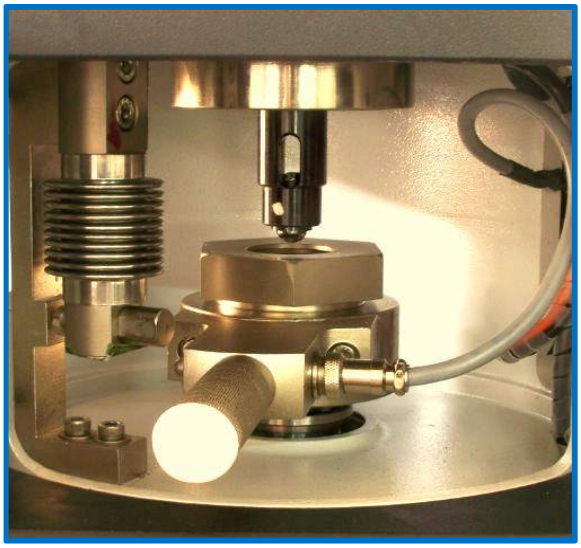
DUCOM FOUR BALL TESTER

Product information sheet



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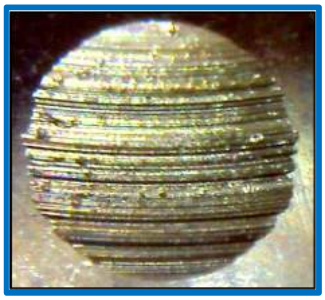
Introduction

Ducom four ball tester is designed to characterize lubricants for wear preventive (WP), extreme pressure (EP) and frictional properties. Test configuration is shown in figure 2. In addition, tester can be used for determination of rolling contact fatigue and shear stability behaviour with appropriate attachments shown in figures 3 and 4.

Fig 1 Ducom Four ball tester- Manual

Welded balls



Wear scar

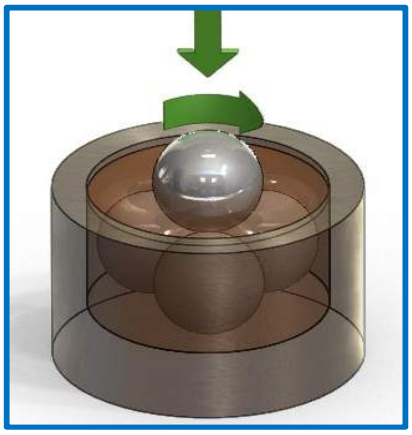


Fig 2 Four ball arrangement

Fig 3 Rolling contact fatigue

Fig 4 KRL Shear stability

Application

- Determine extreme pressure (EP), wear preventive (WP), friction and shear stability of lubricants.
- Effect of lubricant in rolling contact fatigue life.
- Study deterioration of lubricants with use
- Quality control
- Product development

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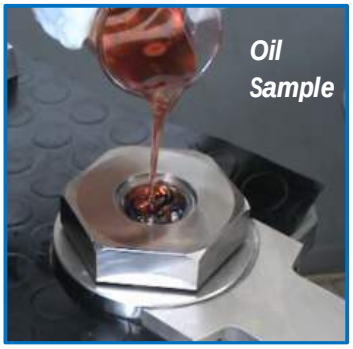
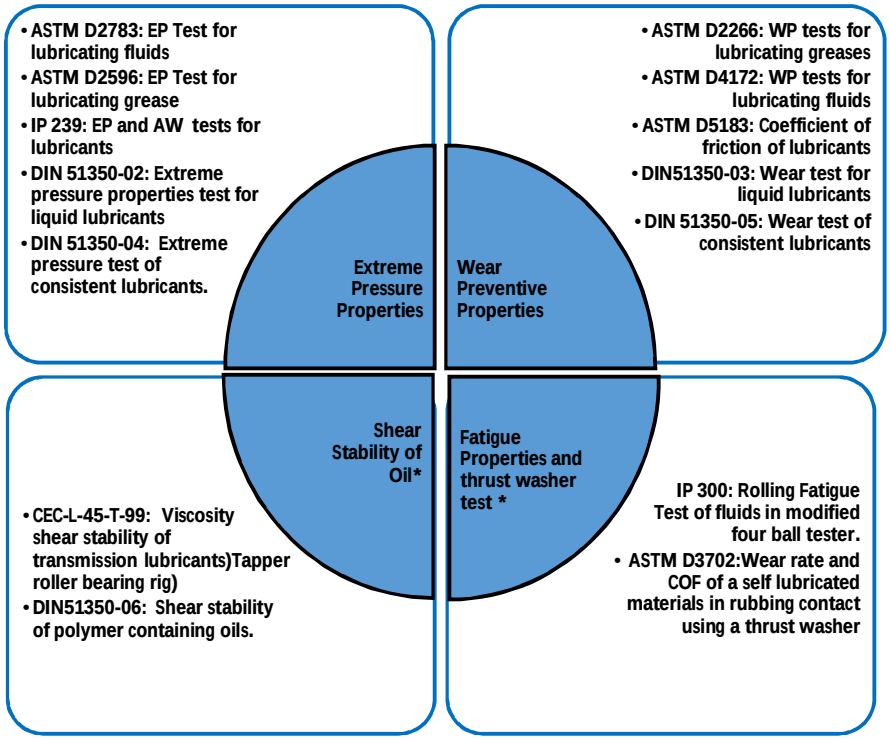
Features

- EP and WP test in single instrument
- PC based machine control and data acquisition
- Compare upto four test results in one screen
- Image acquisition system*
- Automated loading*
- Inbuilt storage for accessories, tools and samples (dead weight loading option only).



Standards



Specifications

Test variables	Units	TR30L	Remarks
Test speed	rpm	300-3000	High speed provision on request
Test loads	N	100-10000	Manual load or software controlled
Frictional torque	Nm	0-16	
Temperatures	°C	Ambient to 120	Higher/lower temperatures on request.
Power	V/Hz/Ø	415/50/3	Other voltages on request

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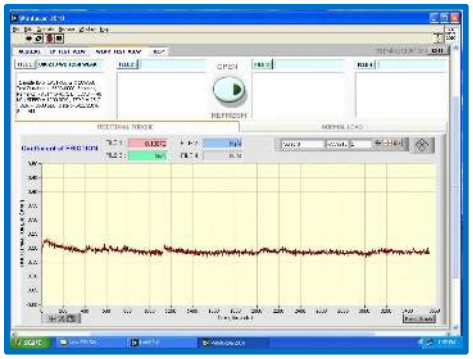
Options*

- Automated loading: Load is applied and controlled by software.
- KRL shear stability attachment: To determine viscosity loss of lubricants.
- Rolling fatigue attachment: To assess the tendency of lubricants to produce fatigue failures in rolling contacts.
- Thrust washer attachment: To determine the wear rate of materials in rubbing contact.
- High temperature ball pot (ambient to 200°C): Special bot pot to heat lubricant cup to 200°C.
- Image acquisition system: To measure wear scar quickly and accurately without unclamping tested balls.

Instrument control and data acquisition

The Four Ball Tester is integrated with instrumentation and controller which permits measurement of normal load, speed, lubricant temperature and frictional torque developed. The data is acquired and displayed graphically on-line. The scar diameter is measured with a measuring microscope or image acquisition system. Graphs of individual test can be printed. Results of different tests can be superimposed for comparative viewing. Data can be exported. An optional scar measuring image acquisition system with an image sensor permits acquiring of scar image on PC.

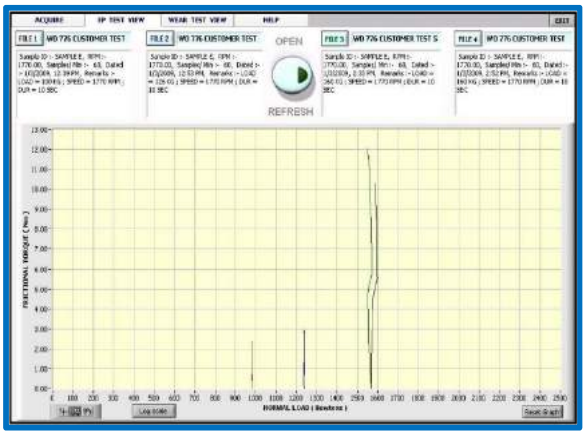


Frictional torque Vs Time

In the **software controlled (optional)** instrument test plan is entered at the beginning of test.

Normal load Vs Time

Comparison of Frictional torque



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ELECTRONIC CONTROLLER

Standard ball pot assembly

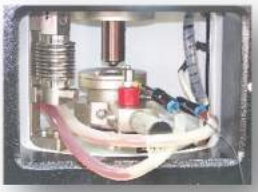
MECHANICAL COMPONENTS

Collet master

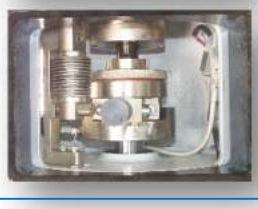
Ducom Four Ball Tester-Pneumatic Loading

SOFTWARE

Software for real time acquisition



RCF attachment*

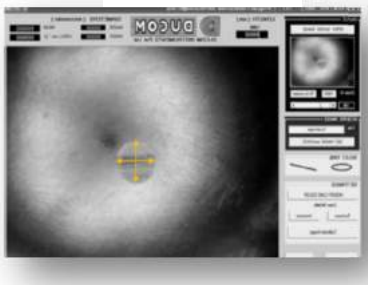


KRL attachment*

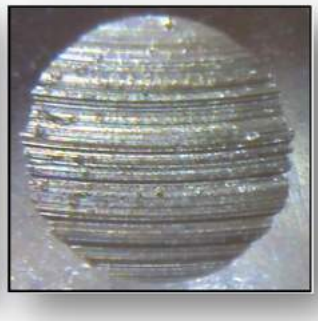
OTHER ATTACHMENTS*

IMAGE ACQUISITION SYSTEM*

DIS software



Wear scar image



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Standard scope of supply

S. No	Included Accessories and Consumables	Number
1.	Four ball tester basic instrument	1
2.	Electronic controller	1
3.	Dead weights (for manual loading)	1 set
4.	Software (Data acquisition system)	1
4.	Measuring microscope	1
5.	Ball pot assembly	2 sets#
6.	Steel/test balls (12.7mm Diameter), AISI E52100 steel balls, hardened to 64-66 HRC	50#
7.	Collets	2#
8.	Collet master	1
9.	Torque wrench	1
10.	Calibration kit	1
11.	Operating manual	2
12.	Tool kit	1
13.	Dust cover for machine and controller	1 set
14.	Data acquisition cable, power cable	1 set
15.	Warranty	1 Year

KRL ATTACHMENT *	
KRL Ball pot assembly	1
KRL Collet	2
Water re-circulation unit	1 set
Taper roller bearing	1
Hook Spanner	1
Cooling Adaptor	1
Image Acquisition System*	
Mechanical System	1
Software: Scarview	1
Automated Loading Arrangement*	
Pneumatic Loading*	

RFA ATTACHMENT *	
RFA Ball pot assembly	1
Oil Tank	1
Peristaltic pump	1
Special ball race to match ball profile	1
Thrust Washer Attachment*	
Low speed pulley	1
Ball pot assembly for thrust washer attachment	1
Collet for thrust washer attachment	1

 # denotes consumables, has to be ordered separately if more numbers are required

Utilities required (please note following items will be required at the site)

Computer*: Minimum configuration for software operation is mentioned, customer can use any higher end.	2GB RAM, 500GB HDD, DVDR, 1.7GHz Clock speed, WINDOWS 7 operating system, PCI & PCI-Xpress SLOT -1No. each, USB PORT: 2 No., COMPORT: 1 No., Color Monitor, Mouse, Keyboard.
Power required 415V/3Phase/50Hz, cooling water, UPS*, computer table and chair* and facility for disposing the tested balls, tested lubricant has to be arranged by the user for proper installation and commissioning of the instrument.	

Please Note: Air compressor for automatic loading, computer, UPS, weighing balance or any optional attachments, consumables, devices or accessories other than mentioned is not included in standard scope of supply, has to be ordered separately. Please contacts Ducom sales professional for any further clarifications.

***Denotes optional modules and attachments**

Other facilities and services by Ducom

Contract Test Lab

Ducom is a preferred partner for tribological tests for several fortune 500 companies including small industries and research labs. Our facilities include a variety of tribometers, mechanical testers and lubricant testers at three locations: Bangalore (India), (USA) and Netherlands. Contract testing on custom development testers are also offered. Ducom also offers the facility to video-witness tests—saving on costs involved with physically witnessing critical tests.

Ducom Test Facility has been in service since 1999, providing tribological testing facilities to academics and industries. Ducom ensures that customers get great value by offering these services on advanced tribometers that are regularly calibrated and checked for repeatability of their results. The test facility is run by experienced staff with more than five decades of cumulative testing experience in the field of tribological testing alone. Advantages of choosing Ducom Test Facility as your testing service provider:

- No capital investment on a tester
- No additional man-power requirement
- No maintenance and AMC costs
- No training requirement
- Excellent security - limited access facility and strongly enforced non-disclosure agreement
- Excellent reporting - test reported in accordance with applicable test standards

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