONDARY PROCESSING (EXTRUSION / ROLLING / FORGING) OF BILLETS	1. Make: 2. Capacity of press: 3. Re-Heating Furnace: 4. Calibration of Furnace:
	<u>PROCESS SUMMARY:</u>	
2.9	HEAT TREATMENT	1. Make: 2. Type of Furnace: 3. Type of Furnace Heating: 4. Calibration of Furnace:
	<u>PROCESS SUMMARY:</u>	

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 12 of 14

	Heat Treatment cycle		
	Heat Treatment	Temp (°C)	Min soaking time
			Cooling media
2.9	PEELING/ MACHINING	1. Peeling M/c input size: 2. Polishing M/c input size: 3. Machining (turning) input size: 4. Coil to bar peeling: 5. Wire draw unit:	

3.0 STAMPING

4.0 PROCESS COMPLIANCE CHECK POINTS

PROCESS PARAMETERS	ACCEPTANCE CRITERIA	COMPLIANCE (YES/NO)
For ex: Super heat temperature	500-540 deg C	
Flow rate		
Melting rate		

5.0 FINAL INSPECTION

6.0 DOCUMENTATION

7.0 DISPATCH

8.0 PROCESS FLOW CHART

9.0 BILL OF MATERIAL

RAW MATERIAL	SPECIFICATION	VENDOR

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 13 of 14

- THIS DOCUMENT IS A GUIDANCE DOCUMENT. APPLICABLE SECTION/ TABLE ROWS MAY BE CONSIDERED. ANY ADDITIONAL DETAILS MAY BE ADDED. ANY NOT APPLICABLE SECTION/ TABLE ROWS MAY BE DELETED. THE TEMPLATE IS VERY GENERAL AND VARY WITH MATERIAL CLASS TO CLASS AND/OR GRADE TO GRADE, PROCESS TO PROCESS, DEVELOPMENT AGENCY PROCESS PLANT AND EQUIPMENTS. THE PROCESS CONTROL DOCUMENT MAY BE FINETUNED WITH THE TAA BEFORE LTCC BASED ON MATERIAL, APPLICATION AND EQUIPMENTS.

Prepared By	Checked By	Approved By	Doc No. <Document number		
			Issue	Revision	Date
					Page No: 14 of 14