



PM/ IS 17042 (Pt.1)/ 1  
June 2019

## PRODUCT MANUAL

**Diesel Engines — NO<sub>x</sub> Reduction Agent AUS 32**  
**Part 1 Quality Requirements**  
**According to IS 17042 (Part 1) : 2018/ISO 22241-1 : 2006**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	<b>Product</b>	:	IS 17042 (Part 1) : 2018/ISO 22241-1 : 2006
	<b>Title</b>	:	Diesel Engines — NO <sub>x</sub> Reduction Agent AUS 32, Part 1 Quality Requirements
	<b>No. of amendments</b>	:	NIL
2.	<b>Sampling Guidelines</b>		As per cl.4 (Annex A) of IS 17042:pt1:2018/ISO 22241-1 : 2006
a)	<b>Raw material</b>	:	No specific requirement
b)	<b>Grouping Guidelines</b>	:	Not applicable
c)	<b>Sample Size</b>	:	2 ltr
3.	<b>List of Test Equipment</b>	:	Please refer Annex –A
4.	<b>Scheme of Inspection and Testing</b>	:	Please refer Annex –B
5.	<b>Possible tests in a day</b>	:	Urea content, Density, Refractive index ,Alkalinity, Aldehydes, Insoluble matter, Phosphate, All trace element content and Identity.
6.	<b>Scope of the Licence :</b>		
	Licence is granted to use Standard Mark as per IS 17042 (Part 1) : 2018/ISO 22241-1 : 2006 with the following scope:		
	<b>Name of the product</b>		Diesel Engines — NO <sub>x</sub> Reduction Agent AUS 32, Part 1 Quality Requirements
	<b>Designation</b>		AUS 32

**ANNEXURE A**

**LIST OF TESTING EQUIPMENT**

Major test equipment required to test as per requirements of Indian Standard.

Sl. No.	Test equipment/Apparatus/Chemicals	Test used in	Clause reference
1.	<p>Apparatus: Automatic nitrogen analyser, Analytical balance, Auxiliary devices for sample preparation (tweezers,, micr-spatula, pipette), Customary chemically resistant glass,</p> <p>Chemicals: De-ionized water, Auxiliary combustion agent and other equipments, Standard substances for nitrogen determination, Oxygen, min. 99,995 %, Other ultrapure gases, Other reagents or auxiliary agents</p> <p>OR</p> <p>Apparatus: Refractometer, Analytical balance, Thermostat , Drying oven , 150 ml beaker, Typical laboratory glass</p> <p>Chemicals: De-ionized water , Urea, (crystalline), Urea test solution</p>	Urea content	<p>Clause 5/  ISO 22241-2 Annex B</p> <p>or</p> <p>ISO 22241-2 Annex C</p>
2.	<p>Hydrometer Method</p> <p>Apparatus: Hydrometer cylinder, Hydrometers, Constant temperature bath, Thermometers (-1°C to 38°C and -20 to 102°C), Glass or plastic stirring rod</p> <p><i>Chemicals:</i> Flushing solvent, Ammonium peroxydisulfate, water (grade 2, grade 3), Air</p> <p>Oscillating U-Tube Method</p> <p>Apparatus: Density Meter, Circulating constant-temperature bath, Calibrated temperature Sensor, Homogenizer,</p>	Density at 20 °C	<p>Clause 5/ISO 3675</p> <p>or</p> <p>ISO 12185</p>
3.	<p>Apparatus: Refractometer, Analytical balance, Thermostat , Drying oven , 150 ml beaker, Typical laboratory glass</p> <p>Chemicals: De-ionized water , Urea, (crystalline), Urea test solution</p>	Refractive index at 20 °C c	Clause 5/ ISO 22241–2 Annex C

4.	<p>Apparatus: Analytical balance, Automatic burette, Potentiometer, Magnetic stirrer, Beaker, Measuring cylinder,</p> <p>Chemicals: distilled or de-ionized water, Hydrochloric acid., Buffer solutions</p>	Alkalinity as NH <sub>3</sub>	Clause 5/ ISO 22241–2 Annex D
5.	<p>Apparatus: Laboratory balance, Vacuum filtration unit, Vacuum filtration unit, Spectrophotometer , Volumetric flasks , Pipettes, Rotary evaporator, Constant-temperature bath</p> <p>Chemicals: Chemicals of analytical grade , Saturated potassium carbonate-solution , Copper sulphate-solution, Alkaline potassium sodium tartrate-solution , Biuret-standard-solution</p>	Biuret	Clause 5/ ISO 22241–2 Annex E
6.	<p>Apparatus: Laboratory balance, Spectrophotometer, Volumetric flasks, Volumetric flasks, Pipettes</p> <p>Apparatus: Chemicals of analytical grade, Sulphuric acid, Chromotropic acid , Formaldehyde standard solution</p>	Aldehydes	Clause 5/ ISO 22241–2 Annex F
7.	<p>Apparatus: Filtration equipment for vacuum filtration ], Membrane filter , Petri dish with cover, Flat-tipped tweezers, Analytical balance, Balance, Glass beake, Drying oven, Desiccator filled with a drying agent, Standard laboratory glass</p> <p>Chemicals: De-ionized water</p>	Insoluble matter	Clause 5/ ISO 22241–2 Annex G
8.	<p>Apparatus: Analytical balance, Incineration dish (platinum or quartz glass), Heating plate or sand bath, Muffle furnace (700 °C), Spectrophotometer, Cells, Graduated flasks, Bulb pipettes.</p> <p>Chemicals: De-ionized water, Calcium carbonate, Hydrochloric acid, Sulphuric acid, Ascorbic acid, Ammonium heptamolybdate tetrahydrate, Potassium antimony(III) oxytartrate hemihydrates, Ascorbic acid solution, Molybdate solution, Potassium hydrogen phosphate, Phosphate stock solutions</p>	Phosphate (PO <sub>4</sub> )	Clause 5/ ISO 22241–2 Annex H
9.	<p>Incineration procedure :</p> <p>Apparatus: Muffle furnace, Bunsen burner, Hot plate, Analytical balance, Quartz glass</p>	Calcium	Clause 5/ ISO 22241–2 Annex I

	dishes, Volumetric flask  Chemicals: nitric acid of min. 65 %, alternative hydrochloric acid of max. 37 %, ICP standard solution  OR  Direct determination:  Apparatus: Volumetric flask, Fixed volume pipette, Measuring instrument, ICP-OES  Chemicals: 32,5 urea solution, nitric acid of min. 65 %, alternative hydrochloric acid of max. 37 %, ICP standard solution		
10.	-do-	Iron	-do-
11.	-do-	Copper	-do-
12.	-do-	Zinc	-do-
13.	-do-	Chromium	-do-
14.	-do-	Nickel	-do-
15.	-do-	Aluminium	-do-
16.	-do-	Magnesium	-do-
17.	-do-	Sodium	-do-
18.	-do-	Potassium	-do-
19.	Apparatus: Fourier transform infrared spectrometer (FTIR) or any IR spectrometer, Optical cell suitable for aqueous solutions or any ATR unit suitable for liquids.	Identity	Clause 5/ ISO 22241–2 Annex J

Specification, Least Count and Range of apparatus and chemicals as applicable should match the values/parameters/tolerances mentioned in the Indian Standard.

The above list is meant only for guidance and may not be treated as exhaustive.



## **ANNEXURE B**

### **SCHEME OF INSPECTION AND TESTING Diesel Engines — NO<sub>x</sub> Reduction Agent AUS 32 Part 1 Quality Requirements According to IS 17042 (Part 1) : 2018/ISO 22241-1 : 2006**

**1. LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

**1.1** The manufacturer shall prepare a calibration plan for the test equipments.

**2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.

**3. MARKING** –The Standard Mark, as given in the Schedule of the license shall be incorporated on each container of the product provided that the product contained in the container thus marked conforms to the requirement of the specification.

**3.1** Following details shall be marked on each container:

- i) Name of material i.e. Diesel Engines — NO<sub>x</sub> Reduction Agent
- ii) Designation of the material i.e. AUS 32
- iii) Manufacturer's name, initials or trade-mark, if any
- iv) Net mass of material
- v) Batch No/Control Unit No. and date of manufacture
- vi) Best before..... (date/month/year in capital letters);OR Best before .....days or months from the date of packaging/manufacture
- vii) Storage conditions
- viii)Any other statutory requirements
- ix) BIS Licence Number CM/L—
- x) BIS website details as follows “For details of BIS certification please visit [www.bis.gov.in](http://www.bis.gov.in)”

**3.2 HANDLING, TRANSPORTATION AND STORAGE:** Handling, Transportation and Storage shall be done as per IS 17042 (Part 3): 2018/ ISO 22241-3: 2017. Materials used for packing shall be as prescribed in IS 17042 (Part 3): 2018/ ISO 22241-3: 2017.

**4. CONTROL UNIT** – For the purpose of this scheme the product manufactured in one day under similar conditions shall constitute a control unit.

**5. LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

**5.1** All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

**7. REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

**TABLE 1**  
**LEVELS OF CONTROL**  
**(Clause 5 of SIT)**

(1)			(2)	(3)			
TEST DETAILS			Test Equipment R: required S: Sub Contracting	LEVELS OF CONTROL			
Cl.	Requirement	Test Methods			No. of samples	Frequency	Remarks
		Clause	Reference				
<b>5</b>	<b>Quality Requirements</b>						
i.	Urea content		ISO 22241-2 Annex B ISO 22241-2 Annex C	R	1	Every batch	
ii.	Density at 20 °C		ISO 3675 or ISO 12185	R	1	Every batch	
iii.	Refractive index at 20 °C		ISO 22241-2 Annex C	R	1	Every batch	
iv.	Alkalinity as NH <sub>3</sub>		ISO 22241-2 Annex D	R	1	Every batch	
v.	Biuret		ISO 22241-2 Annex E	R	1	Every batch	

vi.	Aldehydes		ISO 22241-2 Annex F	R	1	Every batch	
vii.	Insoluble matter		ISO 22241-2 Annex G	R	1	Every batch	
viii.	Phosphate (PO <sub>4</sub> )		ISO 22241-2 Annex H	R	1	Every batch	
ix.	Calcium		ISO 22241-2 Annex I	R	1	Every batch	
x.	Iron		-do-	R	1	Every batch	
xi.	Copper		-do-	R	1	Every batch	
xii.	Zinc		-do-	R	1	Every batch	
xiii.	Chromium		-do-	R	1	Every batch	

xiv.	Nickel		-do-	R	1	Every batch	
xv.	Aluminium		-do-	R	1	Every batch	
xvi.	Magnesium		-do-	R	1	Every batch	
xvii.	Sodium		-do-	R	1	Every batch	
xviii.	Potassium		-do-	R	1	Every batch	
xix.	Identity		ISO 22241-2 Annex J	R	1	Every Batch	

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification.