

Summary

Project Name: Testing & Validation

Scope: Hydraulic Cylinder Testing

Hydraulic Cylinder Testing

- The testing of hydraulic cylinder
- For stroke durability.
- This cylinder is proposed to be used for
- Material handling equipment in Terex-bad shoenborn-Germany.
- This is to validate the cylinder performance by testing for an
- Endurance of 2, 00,000 cycles, i.e., At maximum working pressure and
- Flow. This test indicates the performance & life of the cylinder.
- The test is conducted based on SAE J1334 standard as per Terex requirement.

OBJECTIVE / GOAL :

- The objective of this test is to study and analyze for the satisfactory function of the cylinder for its life, under Practical conditions.

CYLINDER DATA :

- APPLICATION : STICK OPERATION
- CYLINDER BORE DIA : 130 MM
- PISTON ROD DIA : 90 MM
- STROKE : 1070 MM
- RETRACTED LENGTH : 1690 MM
- WORKING PRESSURE : 360 BAR



Test cylinder mounted on the test rig connected with the master cylinder on the rig. The master cylinder is of max. 100 ton capacity which can be varied based on the input pressure.

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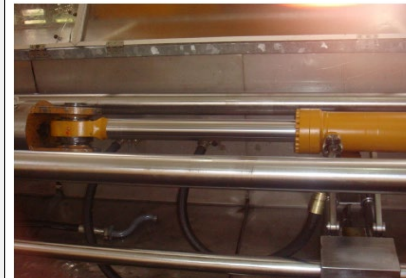
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TEST PLAN :

- Test is conducted as per SAE J1334 standard.
- Install the test cylinder on the cycle test set-up
- Connect test cylinder to a fluid power source and cycle maximum stroke for 30 times (100%) to displace the entrapped air
- Conduct the friction test (Packing drag) and record the pressure.
- Fully extend the cylinder rod and pressurize the cap port to the maximum Pressure of 360 bar. Hold for 3 minute for initial start up only.
- Conduct the initial internal leakage test at low pressure of 50 bar & high pressure of 350 bar. Repeat the same after 50000 cycles.
- Connected the pressure gauges on cushion ports(both side)
- Cycle the test cylinder for one hundred cycles at rated pressure to measure the cushion pressure. Repeat the same after 50000 cycles.

Following tests were conducted after completion of every 50,000 cycles:

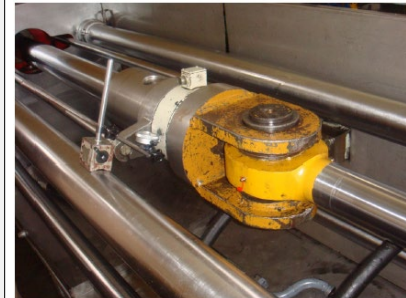
1. FRICTION / PACKING DRAG TEST
2. INTERNAL LEAKAGE TEST
3. PROOF PRESSURE TEST
4. CUSHIONING PRESSURE TEST



Test cylinder put on stand



Packing drag test
(with fully extended condition)



Internal leakage test



Proof Pressure Test

Results were observed for all the above tests and are found to be very consistent. After the endurance test, the cylinder was dis-assembled for inspection of internal parts. no significant wear was observed on any of the parts.