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# Process Control Document (PCD) for Aero Lubricants/Oils/ Greases

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Note / Disclaimer:

- (i) This Process Control Document template is applicable for materials like Lubricants/Oils/ Greases
- (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)
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## **1.0 Introduction**

- a) Product Name:
- b) Description of product
- c) Design Agency/Firm:
- d) Developing Agency/Firm:
- e) Manufacturing Agency/Firm:
- f) Specification
- g) Project Description:
- h) End use application
- i) System applications / end use/Platform details

### 2.0 Scope

This document specifies the requirements for controlling manufacturing process to ensure that the product conforms to its specification /QTS requirements and to produce the product consistent in its quality.

## 3.0 Raw Materials and Additives

Raw Materials	Sources of Raw Materials
X1	
X2	
X3	:
X4	Q:
X5	
X6	:

3.1 Details and Sources of Raw Materials and Additives

#### 3.2 Raw Materials and Additives Specification

Raw Materials	Specification of Raw Materials
X1	:
X2	:
X3	:
X4	:
X5	:
X6	:

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#### 3.3 Inward goods inspection of Raw Materials and Additives

Inward goods inspection shall be carried out as per the raw materials specification mentioned at Section 3.2. Analysis certificate of raw materials with compliance statement to be issued after inward goods inspection.

#### 3.4 Storage of Raw Materials and Additives

Raw Materials should be stored under conditions of covered storage at ambient temperature (ranging in temperature of----<sup>0</sup>C, Max %RH). Store the raw materials/ additives preferably in original packs or other sealed containers or in storage tanks with suitable identification and traceability in a suitable warehouse which is clean, dry, well-lit. Necessary care is to be taken to ensure proper protection of the raw materials/ additives from water seepage, direct sunlight and dirt.

## **4.0 Product Formulation details**

Composition (For a blend of --- Kg.)

Raw Materials	% of Raw Materials / Additives			
/Additives	for a kg batch			
X1	: ( V			
X2	:			
X3				
X4				
X5	: ())			
X6				

## 5.0 Details of manufacturing equipment

Equipment	Capacity/Description	Identification	Calibration
Blending Kettle –			
Blending Kettle –			
Blending Kettle –			
Laboratory blending			
unit			
Thermic Fluid Heater-			
Thermic Fluid Heater-			
Heat Exchanger-			
Heat Exchanger-			
Filter-			
Filter-			
Filling Machine-			
Filling Machine-			

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Other equipment's		

### 6.0 Details of manufacturing process:

The Manufacturing process shall include the contents on following topics:

- (i) Process flow diagram explaining the step-by-step process and document control
- (ii) Sequence of addition of raw materials
- (iii) Process parameters for each process stage/step as applicable
  For example:
  Temperature
  Pressure
  Flow rate
  Stirring speed
  Process time etc.... as applicable
- (iv) In-process checks for each process stage/step as applicable
- (v) Other details involving process control along with the internal control document reference as applicable.

A sample flowchart and process description is given below in Para 6.0 subsections for reference purpose only.

The flow chart depicting the outlines of the manufacturing process.

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#### 6.1 Mixing of Blend components

The blending process of oils/Lubes / grease involves the steps mentioned below.

Weighed quantities of XI, X2 are charged into the blending kettle. Start stirring the base oil mixture. Heat the base oil mixture. --. Add weighed quantity of additives X3, X4, X5 and X6 with stirring. Continue mixing the components for a minimum of half an hour. Temperature of blend can be increased to--- if required, for complete dissolution of the additives in the base oil. Check conformance of the blend to the below mentioned characteristics.

Characteristics	Units	Limits	Methods
Appearance			
Kinematic viscosity at°c			
Content of free acid			
Content free alkali as NaOH		0	
Pour point			
Ash content			
Other parameters			

Dosage of XI and X2 can be adjusted to get the required viscosity.

#### 6.2 Dehydration and testing

If the water content of the blend is above the specified limit, keep stirring, increase the temperature to --- and dehydrate until the water content reaches below the specified limit.

Characteristics	Units	Limits	Methods
Water content	ppm		
Other parameters			

#### 6.3 Cooling

Cool the product by re-circulating through the heat exchanger until the temperature reaches---°c.

#### 6.4 Filtration

Recirculate the product through the filtration unit (Filter size:\_\_\_\_\_) till a clear product free from visible impurities is obtained. The cleanliness class shall meet GOST /NAS class\_\_\_\_\_.

Characteristics	Units	Limits	Methods
Appearance			Visual

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#### 6.5 Intermediate/ Rundown Analysis

The filtered product in the blending kettle is analyzed for conformance to the characteristics mentioned below:

Characteristics	Units	Limits	Methods
Appearance			Appearance
			180.
Kinematic viscosity at <sup>0</sup> c			6/
Mechanical impurities			5
Other parameters			

6.6 Other unit operations:

## 7.0 Filling Procedure

Product can be filled in Metal /HDPE/ or ------ containers as per technical requirements and customer needs. Containers shall be examined for rust, water, external impurities, and markings. All the containers are to be routed through the washing unit before filling. Only dry and clean containers with proper markings as indicated in para 10 shall be used for product filling.

## 8.0 Sampling Procedure for final testing

Sampling for physico-chemical properties testing to be done as per specification /QTS / standard procedure \_\_\_\_\_\_. Composite sample shall be tested for final quality check in accordance with the Control Specification mentioned at para 9.0.

## 9.0 Finished Product Analysis

The finished product is tested as per the governing specification \_\_\_\_\_/ QTS No.

# 10.0 Labelling of Containers

The following marking shall appear on each filled container:

Product Name Specification /QTS :

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Batch /Lot No Date of Manufacturing Date of Re-inspection Total Shelf Life Order No Consignee Name and address of the manufacturer Net Content

## **11.0 Packaging and storage conditions**

Oil –(Quantity) Lit can be filled in Metal or HDPE Containers of appropriate size as per customer requirements. Containers should be clean, dry, and free from manufacturing defects. The product shall be packed and supplied in suitable containers as agreed between the airborne user and manufacturer.

The product should be stored in original sealed containers in a suitable warehouse which is clean, dry, well-lit, and not subject to wide temperature changes. Necessary care should be taken to ensure proper ventilation in the warehouse and protection of the product from water seepage, direct sunlight and dirt. Storage of the product at below----- and relative humidity of less than----- is recommended.

11.1 MSDS : MSDS shall be prepared and submitted to TAA and User

## 12.0 Shelf life and retest criteria

The initial shelf life of the product is .... months from the date of manufacture as stipulated by the manufacturer. The total shelf life of the product shall be indicated by the manufacturer. Control sample of qualification batch of the product shall be stored at prevailing ambient condition and proved for storage stability by conducting tests as per specification/QTS for periodicity of 12, 24, 36 months or till the total shelf life declared by the manufacturer duly witnessed and coordinated by DGAQA.

# 13.0 Records

Formulation and Manufacturing Advice

**Blending Log Sheet** 

Analysis Certificate

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