

NTPC LTD

CC-OS

EOC NOIDA

Sub: Qualifying Requirement for Vendor Enlistment for supply of CHP Idlers & Frames & Rolls

A)	MEG DETAILS		
	1.0	MEG NO.	55MEC-03
	2.0	MEG DESCRIPTION	CHP Idlers & Frames & Rolls
	3.0	RESPONSIBILITY CENTRE	CC
B)	<p>Technical Criteria of QR:</p> <p>1. The applicant must be a manufacturer of Idlers aAssembly for Conveyor Belt of width 1000 mm and above</p> <p>2. OPTION-1 The applicant should have supplied following Idler Assemblies/Rolls (For minimum 1000mm width Conveyors) against a single order to any Industrial Users or Main Package Contractors during last 5 years from the date of application</p> <p>i) Minimum 6000 IDLER assemblies OR ii) Combination of IDLER Assemblies & IDLER Rolls having minimum 12000 IDLER Rolls OR iii) Minimum 12000 Idler Rolls</p> <p>OPTION-2 The applicant should have executed any material handling package having minimum 6kM Conveyor length.</p> <p>3. The applicant should have in-house testing facilities for Run-out, Water Ingress & Dynamic Friction Test.</p>		
C)	<p>Other Documents to be submitted: In addition to the documents required in support of meeting technical requirements as stated above, following documents are required to be submitted by the Applicants applying for enlistment:-</p> <p>1. Three POs of the highest executed values of similar work during previous five years from the date of application. Copy of Invoice / Completion certificate from the concerned buyer/s in support of successful execution of supply against the POs to be submitted.</p> <p>2. Audited balance sheet including Profit & Loss statement for the previous three completed financial years reckoned from the date of application. In case the audited documents are not ready / available, then certified copy by a registered practicing Chartered accountant may be submitted.</p> <p>3. Latest annual report OR NSIC / SSI / MSME registration certificate / BIS license / ISO certificate / Certificate of registration from the concerned excise department / any other statutory document as a proof of being manufacturer of the required material.</p> <p>4. Any other documents in addition to the above which the applicant wants to submit.</p>		
D)	NOTE-1	<p>Similar works means: Supply of Idlers to Bulk material handling installations having conveyors, Thermal Power Plants or CHP main package Contractors OR Execution of Material Handling Packages having Conveyor Systems</p>	
	NOTE-2	<p>The executed value means Basic value of quantity of similar works executed/supplied against the reference PO(also applicable to partly executed POs as on date of application).Where PO value is composite(i.e. including Taxes etc.),the applicant to give item-wise break-up of Composite PO value mentioning Basic Value, Taxes etc.</p>	

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Sub: Technical Specifications for Vendor Enlistment for supply of CHP Idlers & Frames & Rolls

A)	MEG DETAILS		
	1.0	MEG NO.	55MEC-03
	2.0	MEG DESCRIPTION	CHP Idlers & Frames & Rolls
	3.0	RESPONSIBILITY CENTRE	CC
B)	Technical Specifications: As per attached Annexure		

Specification for Idlers

SI	Description								
01	Idlers to be made as per IS: 8598-1987 or the latest.								
02	Idler rolls shall be drop in type, roll can be removed without dismantling the bracket from the conveyor structure.								
03	Steel tubes (ERW) used in the manufacture of idler shall conform to IS: 9295-1983 'Specification for steel tubes for idlers for troughed belt conveyors (first revision)'. Nominal thickness of the tube should be 4.5 mm. The pipe used for manufacturing idlers shall be machined at both end simultaneously in one setting to maintain co-axiality.								
04	Troughing angle of the carrying, self-aligning & impact idler should be 35 degree (or as specified in the attached drawing).								
05	Spindle should be of EN-8 material, BS-970 / 40C8 Bright Bar as per IS:1570, ground to super finish at the bearing seating ($\Delta \Delta \Delta$) with required tolerance. <ul style="list-style-type: none"> a) Dia of the spindle should be 35 mm or more for Carrying Idlers for conveyor belt width upto 2000 mm b) Dia of the spindle should be 40 mm or more for Carrying Idlers for conveyor belt width more than 2000 mm. c) Dia of the spindle should be 25 mm or more for Single roll Return Roller, for belt width upto 1800 mm and 30 mm or more, for belt width more than 1800 mm d) Dia of the spindle should be 25 mm or more for V - Type Return Roller 								
06	Spindle end – Type B as specified in IS: 8598-1987 Clause 3.4.2								
07	All rolls of similar belt width should be interchangeable								
08	Ball bearing should be deep groove type 630* C3 2Z (* depends on the size of shaft dia) adequately sealed and lubricated for life. L10 bearing life shall be minimum 30000 hours.								
09	The idlers shall be provided with multi labyrinth seals (Minimum triple labyrinth) with arrangements to prevent ingress of dust and moisture into the bearing housing								
10	Idlers to be manufactured as per attached drawings (To be attached by respective sites) Idler Frame size suggested is shown Annexure-I. Station to update their dimensional and fitment drawings with the Idler frame sizes shown in Annexure-I) Idler Frame: Steel sections to be used in Idler Frame is shown in Annexure –I. If vendor feels that higher sized / thickness MS sections are required for better life of the idler, they can use the same. The suggested sections are of minimum requirement.								
11	Bearing Housing shall be manufactured from CRCA steel of extra deep drawing quality steel of minimum thickness 3.5 mm of original sheet. The outer edge of the bearing housing shall be at least 5 mm away to the inside of the pipe edge. Bearing housing shall be simultaneously welded to the pipe at both ends to eliminates distortion.								
12	Direction of Belt travel to be embossed / punched on the brackets								
13	Rubber ring for Impact idlers (Natural Rubber) <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>a) Hardness – 65+/-5 Shore-A</td> <td>b) Sp Gravity of Rubber <= 1.15</td> </tr> <tr> <td>c) Tensile Strength = 240 kg/cm Sq. (min)</td> <td>d) Elongation at break = 450 % (min)</td> </tr> <tr> <td>e) Ash Content = 11 % Max</td> <td>f) Abrasion – 250 mm³ as per DIN 53516</td> </tr> <tr> <td colspan="2">g) Rubber rings to be fitted on steel tubes with sufficient interference fit.</td> </tr> </tbody> </table>	a) Hardness – 65+/-5 Shore-A	b) Sp Gravity of Rubber <= 1.15	c) Tensile Strength = 240 kg/cm Sq. (min)	d) Elongation at break = 450 % (min)	e) Ash Content = 11 % Max	f) Abrasion – 250 mm ³ as per DIN 53516	g) Rubber rings to be fitted on steel tubes with sufficient interference fit.	
a) Hardness – 65+/-5 Shore-A	b) Sp Gravity of Rubber <= 1.15								
c) Tensile Strength = 240 kg/cm Sq. (min)	d) Elongation at break = 450 % (min)								
e) Ash Content = 11 % Max	f) Abrasion – 250 mm ³ as per DIN 53516								
g) Rubber rings to be fitted on steel tubes with sufficient interference fit.									
14	Painting of Idlers : After proper surface cleaning, 2 coats two pack air drying, Epoxy polyimide resin based red oxide – zinc phosphate (epoxy content – 15 to 18 by % of weight). Temperature resistance- upto 120 deg C dry heat, DFT / coat- 30 micron (min). and one coat of a two pack air drying high build epoxy resin based paint with MIO (Temp resistance up to 180 deg C dry heat, DFT / coat- 100 microns). Colour – Grey or as specified.								
15	This specification covers carrying and return Idlers of different types to be used for handling of coal in conveyor in Thermal Power Plant. Conveyor belts handles coal up to 250 mm cube size (occasionally 1-2 % 400 mm cube lumps). Speed of the conveyor is generally 3.4 m/sec.								

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ANNEXURE-I (IDLER FRAMES OF VARIOUS TYPES)

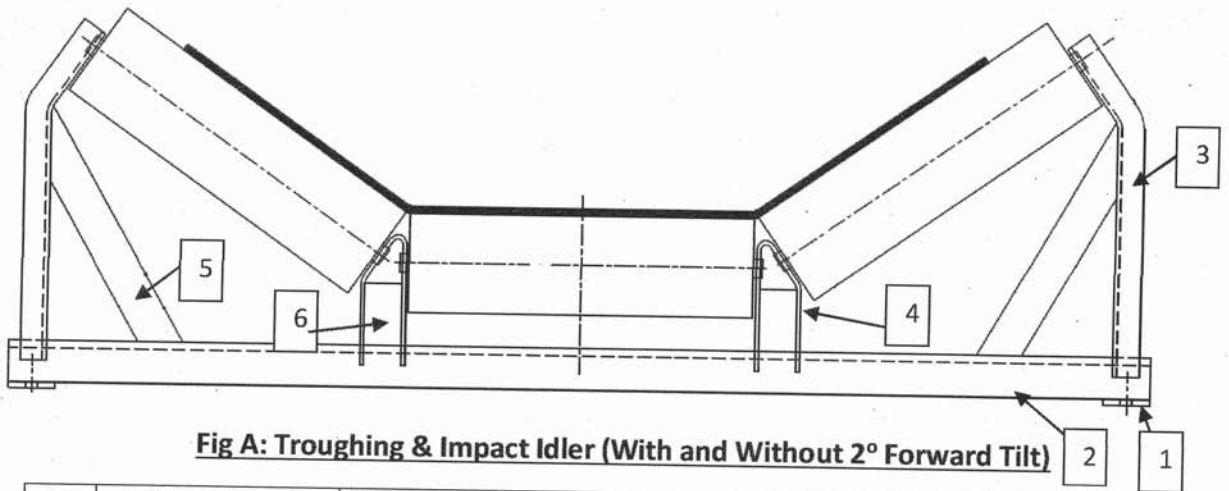


Fig A: Troughing & Impact Idler (With and Without 2° Forward Tilt)

Sno	Description	For Idler of Conveyor Belt width up to 1400 mm, Minimum Size of members	For Idler of Conveyor Belt width more than 1400 mm, Minimum Size of members
1	Base Bar	ISF: 8X75	ISF: 8X75
2	Base Board	ISA: 75x75x8	ISA: 100x100x8
3	End Bracket	ISMC: 75x40x4.8	ISMC: 100x50x5
4	Centre Bracket	ISF: 8x100	ISF: 8x100
5	Stiffener	ISF: 8X75 (optional)	ISF: 8X75
6	Rib	6 mm thick MS Flat	6 mm thick MS Flat

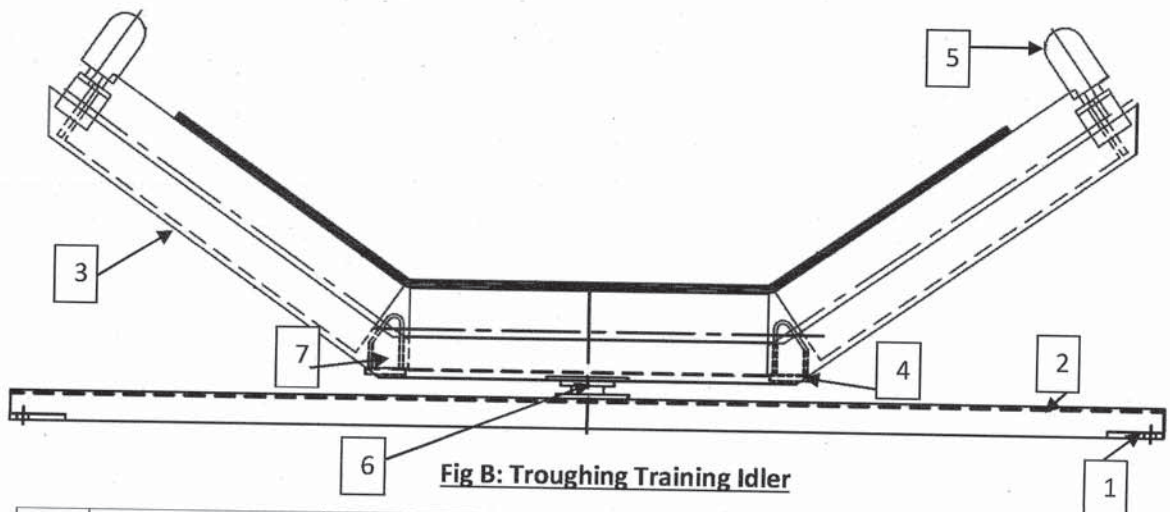


Fig B: Troughing Training Idler

Sno	Description	Minimum Size of members
1	Base Bar	ISF: 8X75
2	Base Board	ISA: 75x75x8 For Idler of Conveyor Belt width up to 1400 mm, ISA: 100x100x8 For Idler of Conveyor Belt width more than 1400 mm
3	Flat	ISF: 10x75
4	Centre Bracket	ISF: 8x100
7	Rib	6 mm thick MS Flat
5	Guide Roll Assy	Shaft dia (min) 20 mm, 02 nos bearing
6	Pivot Assy	Adequately designed

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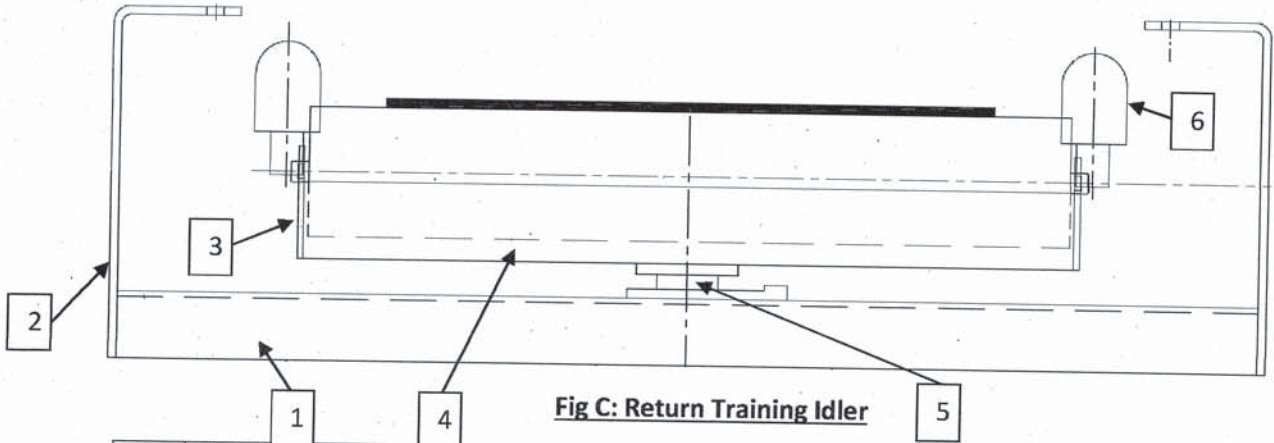


Fig C: Return Training Idler

Sno	Description	Minimum Size
1	Base Board	ISMC: 150x75
2	Bracket	Plate Thickness 8
3	End Bracket	ISF:75X6
4	FLAT	ISF: 75X10
5	Pivot Assy	Adequately designed
6	Guide Roll Assy	Shaft dia (min) 20 mm, 1 bearing

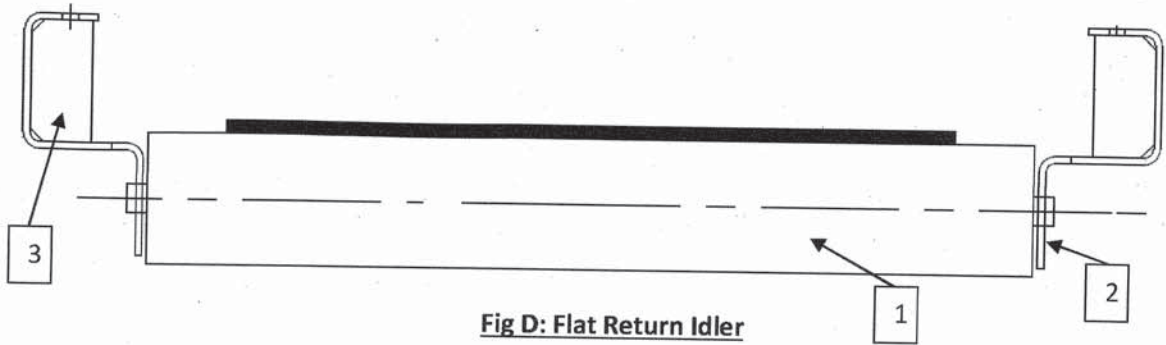


Fig D: Flat Return Idler

Sno	Description	Minimum Size
1	Roll Assembly	As per specification
2	Hanger Bracket	125 mm width, 6 mm thick MS plate
3	Rib at centre	6 mm thick MS Plate

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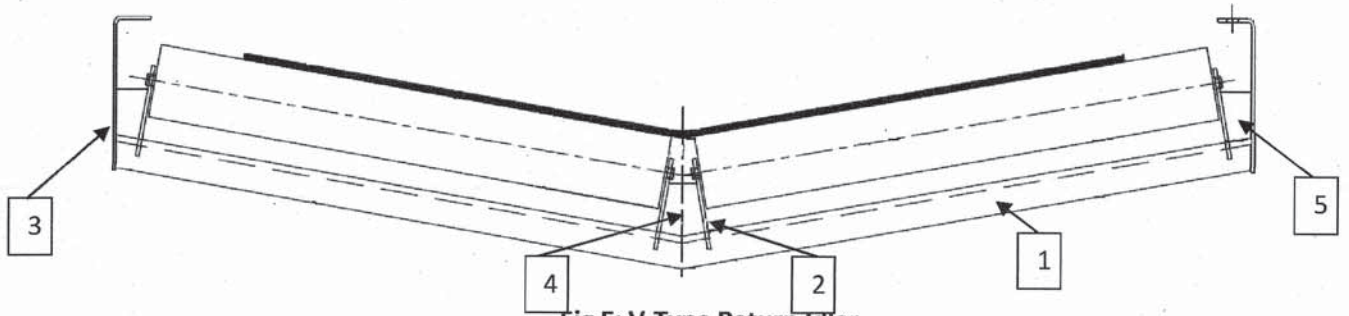



Fig E: V-Type Return Idler

Sno	Description	Minimum Size
1	Base Angle	ISA: 75x75x8
2	Centre Bracket	ISF: 75x8
3	End Bracket	Plate Thickness 8
4	Rib	Rib 6 mm thick
5	Rib	Rib 6 mm thick

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SI NO	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS	
					M	C/N				M	C	N		
1	2	3	4	5	6		7	8	9	D*	** 10		11	
1.0 Raw Materials														
1.1	Tube for Roller	Surface Defects	Major	Visual	100%	100%	IS 9295		IR		P	V	-	See Note 1
		OD, Thickness, Nominal Mass, Ovality, Eccentricity & Straightness	Major	Measure	S 9295	IS 9295	IS 9295 / NTPC Tech Spec	Manufacturer TC	√	P	V	V		
		Chemical Properties	Major	Chemical Analysis										
		Physical Properties (Tensile, Yield Stress, % Elongation, Flattening & Drift Expansion Test)	Major	Mechanical Test										
1.2	Bar for Shaft/Spindle	Chemical & Physical Properties	Major	Chemical & Mechanical Test	1/Heat	1/Heat	Relevant Material Standard as per Approved Drg/Datasheet /NTPC Tech Spec		TC	√	P	V	V	
1.3	Bearing Housing, and Sections & Flats for Idler Frames	Chemical & Physical Properties	Major	Chemical & Mechanical Test	1/Lot	1/Lot	Relevant Material Standard as per Approved Drg/Datasheet /Tech Spec		TC	√	P	V	V	
1.4	Rubber Disc for Impact Idler & Self Cleaning Idler	Tensile & Elongation, Hardness, Specific Gravity, Abrasion Loss, Ash Content	Major	Mechanical Test	1/Lot	1/Lot	Relevant Material Standard as per NTPC Approved Drg/Datasheet /Tech Spec	NTPC Approved Drg/Datasheet /Tech Spec	IR	√	P	V	V	
1.5	Bearings	Type/Size/Dimension/Make	Major	Verification	100%	100%	Approved Drg/Datasheet /Tech Spec		IR	√	P	V	V	
1.6	Labyrinth, Dust seal	Dimension, Condition	Major	Verification	100%	100%	Approved Drg/Datasheet /Tech Spec/Mfg Standard		IR	√	P	V	V	

LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
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2.0 In-process Inspection														
2.1	Fabrication of Roller	Dimension, Runout		Verification /Measurement	Mfg Std Practice	Mfg Std Practice	Mfg Drg / IS 8598	Mfg Drg / IS 8598			P	V	V	Refer Note-2
2.2	Machining of Spindle	Dimensions including end Dimensions , Surface Finish at Bearing area	Major	Measurement	100%	100%	NTPC Approved Drg/Datasheet /NTPC Tech Spec		√		P	V	V	
2.3	WPS, Procedure & Welder Qualification (for Frame Fabrication)	Conformance to Standards	Major	Verification / Mechanical Test	100%	100%	ASME Sec IX	ASME Sec IX	WPS, PQR & WPO	√	P	V	V	Refer Note 3
2.4	Fabrication of Housing, Bracket & Frames	Surface Defects on final welds	Major	DPT	Random 10%	Random 10%	ASTM E 165	ASME Sec VIII Div 1 Appendix 8	DPT Report	√	P	V	V	
3.0 Final Inspection														
3.1	Rollers	Dimensional	Critical	Measurement	Random 10%	1/Lot	NTPC Approved Drg/Datasheet /NTPC Tech Spec		IR	√	P	W	W	
		Free Rotation	Critical	Visual	Random 10%	1/Lot	Approved Drg/Data sheet / IS 8598		IR	√	P	W	W	
		Run out	Critical	Measurement	Random 10%	1/Lot	Approved Drg/Data sheet / IS 8598		IR	√	P	W	W	
		Dust Ingress Test #	Critical	Measurement	1/Lot	1/Lot	Approved Test Procedure (see Note 5)		IR	√	P	W	W	Refer Note 2, 4 & 5
		Water Ingress Test #	Critical	Measurement	1/Lot	1/Lot	Approved Test Procedure (see Note 5)		IR	√	P	W	W	
		Friction Factor#	Critical	Measurement	1/Lot	1/Lot	Approved Test Procedure (see Note 5)		IR	√	P	W	W	
		Rubber Hardness	Critical	Measurement	1/Lot	1/Lot	NTPC Tech Spec/ Datasheet		IR	√	P	W	W	
3.2	Frames	Dimensions, Forward Tilt of Frames	Critical	Measurement	10%	1/Lot	NTPC Approved Drg/Datasheet /NTPC Tech Spec		IR	√	P	W	W	Forward Tilt is not applicable for reversible Conveyors.
		Fitment of roller to Bracket	Critical	Visual	10%	1/Lot	Free Drop, Rolls shall be interchangeable,		IR	√	P	W	W	
		Marking on Brackets	Critical	Visual	100%	100%	Direction of Belt travel to be embossed / punched on the brackets		IR	√	P	V	V	

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13/2
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3.3	Painting	DFT & Paint Shade	Major	Measurement & Visual	Random 1%	Random 1%	Approved Drg/Data sheet/ Tech Spec	IR	√	P	V	V	
3.4	Packing	Conformance	Minor	Verify	100%		Manufacturer Std Practice	IR		P			Refer Note 6

Note 1: Tubes for Rollers shall conform to IS : 9295 and shall be procured from BIS approved sources with valid license

Note 2: Runout, Dust Ingress, Water Ingress & Friction Factor Test- Not applicable for Impact Idlers & Self-cleaning idlers

Note 3: NTPC /Reputed Third Party like Lloyds, BVQI, TUV, SGS, Intertek, TPL etc. approved WPS, PQR & WPQ are acceptable. Only Qualified welders to be deployed.

Note 4: Lot means 1000 Nos or Part thereof offered per Visit

Note 5: Test procedure specific to the manufacturer shall be finalized with the manufacturer, prior to start of manufacturing of Idlers. However, following procedures are being given as guidelines, which are in line with the procedure followed by Major Manufacturers, for easy reference

- a) **Dust Ingress Test:** The selected Roller is mounted horizontally on a suitable fixture in a test rig located in a closed dust chamber and made to rotate at the operating speed range of the roller. A continuous dust cloud is maintained in the dust chamber throughout the test period. Test is carried out for duration of 180 minutes. There after roller is dismantled.
- Acceptance Norm for Dust Ingress Test: No Dust particle to be found beyond inner labyrinth ring zone. If Dust particle are physically visible following procedure may be followed to ascertain the percentage of dust presence in the grease. Approximate 2 gms of "Grease" from the bearing of this dismantled roller is taken and dissolved in a solvent and residue content weighed. Similarly same weight of fresh unused grease is dissolved in the solvent and residue content weighed. The difference in the weights of the two residue content shall be within 5%.
- b) **Water Ingress Test:** The selected Roller is mounted horizontally on a suitable fixture in a test rig and made to rotate at the operating speed range of the roller for a duration of 180 minutes. During running of roller, water is sprayed from both sides at an angle of approx. 35 degree at a min. pressure of 1 kg per cm square directly on the roller face near end cap. After testing roller is dismantled and check for water particles at the bearing area.

Acceptance Norm for Water Ingress Test: Roller is accepted if there is no ingress of water on bearing and there is no emulsification of grease. Presence of water after outer labyrinth seals shall be considered as improper sealing. In case of improper sealing observed on the selected sample then two more random sample from the lot shall be tested as per the above procedure and if both samples are accepted then lot shall be considered as accepted.

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c) **Friction Test:** The selected Roller is mounted horizontally on a suitable fixtures and made to rotate at the operating speed range of the roller for determining the friction factor.
Testing Methodology 1: Test idler is driven to rotating speed above the operating speed after that Drive disconnected. Idler allowed to decelerate freely after disengaging the drive, rotating speed recorded. Dying time (ie time to decelerate from operating speed to zero speed) is noted.

Friction Factor = $K^2 \times 2 \times 3.1416 \times N / 60 \times t \times 9.81 \times R1$ where
 K = Radius of Gyration i.e. as $\sqrt{(D_1^2 + D_2^2) / 4}$ D1 = Roller outside diameter in mtr D2 = Roller inner diameter in mtr
 N = Actual operating speed in rpm R1 = Outside radius of roller in mtr t = Deceleration time in sec

Testing Methodology 2: The test roller is rotated under a known load on a test rig (keeping the load on the shaft while the rollers are running). The resisting force in measured using a spring balance (connected through a lever arm). Taking moments of the above two forces (ie load applied on the roller & the resisting force) at the roller center the Frictional Factor is calculated

Acceptance Norm for Friction Test: **Friction factor shall be within 0.02**

Note 6: Care to be taken to reduce metal to metal contact & relative motion between Rollers

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