



## About

### **PROJECT: TEST RIG FOR HYDRAULIC FLUID (A3987)**

The test rig is used to test the anti-wear properties and the aging behaviour of hydraulic fluids under defined and reproducible conditions. For this purpose, a vane pump Vickers 35VQ25A-11\*20 for ASTM D6973-2014 and a Bent Axis type axial piston pump A2F10 for JCMAS P 045 are used as test objects. The subsequent investigation of the wear inserts and oil condition then allows conclusions about the performance of the tested fluids, especially their ability to avoid wear and resist oxidation. The modern and ergonomically designed test rig meets all the specifications of the European Machinery Directive 2006/42/EG to a high standard or equivalent Indian Standard. The test rig is used to determine the wear characteristics and oxidation/ aging of non-petroleum and petroleum hydraulic fluids. For this purpose, a rotary vane pump generates a test pressure under specific boundary conditions. The result obtained is the total mass loss from the cam ring and the ten vanes (ASTM D6973-2014) after the test. For indicating oxidation stability or aging behaviour of hydraulic fluids this test bench, uses a bent axis pump A2F010 and a pressure relief valve DBDS 10 K1X/400V as load at high temperatures. The test takes place under the influence of air and a copper catalyst. This procedure allows for an accelerated aging rate using a real hydraulic component. The test rig parameters meet the specifications according to ASTM D6973-2014 and JCMAS P 045. Additionally, it is capable of carrying out the evaluation of hydraulic fluid for frictional characteristics and energy efficiency performance under indigenously developed and industrially simulated test methods by varying load, speed, temperature, pressure, flow rate etc.

## TECHNICAL SPECIFICATION:

### TEST RIG FOR HYDRULIC FLUID METHOD ASTM D 6973-14

This test method covers a constant volume high pressure vane pump test procedure for indicating the wear characteristics of petroleum hydraulic fluids.

#### SYSTEM DESIGN PARAMETER

<b>TEST UNIT ASTM D 6973-14</b>	
OPERATING DESIGN PRESSURE(MAX)	207 Bar
MAXIMUM SYSTEM DESIGN PRESSURE	250 BAR
MAXIMUM FLOW (SYSTEM) UNDER OPERATIONS	Main Pump: ~170 LPM
POWER CONNECTIONS	3 PHASE AC, 50 HZ, 415 + 10% • 24 V DC
MAXIMUM INPUT POWER	110 KW (VFD CONTROL )
OIL PURITY	NAS 1638 class 6 or better
TYPE OF OIL	ISO VG 32/46/68
DUTY CYCLE	INTERMINENT

#### **TEST PARAMETER:**

<b>TEST UNIT ASTM D 6973-14</b>	
PUMP SPEED	2400 RPM $\pm$ 20 RPM
<ul style="list-style-type: none"><li>• PUMP OUTLET PRESSURE</li><li>• PUMP INLET TEMPERATURE TO RISE AND NOT EXCEED</li><li>• RUN TIME</li></ul>	<ul style="list-style-type: none"><li>• 6.9 MPa <math>\pm</math> 0.2 MPa</li><li>• 52 <math>^{\circ}</math>C <math>\pm</math> 3 <math>^{\circ}</math>C (125 <math>^{\circ}</math>F <math>\pm</math> 5 <math>^{\circ}</math>F)</li><li>• 30 MINUTES</li></ul>
PUMP SPEED	2400 RPM $\pm$ 20 RPM
<ul style="list-style-type: none"><li>• PUMP OUTLET PRESSURE</li><li>• PUMP INLET TEMPERATURE TO RISE AND NOT EXCEED</li><li>• RUN TIME</li></ul>	<ul style="list-style-type: none"><li>• 13.8 MPa <math>\pm</math> 0.2 MPa</li><li>• 79 <math>^{\circ}</math>C <math>\pm</math> 3 <math>^{\circ}</math>C (175 <math>^{\circ}</math>F <math>\pm</math> 5 <math>^{\circ}</math>F)</li><li>• 30 MINUTES</li></ul>
PUMP SPEED	2400 RPM $\pm$ 20 RPM
<ul style="list-style-type: none"><li>• PUMP OUTLET PRESSURE</li><li>• PUMP INLET TEMPERATURE TO</li></ul>	<ul style="list-style-type: none"><li>• 20.7 MPa <math>\pm</math> 0.2 MPa</li><li>• 95 <math>^{\circ}</math>C <math>\pm</math> 3 <math>^{\circ}</math>C (203 <math>^{\circ}</math>F <math>\pm</math> 5 <math>^{\circ}</math>F)</li></ul>

RISE AND NOT EXCEED • RUN TIME	• 49 MINUTES
MINIMUM PUMP FLOW	132 LPM(35GPM)

## **TEST RIG FOR HYDRULIC FLUID METHOD JCMAS 045**

### **SYSTEM DESIGN PARAMETER :**

TEST UNIT ASTM D 6973-14	
OPERATING DESIGN PRESSURE(MAX)	350 Bar
MAXIMUM SYSTEM DESIGN PRESSURE	420 BAR
MAXIMUM FLOW (SYSTEM) UNDER OPERATIONS	Main Pump: 10.3CC/REV
POWER CONNECTIONS	3 PHASE AC, 50 HZ, 415 + 10% • 24 V DC
MAXIMUM INPUT POWER	45KW (VFD CONTROL )
OIL PURITY	NAS 1638 class 6 or better
TYPE OF OIL	ISO VG 32/46/68
DUTY CYCLE	INTERMINENT

### **TEST PARAMETER:**

TEST UNIT JCMAS 045	
PUMP SPEED	2600 RPM ± 1 RPM
PUMP OUTLET PRESSURE	35 MPa ±0.1 MPa
TEMP IN THE SUCTION LINE	90 <sup>0</sup> C ± 1 <sup>0</sup> C
AIR DOSING	0.1 L/H (@20 <sup>0</sup> C)
WATER DOSING	0-100 ml/hr
CATALYST	POLISHED COPPER SHEET, SURFACE 0.3 M2 AND RUBBER SEALS
OPERATING TIME	500 HOURS
SAMPLE TAKING	6 SAMPLES WITH A MAXIMUM OF 300 ML EACH

## 1. KEY FEATURES OF THE MACHINE

- STANDARDIZED TEST RIG WITH VERY GOOD REPEATABILITY AND REPRODUCIBILITY.
- FULLY AUTOMATIC SAMPLE TAKING ALLOWS DURING TEST OPERATION.
- FULLY AUTOMATIC TEMPERATURE CONTROL AS PER TEST METHOD.
- MACHINE IS ADVANCE FOR FUTURE PURPOSE IF ANY CHANGES IN TEST METHOD.
- EXAMINATION OF THE AGING BEHAVIOR UNDER THE INFLUENCE OF AIR AND WATER VIA AN AUTOMATIC DOSING SYSTEM IN THE SUCTION LINE.
- POWER PACK OF ASTM D IS CAPABLE UP TO 300 LPM & 207 BAR.
- POWER PACK OF JCMAS IS CAPABLE UP TO 70 LPM & 350 BAR.
- TEST RIG IS AUTOMATIC GENERATE TEST DATA EVERY 0.1 SEC.

## 2. APPLICATION

- HYDRAULIC OIL INDUSTRY

