

# ● FLOW CHARACTERISTICS OF HYDRAULIC PUMP QHD 17 IN DEPENDENCE ON THE CHANGE OF PHYSICAL PROPERTIES OF HYDRAULIC FLUID

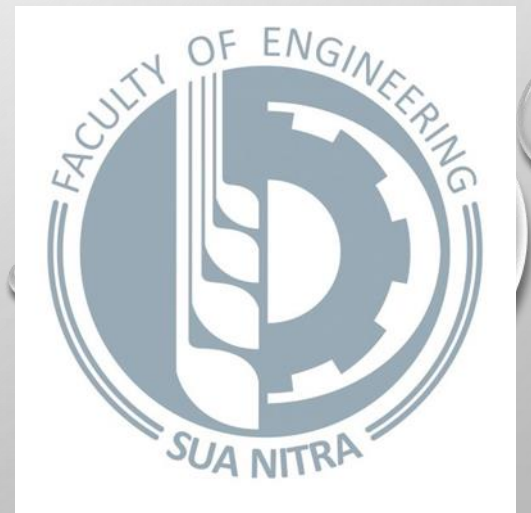


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# INTRODUCTION

- MEASUREMENT OF FLOW CHARACTERISTICS OF A HYDRAULIC PUMP QHD 17.
- PHYSICAL PROPERTIES OF THE OPERATIONAL FLUID AFFECTS THE FLOW CHARACTERISTICS OF THE HYDRAULIC PUMP.
- HIGH DEMANDS ON FLUID.
- ACCELERATED TESTS UNDER LABORATORY CONDITIONS WERE USED.

# METHODS

- LABORATORY TEST EQUIPMENT ALLOWS SIMULATION.
- FLOW SENSOR, PRESSURE SENSOR AND TEMPERATURE SENSOR.
- LABORATORY TEST USING METHODOLOGICAL PROCEDURE.
- SAMPLING FOR DETERMINATION OF PHYSICAL PROPERTIES OF FLUID USING STANDARD STN 65 6207.

# METHODS

- METHODOLOGICAL PROCEDURE FOLLOWED THESE STEPS:
  - a) PROVISION OF A REFERENCE SAMPLE AND ITS ANALYSIS OF PHYSICAL PROPERTIES,
  - b) THE FIRST MEASUREMENT WAS PERFORMED IN THE RANGE OF 125 HOURS WORKED AND THE SIGNAL DATA FROM THE FLOW, PRESSURE AND TEMPERATURE SENSOR WERE RECORDED DURING HYDRAULIC PUMP SPEED ROTATION 1500 RPM,
  - c) SAMPLES OF THE TEST FLUID SHOULD BE TAKEN BEFORE THE NEXT SET OF MEASUREMENT, FURTHER SAMPLING OF THE TEST FLUID ARE REALIZED AFTER 250, 375 AND 500 HOURS WORKED,
  - d) THE FLUID SAMPLES, AFTER PROCESSING THE AFOREMENTIONED NUMBER OF HOURS, WERE SUBJECTED TO PHYSICAL ANALYSIS.

# METHODS

Parameters		Identification	Units	Values
Actual geometric volume		$V_g$	$\text{dm}^3$	$17.24 \times 10^{-3}$
Speed rotation	nominal	$n_n$	rpm	1500
Inlet pressure	minimum	$p_{1\min}$	MPa	-0.03
	maximum	$p_{1\max}$	MPa	0.05
Outlet pressure	maximum continuous	$p_{2n}$	MPa	29
	maximum	$p_{2\max}$	MPa	31
	peak	$p_3$	MPa	32
Nominal output flow (min.) during $n_n$ and $p_{2n}$		$Q_n$	$\text{dm}^3 \cdot \text{min}^{-1}$	23.2
Maximum flow during $n_{\max}$ and $p_{2\max}$		$Q_{\max}$	$\text{dm}^3 \cdot \text{min}^{-1}$	54.3
Nominal input power (max.) during $n_n$ and $p_{2n}$		$P_n$	kW	14.8
Maximum input power during $n_{\max}$ and $p_{2\max}$		$P_{\max}$	kW	33.6
Weight		$m$	kg	10.9

Tab. 1 Parameters of the hydraulic pump QHD 17.

# CONCLUSION

Method	Parameter	Units	Sampling interval				
			0 h	125 h	250 h	375 h	500 h
ASTM D7042	Density at 40 °C	kg.m <sup>-3</sup>	860.70	860.65	860.66	860.60	860.62
	Dynamic viscosity at 40 °C	mPa.s	49.00	47.10	46.50	46.56	46.05
	Kinematic viscosity at 40 °C	mm <sup>2</sup> .s <sup>-1</sup>	56.90	54.80	54.00	54.10	53.50
Acid number ASTM D664 A		mgKOH.g <sup>-1</sup>	2.91	3.29	3.36	3.59	3.67
Water content DIN 51777		%	0.07	0.05	0.04	0.05	0.04

Tab. 2 The physical properties of the hydraulic fluid under test – MOL Farm NH Ultra.

# CONCLUSION

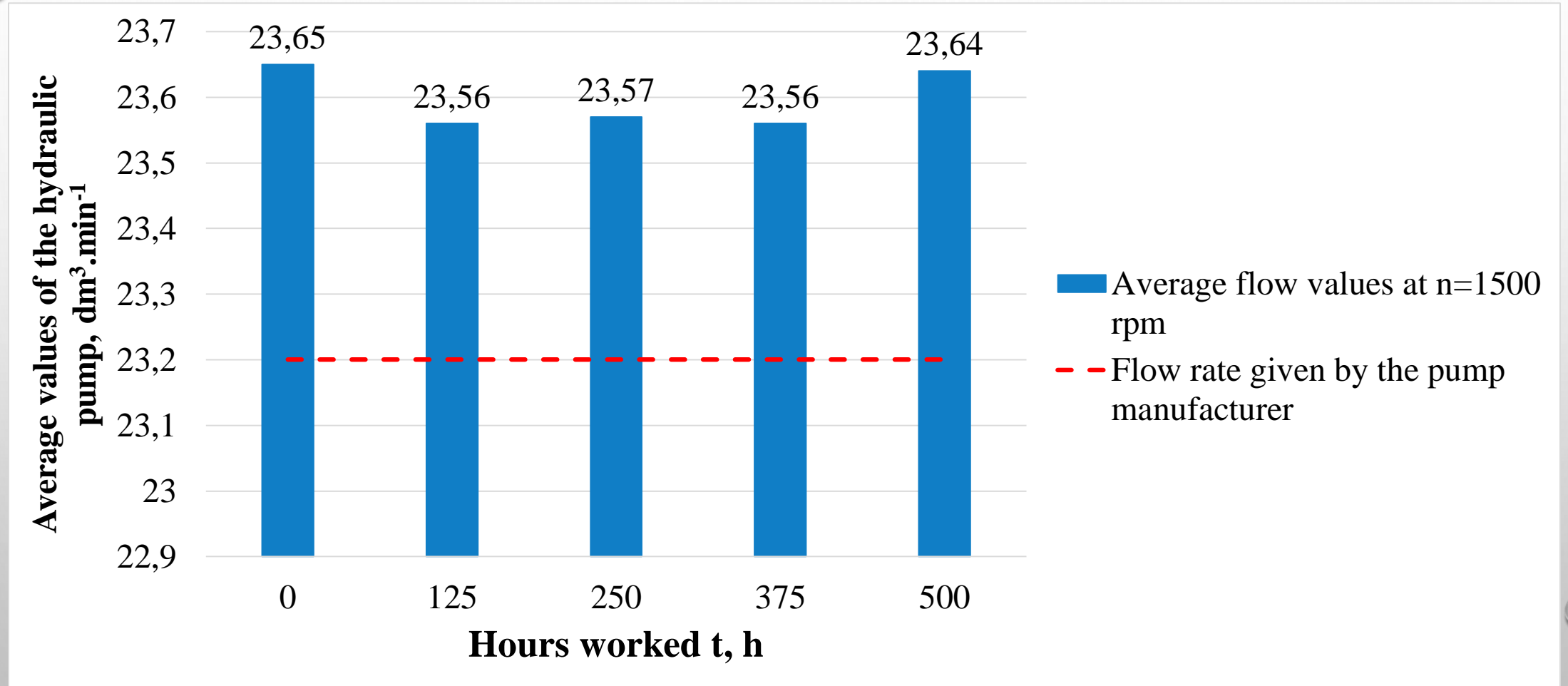


Fig. 1 Dependence of average flow value QHD 17 during test with tested transmission-hydraulic fluid – rotation 1500 rpm

# CONCLUSION

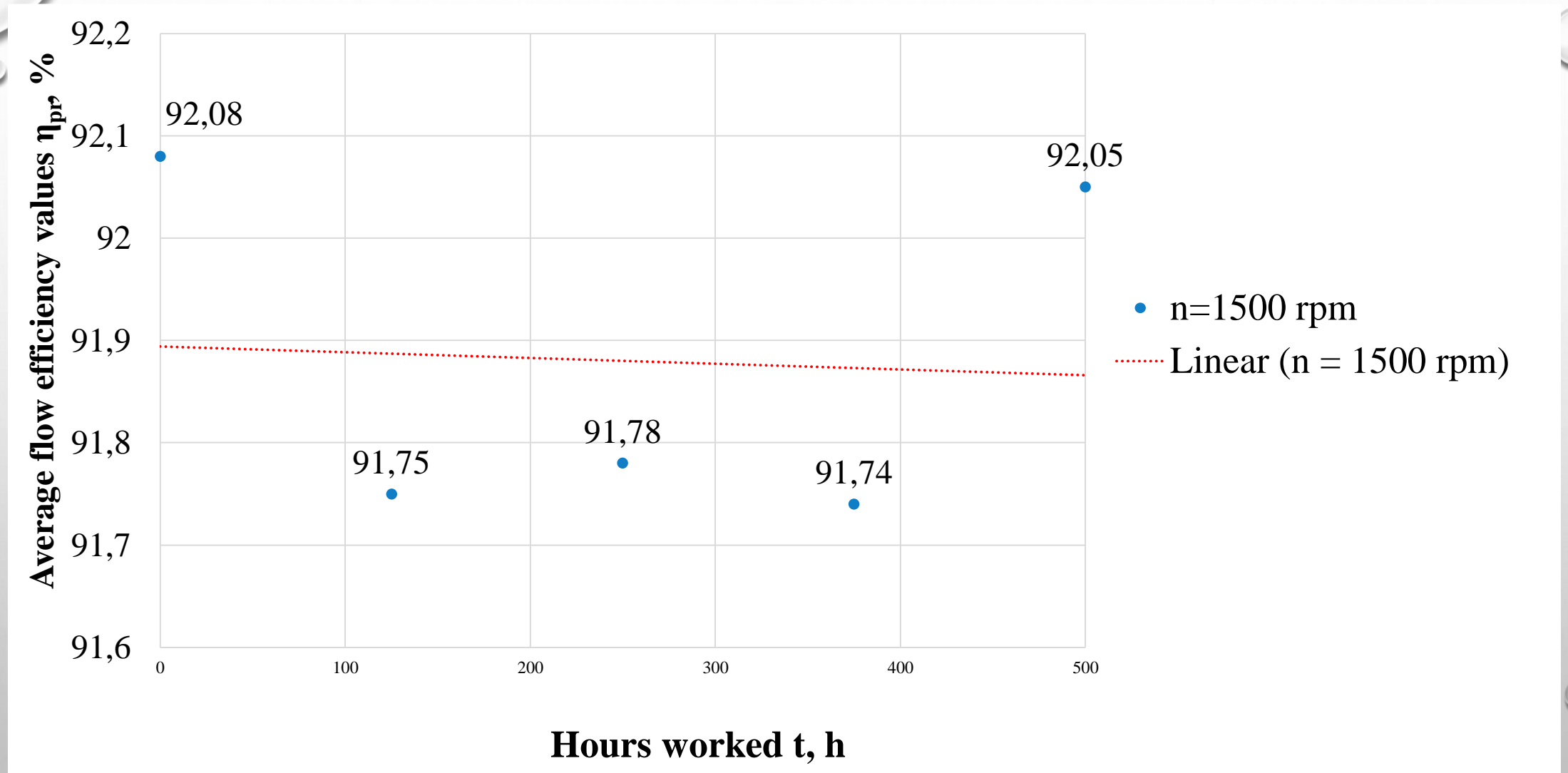


Fig. 2 Dependence of average values of flow efficiency QHD 17 during the test with tested transmission-hydraulic fluid – rotation 1500 rpm



# CONCLUSION

- FLUID DOES NOT AFFECT THE FLOW PROPERTIES OF THE HYDRAULIC PUMP OR ANY OTHER COMPONENT.
- FLOW EFFICIENCY DID NOT DECREASE BY MORE THAN 20 %.
- RELATION BETWEEN THE AVERAGE FLOW RATE AND NUMBER OF HOURS WORKED, THE PHYSICAL COMPOSITION OF THE HYDRAULIC OIL MOL FARM NH ULTRA HAS NO NEGATIVE EFFECT ON THE FLOW PROPERTIES OF THE HYDRAULIC PUMP.
- CONTAMINATION OF WORKING FLUID CAUSES ACCELERATED WEAR OF THE HYDRAULIC SYSTEM, CORROSION, OXIDATION ETC.
- POLLUTION MAINLY AFFECTS ECOLOGICAL FLUIDS.

The image features a light gray background with a subtle gradient. In the top-left and bottom-right corners, there are several realistic water droplets of various sizes, rendered with soft shadows and highlights to give them a three-dimensional appearance. The text "THANK YOU FOR YOUR ATTENTION!" is centered in the middle of the page in a bold, black, sans-serif font.

**THANK YOU FOR YOUR ATTENTION!**