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Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
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"Step Out From the Old to the New"

IS 10686 (1983): Mechanical Multi-disc Clutches (Wet Type)
[PGD 31: Bolts, Nuts and Fasteners Accessories]

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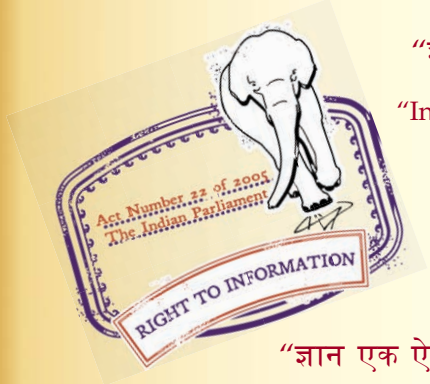

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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(Reaffirmed 2006)

Indian Standard

SPECIFICATION FOR MECHANICAL MULTI-DISC CLUTCHES (WET TYPE)

[Ref : Doc : EDC 44 (3594)] Transmission Devices Sectional Committee, EDC 44; Clutches Subcommittee, EDC 44 : 6

1. Scope — Covers the general requirements of the multi-disc (wet type) clutches of metallic friction inter-face used in power transmission of machinery.

2. Nomenclature — The nomenclature of certain essential parts shall be as given in Fig. 1 and 2.

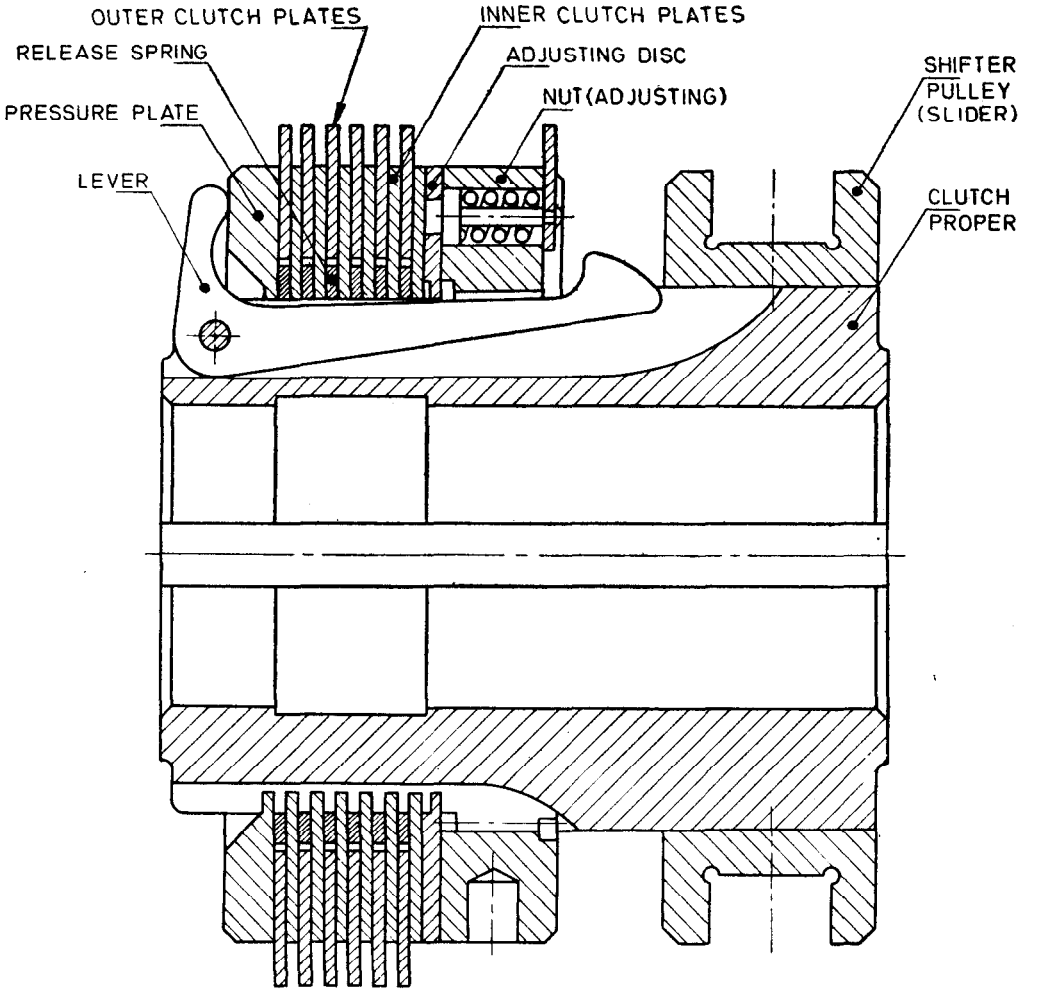

FIG. 1 MECHANICAL MULTI-DISC CLUTCHES, SINGLE ACTING

3. Terminology

3.1 *Clutch Friction Inter-Faces* — The clutch friction elements like internal and external clutch plates.

3.2 *Slider* — A ring collar which is used to shift and operate the clutches.

3.3 *Adjusting Nut* — A ring nut provided on the clutch to adjust normal pressure between clutch plates.

3.4 *Lever* — A pivoted lever used to transmit force from the slider to the clutch plates.

3.5 *Hub* — The body of clutch on which inner clutch plates, levers, adjusting nut and sliders are mounted. Hub also receives one of the drive or driven shaft of the machinery.

Adopted 25 October 1983 Gr 2

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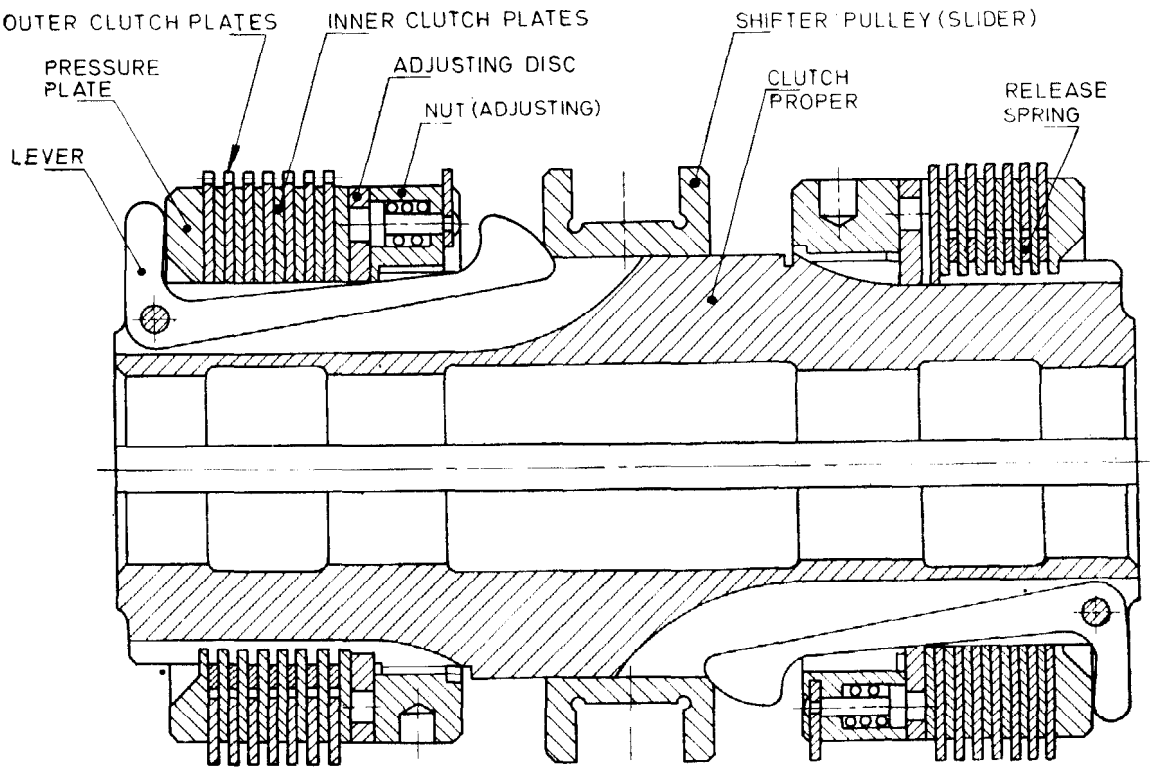

FIG. 2 MECHANICAL MULTI-DISC CLUTCHES, DOUBLE ACTING

3.6 *Outer Housing* — An element which will engage the outer clutch plates and drive or driven shaft.

3.7 *Static Friction Torque* — A maximum torque that is transmissible from the driving side to the driven side, when the clutch is completely engaged.

3.8 *Dynamic Friction Torque* — A torque that is transmissible from the driving side to the driven side, in a slipping state at certain relative velocity, when the clutch is engaged.

3.9 *Drag Torque* — A torque that is transmissible from the driving side to the driven side, when the clutch runs idle.

3.10 *Thrust (Engaging) Force* — A force to move the shifter pulley in axial direction to give surface pressures on the inner and outer discs.

4. Types — Clutch is classified in following two basic types.

4.1 *Single Acting* — A single acting clutch implies a single clutch unit which shall be used to engage or disengage only one drive.

4.2 *Double Acting* — A double acting clutch implies two clutch units so designed as to engage either to one or other drive by means of common operation. The double acting clutch may also have a neutral position where both the drives are disengaged simultaneously. This latter requirement shall be agreed upon between the manufacturer and the purchaser.

5. Material — The type of material to be used for the clutch shall be decided by the manufacturer in agreement with the purchaser so as to withstand the service conditions and for reasonably long service life. One of the pair of the clutch plate may be made, if required, from phosphor — bronze while the other shall be made of steel. In the absence of such requirements, the manufacturer, at his discretion, may use steel as material for both the pairs of the plates.

6. Dimensions and Tolerances — The dimensions and the tolerances of individual parts of the clutch and the unit as a whole shall be to the discretion of the manufacturer and shall be so selected as to give satisfactory performance. The bore in the clutch hub may be a nominal pilot bore without the keyway. However, the bore shall be concentric with the other part of the clutch so that it may be used as a reference bore at the time of opening it out to the matching dimension needed at the time of assembly of the clutch to the mating component of the drive.

7. General Design — Clutch shall be of multi-disc design where friction element shall consist of number of pairs of inner and outer clutch plates. The inner clutch plates shall have internal lugs or spline to

engage in hub of the clutch. The outer plate of the pair shall have either external lugs or suitable involute teeth to engage with the outer housing. Design of the outer housing of the clutch does not form the scope of this standard as it depends upon the specific requirement of the application. The clutch shall be engaged by shifting a slider which will apply pressure on the clutch plates through a set of levers. The pressure on the plates shall create sufficient frictional force to engage the clutch without slip.

7.1 Typical designs of the clutches are shown in the Fig. 1 and 2 for illustrative purposes.

8. Workmanship and Finish — The clutch shall be free from external flaws, cracks, rust and other defects and shall be well finished.

9. Methods of Testing — Shall be as given in Appendix A.

10. Marking — The type, name of the manufacturer or trade-mark (if any), serial number of the unit shall be suitably indicated on the visible part of the clutch.

10.1 *ISI Certification Marking* — Details available with the Indian Standards Institution.

APPENDIX A

(Clause 9)

METHODS OF TESTING OF MULTI-DISC CLUTCHES (WET TYPE)

A-1. Static Torque Test — Install the clutch between the drive and the driven shaft. Apply the brake on the driven shaft so that it is effectively locked. Fix lever of sufficient length on the driven shaft. Apply torque on the driven shaft by applying force on the lever. Measure the force required to make the clutch just slip. Force multiplied by the distance between the point of application of force to the centre of the shaft is mechanical static friction torque of the clutch.

A-2. Dynamic Torque Test — Install the clutch between drive and driven shaft. Engage the clutch. Rotate the driven shaft at the rate between 100-200 rev/min by means of a pony brake arrangement or dynamometer load the drive shaft of the clutch. Increase the loading on the pony brake or the dynamometer till the driven shaft continuously slips. Torque indicated on the pony-brake or dynamometer is the dynamic friction torque.

A-3. Engaging Force — Measure the maximum force required to shift the slider so as to engage the clutch to transmit the rated torque.

A-4. Drag Torque Test — Install the clutch between the drive and driven shaft and disengage the clutch. Apply few drops of lubricating oil as specified by the manufacturer, rotate the drive part of the clutch at 1 000 rev/min and lock the driven part of the clutch by means of loaded brake lever arm applied on the driven part (arrangement similar to that for static torque test) (*see* **A-1**). The load on the arm should be reduced in stages till the arm is just about to rotate. Torque shall be determined by knowing the force applied multiplied by the lever arm distance.

EXPLANATORY NOTE

The mechanical multi-disc clutches (wet type) are used in machine tools and many other machines as power transmission device. Their use is increasing with the expansion of industrialization in the country and sophistication of machinery and machine tools It is, therefore, felt that a suitable standard need be formulated to take care of the standardization and quality of the product.

This standard covers only multi-disc (wet type) clutch with a metallic friction inter-face. It does not cover non-metallic organic friction inter-faces. The construction of the clutch is based on multi-discs as friction elements and are operated in presence of light lubricating oil. Therefore, the standard does not cover dry type of clutches.

In formulating this standard, considerable assistance has been derived from JIS B 1401-1976 ' Mechanical multiple disc clutches (wet type)' published by Japanese Industrial Standards Committee.

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