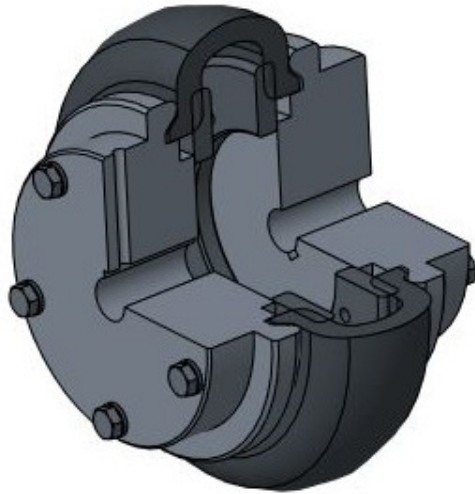
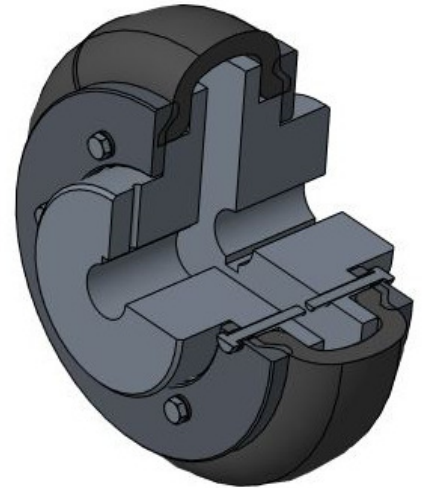


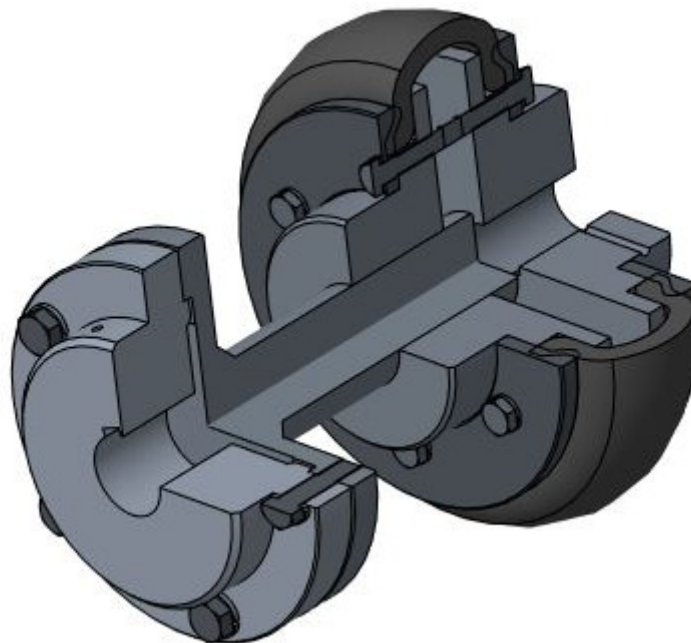
Installation & Operating Manual (IOM)
Tyre Coupling
T/TO & RST



T



TO



RST

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Installation & Operating Manual T/TO & RST Coupling


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1. Introduction & General Guidelines

- Tyre coupling are designed to transmit torque between drive and driven shaft using tyre element, Permits higher misalignments than any other coupling and protects against heavy shocks due to sudden change in load.
- This manual will help you to install and maintain Tyre coupling before installing/disassembling of coupling. It is advisable to read the manual carefully before starting the work. These special designs are always provided with general assembly drawing which provides detail information of the design and connected equipments.
- Symbol description :

 Caution person may get injured

 Damage the product

 Pay attention

 Potentially explosive warning

2. Before installation information

- Tyre couplings are delivered by RTPL as assembled condition which consists components as shown in fig.1, 2 &3

T

Part No.	Component	Qty.
1	Hex Head Bolt	Refer GA drg
2	Spring washer	Refer GA drg
3	Driving hub	1
4	Clamping ring	2
5	Tyre	1
7	Driven hub	1



Fig.1

TO

Part No.	Component	Qty.
1	Hex Head bolt	Refer GA drg
2	Spring washer	Refer GA drg
3	Clamping ring	2
4	Driving hub	1
5	Tyre	1
6	Driven hub	1



Fig.2

RST

Part No.	Component	Qty.
1	Hex Head Bolt	Refer GA drg
2	Spring washer	Refer GA drg
3	Adaptor	1
4	Spacer	1
5	Hex Head Bolt	Refer GA drg
6	Spring washer	Refer GA drg
7	Clamping ring	2
8	Hub/Flange	1
9	Tyre	1
10	Hub/Flange	1

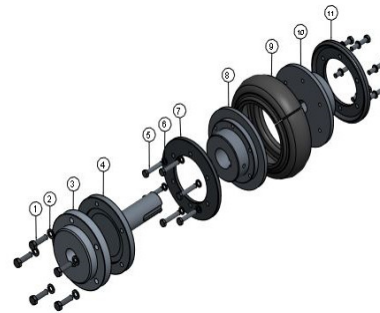


Fig.3

- Inspect coupling assembly for visible damage, if you found contact RATHI.
- Dismantle the coupling; remove protective coating/lubricants from coupling components.

3. Installation Information

- +** Ensure the system is disconnected from electrical connection and other possible energy transmission before starting the work.

3.1 Finish Bore Instruction (Fig. 4)



- Hub finish bores machined by customer with reference to flange outside diameter.
- Finish bore strictly done within specified limit (H7, Js9).
- Keyway must be done between two adjacent holes.
- Provide set screw at distance L ($L = LTB / 2$)

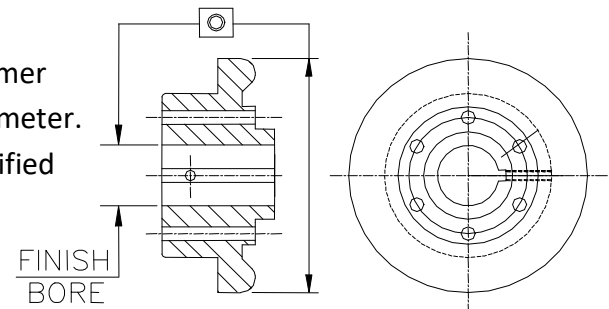


Fig.4

3.2 Hub Mounting.

- Mount hubs/adapters on their respective shafts with keys such that the shaft ends are flush with inner face of the adapter & tighten the set screw over the keys.
- Bring both the hubs closer to maintain gap 'M'(Table 2) as shown in fig.5
- In case of spacer type of couplings, mount the hubs by maintaining DBSE.
- For normal applications the shaft ends should be flush with inner face of hub/adapter, they can protrude beyond the inner face of hub/adapter or remain inside if required but sufficient gap should be allowed to take care of end float of both shafts (i.e. axial misalignment)

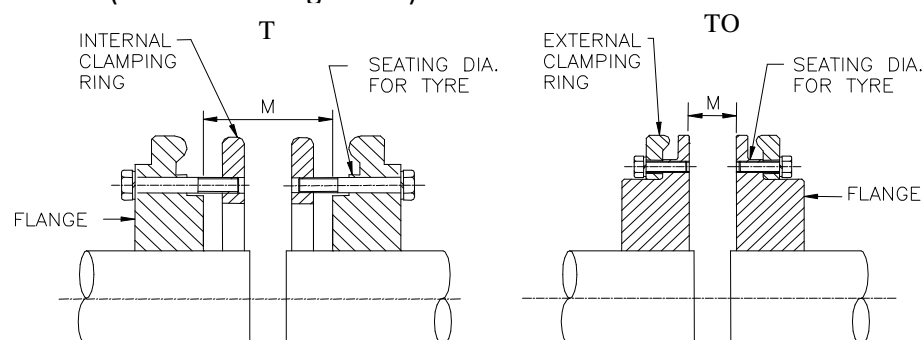


Fig.5

Installation & Operating Manual T/TO & RST Coupling

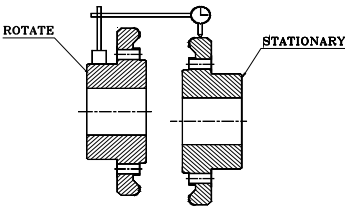
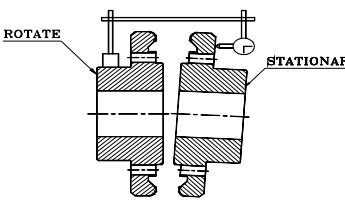
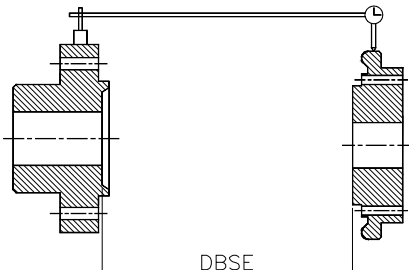
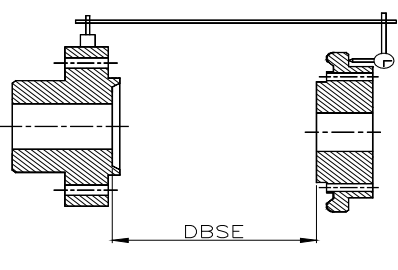
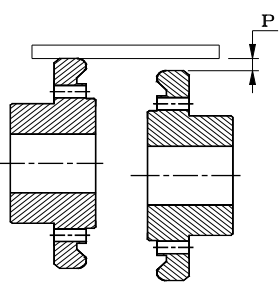
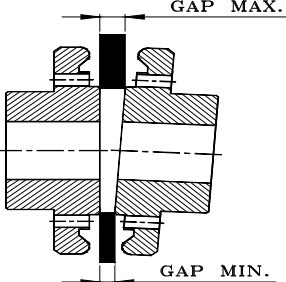
3.3 Shaft Alignment.

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- In order to achieve optimum service life of the coupling, shafts must be aligned.
- Initial misalignment should not be more than 25 % of maximum misalignment (Refer Table 2).

Table 1: Method of misalignment

Method	Parallel/Radial	Angular
1	<p>Using dial gauge</p> 	<p>Using dial gauge</p> 
		
	<ul style="list-style-type: none"> • Clamp dial gauge on the hub of one of the half & set plunger on the OD of another half. • Note the reading at each quarter rotation of hub by rotating one end. • P or X is half the Total Indicated Reading (TIR) shown on dial gauge, which should not be more than value of initial misalignment. 	
2	<p>Using straight edge</p> 	<p>Using filler gauge</p> 
	<ul style="list-style-type: none"> • If the field constraints do not permit to use dial gauge then alternatively use straight edge & filler gauge to measure parallel and angular alignment respectively. • Note the reading of Gap 'G' at each quarter without rotating shafts. The difference in maximum & minimum gap will be the Total Indicated Reading (TIR) 	

Installation & Operating Manual T/TO & RST Coupling

Table 2 : PERMISSIBLE MAXIMUM MISALIGNMENTS & TIGHTENING TORQUE

Sr. No.	Coupling Size	Permissible Maximum Misalignment				Gap		Bolt Size	Tightening Torque Nm
		Parallel/ Radial 'P' mm	Axial mm	Angular		T	TO		
				Degree	Total Indicated Reading (TIR)				
1	T-4	1.1	± 1.3	2°	2.86	24	-	M6	5
2	T-5	1.3	± 1.7	2°	3.49	29	-	M6	5
3	T-6	1.6	± 2.0	2°	4.36	35	-	M6	5
4	T-7 / TO-7	1.9	± 2.3	2°	5.03	43	16	M8	10
5	T-8 / TO-8	2.1	± 2.6	2°	5.83	47.5	22	M8	10
6	T-9 / TO-9	2.4	± 3.0	2°	6.56	51	24	M10	18
7	T-10 / TO-10	2.6	± 3.3	3°	11.32	58	24	M10	18
8	T-11 / TO-11	2.9	± 3.7	3°	12.20	53	22	M12	30
9	T-12 / TO-12	3.2	± 4.0	3°	13.84	57.5	24.5	M12	30
10	TO-14	3.7	± 4.6	3°	16.30	-	23	M12	30
11	TO-16	4.2	± 5.3	4°	24.10	-	8	M14	48
12	TO-18	4.8	± 6.0	4°	27.80	-	22	M16	70
13	TO-20	5.3	± 6.6	4°	29.92	-	30	M20	140
14	TO-22	5.8	± 7.25	4°	33.06	-	27	M20	140
15	TO-25	6.6	± 8.25	4°	37.11	-	30	M24	230

Gap 'M' in the above table is given when angular & axial misalignments are zero.

3.4 Final Assembly

- Ensure equipment is aligned properly.

FOR T/TO-F/H

- Open Tyre and fit it over the T/TO-F/H flanges ensuring that the Tyre beads are properly inserted between the T/TO-F/H flanges & the internal/external rings. It may be necessary to strike the outside diameter (i.e. circumference) of Tyre with a small mallet.
- When seated there should be a gap 'M' between the Tyre ends. Tighten clamping ring screws evenly (half turn a time) working round each flanges until the required screw torque is achieved. Refer table 2 clamping screw tightening torque.

FOR RST

- Clamp one clamping ring to T/TO flange mounted on shaft.

Installation & Operating Manual T/TO & RST Coupling

- Then insert the flange mounted RST shaft assembly (along with clamping ring) between RST adapter & T/TO flange and bolt it to the RST adapter. Fit the tyre as per above instructions. (Refer fig. 6)

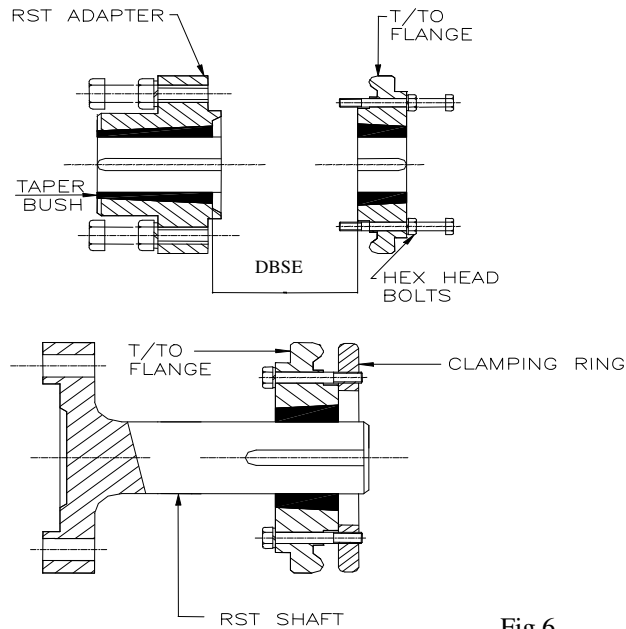


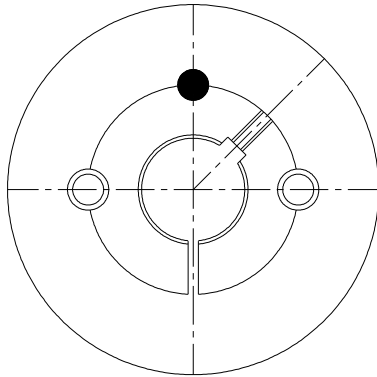
Fig.6

- Maintain gap 'G' (refer table 2) during assembly.

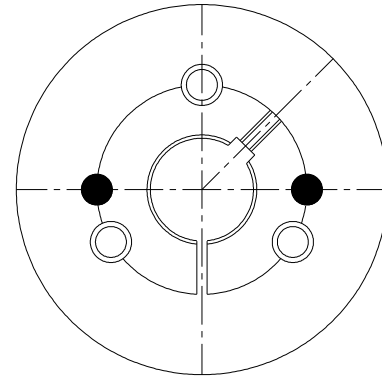


Customer must provide required safety guards, RTPL does not supply safety guards or shields.

Installation & removal of Flanges/Adaptors with Taper Bushes



Sizes - 1008 to 3030



Size - 3525 to 5050

A) TO ASSEMBLE

- Clean and de-grease the bore and taper surfaces of the bush and the tapered bore of the flanges/adapters. Insert the bush in the coupling flanges/adapters and align the holes (half thread holes must line up with half straight holes).
- Lightly oil the grub screws (bush size 1008 to 3030) or the cap screws (bush size 3525 to 5050) and screw them loosely in holes threaded in flanges/adapters shown in this diagram, do not tighten yet.
- Clean and de-grease the shaft. Fit the coupling flanges/adapters with taper bush on shaft and locate in desired position.
- When using a key it should first be fitted in the shaft keyway. There should be a top clearance between the key and the keyway in the bore.
- Using a hexagon socket wrench, gradually tighten the grub/cap screws in accordance with the torques as listed in the Table 'C' of screw tightening torques.
- When the drive has been operating under load for half to one hour check and ensure that the screws are not loosened. If found loose take appropriate steps.

B) FOR REMOVAL

- Loosen all screws. Remove one or two according to number of jacking off holes shown in the diagram. Insert these screws in jacking off holes.
- Tighten screw(s) uniformly and alternately until the bush is loose in the flanges/adapters and coupling is free on the shaft.

Installation & Operating Manual T/TO & RST Coupling

- Remove coupling assembly from the shaft.

TABLE 3: Tightening Torque




Taper Bush Size	Screw Tightening Torque (Nm)	Screw	
		Size	Qty
1008	5.6	1/4" BSW	2
1108			
1210	20	3/8" BSW	2
1215			
1610	20	3/8" BSW	2
1615			
2012	31	7/16" BSW	2
2017			
2517	48	1/2" BSW	2
2525			
3020	90	5/8" BSW	2
3030			
3525	112	1/2" BSW	3
3535			
4030	170	5/8" BSW	3
4040			
4535	192	3/4" BSW	3
4545			
5040	270	7/8" BSW	3
5050			

Installation & Operating Manual T/TO & RST Coupling

4. Safety General Hazard & Environment

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4.1 Safety General Hazard

- Proper care and safety must be taken care before work started.
-  • The relevant safety and environmental regulations must be complied during installation, commissioning, operation, assembly, disassembly and maintenance.
-  • Coupling must be maintained and/or repaired in the presence of skilled or qualified persons for particular work.
- During installation or maintenance ensure the drive unit is cut off from the power supply and caution notice should be display on switch.
-  • Immediate stop the drive unit if anything abnormalities observed on coupling (e.g. cracks, chips, wear, or deformation)
- Check all the bolts are tightened as per torque specified in the manual or as specified in the GA drawing.
- The supplied coupling may have to rotate at high speed, it is most important to guard the area in compliance to ATEX and various other local applicable standards.
- This coupling is certified as per ATEX requirement. Please check the suitability of hazardous environment at the time of selection of the coupling or during installation of the coupling.
- All spare parts are to be purchased from manufacturer only.

4.2 Environment

- Our products are comply with EMS standard ISO 14001:2015, any instruction which are impermissible according to standard are not followed.

5. Inspection & Periodic Maintenance

- The Tyre-flex coupling can be monitored under running condition as well as under idle condition.
-  • Inspect the coupling once in 6 months in idle condition or whenever it is taken for periodic maintenance.
- During running condition, it is recommended to check the vibration and noise on either side of the equipments to be under specified limits.
- Visual inspection is recommended to check below defects,
 - Axial, Angular & Parallel misalignments.
 - Bolt loosening.
 - Flexible elements for wear, cracks, swelling or deep impression.
-  - Replace tyres immediately if they observed any of the above defects.

6. Spare Management & Complaint Handling

6.1 Spare management

- We recommend to store spare items as given below, in order to have continuous operation and to reduce down time due to failures.
- Spare component list.(Fig.1)



Sr.No.	Part descriptions	Components/ part No.	Quantity
1	Hex Head Bolt	Refer fig.1,2&3	1 set
2	Tyre	Refer fig.1,2&3	1 set
3	Taper Bush	Refer fig.6	1 set

6.2 Complaint Handling

- In case of any failure, for proper root cause, fill up Product Performance Datasheet (PPDS) and provide us along with images/videos.

Installation & Operating Manual T/TO & RST Coupling

- Product Performance datasheet(PPDS)

		ANNEXURE Product Performance Data Sheet (PPDS)	Ref.:	
			Date:	
Contact Details	Distributor			
	ZR			
	Customer Details:Name			
	Contact Person			
	Cell No			
	Email ID			
Supply details	Product			
	PO No and Date			
	Invoice No & Date			
	Ref Drawing No			
	Coupling Serial No.			
	Logo: RATHI/Lovejoy/RTFL/OTHER			
	Qty purchased			
	Qty Failed			
Service Details	Application Details: Driver/Driven			
	Equipment Name			
	Installation Date			
	Failure Date			
	Approx service life			
Installation details	Finish bore/Keyway machining by : RTPL / Customer			
	Hub Fitment: Slide fit / Interference / Press fit			
	Method of Hub fitment: Mallet / Jacking / Heating / Hydraulic			
	Fastener Tightening Method: Torque Wrench / Spanners			
	Tightening Torque values			
	Power Rating: Kw/RPM/Torque			
	Start/stop frequency			
	Temperature: °C			
	Duty: Hrs / Day			
	Alignment Initial: Axial/Angular/Parallel			
	Alignment after failure: Axial/Angular/Parallel			
	Rathi Installation Instruction: Followed/Not followed			
	Installation skills: Average/Good/Excellent			

Installation & Operating Manual T/TO & RST Coupling

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Failure details	Lubrication condition, if applicable	
	Breaking of components: Yes/No	
	Possible Sequence of Component Failure	
	Damage of components: Yes/No	
	Loosening of fasteners: Yes/No	
	Overload/Sudden Peak: Yes/No	
	Loosening of foundation bolts:	
	Loosening of attached piping / ducting: Yes/No	
	Replacement Status : If replaced whether Coupling or Spares	
	Customer analysis of the Failure causes (Attach separate sheet, if required)	
Evidence / Requirement	Failed product photos : Attached / Not attached	
	Failed product being returned to RTPL : Yes / No	
	RTPL visit required: Yes/No	
	Replacement required: Yes/No	
	ZR / Distributor Remarks if any	
Other info	Details of any other Coupling previously in use	
	Failure history	
	Bearing condition of Driver & Driven units (Smooth/Noisy/Vibrations)	
R/002		PAGE 2 OF 2

7. Breakdown & Trouble Shooting

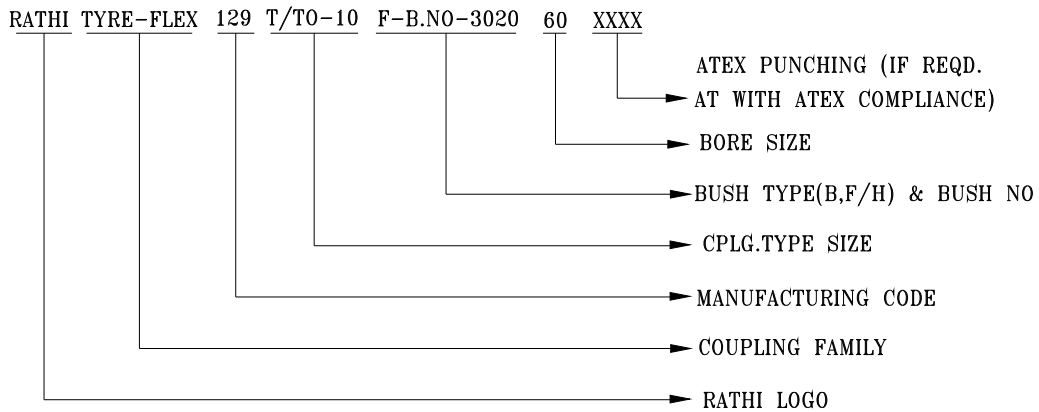
SR. NO.	FAILURE MODE	PROBABLE CAUSES	CORRECTIVE ACTIONS
1	Worn out Tyre Shaft bearing failure	Excessive misalignments.	Replace the Tyre & Realign the coupling.
2	Fatigue of Tyre Overheated Tyre	Torsional vibration Excessive starts and stops High peak load	Perform torsional analysis Use larger coupling
3	Swollen or cracked Tyre	Chemical attack	Use more chemically resistant Tyre (*)
4	Distorted or deteriorated Tyre	Excessive heat	Use more heat-resistant Tyre (*)
5	Shattered Tyre	Low temperature	Use special low temperature Tyre (*)
6	Loose hubs on shaft with sheared keys.	Torsional shock overload	Find & eliminate causes of overload.
7	Severe hub corrosion	Chemical attack	Coat hub with anticorrosive coating (*)

(*) - Consult M/s RATHI if required



8. Marking Details

- The ATEX marking for Tyre coupling will be given on outer surface or front side .

- Example :**



- ATEX Punching sample**




RATHI TYRE-FLEX 129 TO-10 F B.NO.-3020 60   II 2GD -45°C +70°C

- Where,**

1. Manufacturing code e.g. 129 for December 2019
2. Product code e.g. T/TO-10
3. Finish bore size code e.g. 60

9. Declaration of Conformity

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<i>Declaration of Conformity</i>			
<i>2014/34/EU</i>			
Customer Name	<input type="text"/>	Certificate No.	<input type="text"/>
PO No.	<input type="text"/>	Date	<input type="text"/>
1) Declaration relating to :			
Type :		<input type="text" value="Metallic (Non-Disc) Coupling"/>	
Size :		<input type="text"/>	
2) Manufactured and assessed by			
Rathi Transpower Pvt.Ltd., Gaia Apex, S. No. 33/2D, Viman Nagar, Pune 411 014 (INDIA).			
3) Notified by :			
4) This product fulfills all the requirements for Group 2 Category 2 GD equipment in accordance with directive 2014/34/EU (ATEX)			
The design complies with ISO 80079-36 AND ISO 80079-37 and is fully documented in Technical File No. RG 003/20			
5) The product is incapable of producing arcs, sparks or hot surface which may cause ignition and is designed to be used in accordance with ISO 80079-36 AND ISO 80079-37.			
6) The required marking of the product is specified in Technical File No. RG 003/20 and includes the distinctive community marks.			
7) Coupling without the  marking must not be used in potential Explosive Atmosphere.			
8) Manufacturing is controlled by an ISO 9001 registered system.			
9) Approved signatories for and on behalf of Rathi Transpower Pvt.Ltd.			
Quality Inspector (Quality Manager (
Date :		Date :	

Format No : 3QA-F-33 Rev 1



ATEX

Declaration of Incorporation

E.C. Machinery Directive (2006/42/EC)

Section 1.0 - Machinery Description:
Flexible Power Transmission Couplings
Types: Metallic (Non-Disc) Coupling

Series:

Section 2.0 - Applicable Harmonized Standards
ISO13709(API 610)for centrifugal pumps
ISO14691 couplings for-General-purpose applications
ISO10441(API 671)(opt)couplings for-Special-purpose applications

Section 3.0 - Declaration:
We, Rathi Transpower Pvt. Ltd. declare that under our sole responsibility for the supply of the machinery defined in Section 1.0 above, the said machinery parts are intended to be incorporated into other machinery or assembled with other machinery to constitute machinery as covered by this Directive.

The machinery parts, covered by this declaration must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive.

Signed

Date :

(Quality Manager)

Format No : 3QA-F-33 Rev 1