



# **DYNAMIC PRESSURE MEASUREMENTS at UME**

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# What is dynamic pressure?

A dynamic measurement can be defined as a measurement where the physical quantity being measured (the measurand) varies with time.

$$p = p(t)$$

# Typical Applications



Blood pressure measurements



Ballistics and explosion



transportation



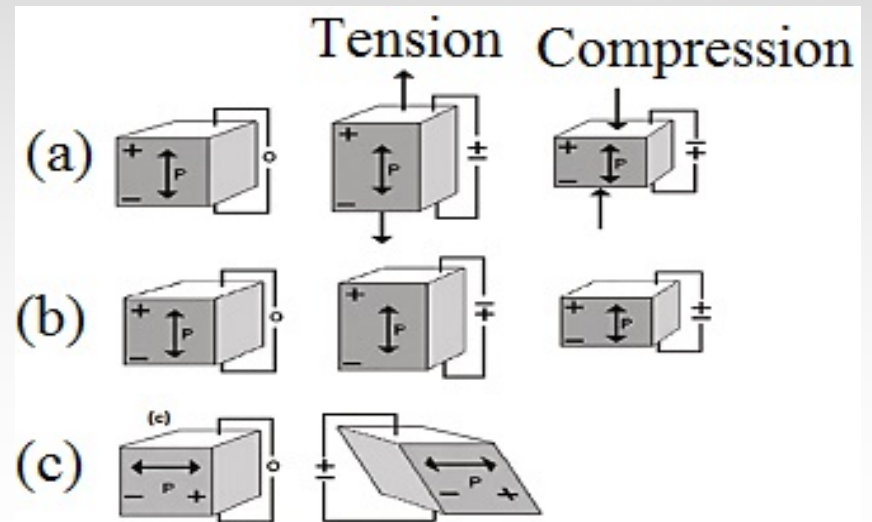
Crash test

# dynamic pressure transducers

- They have quartz based piezoelectric sensors so they produce load (pC) under stress
- Very fast response time



Dynamic pressure sensors

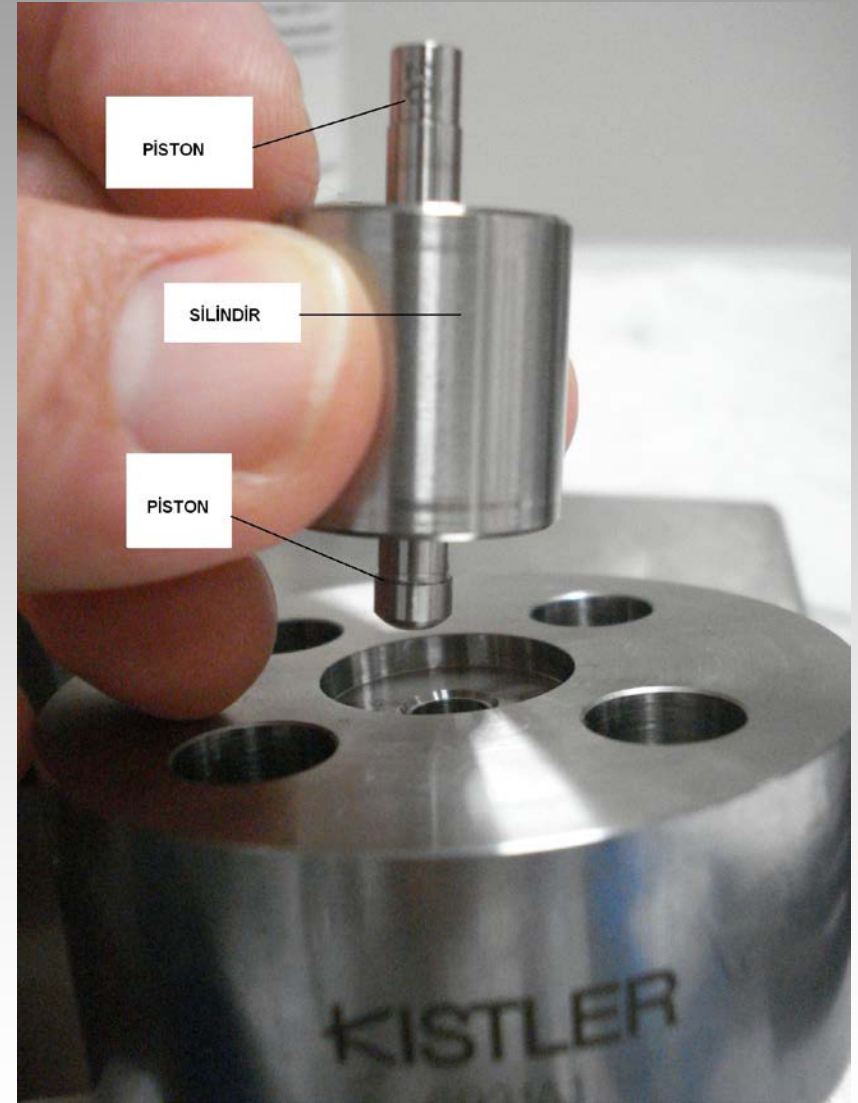
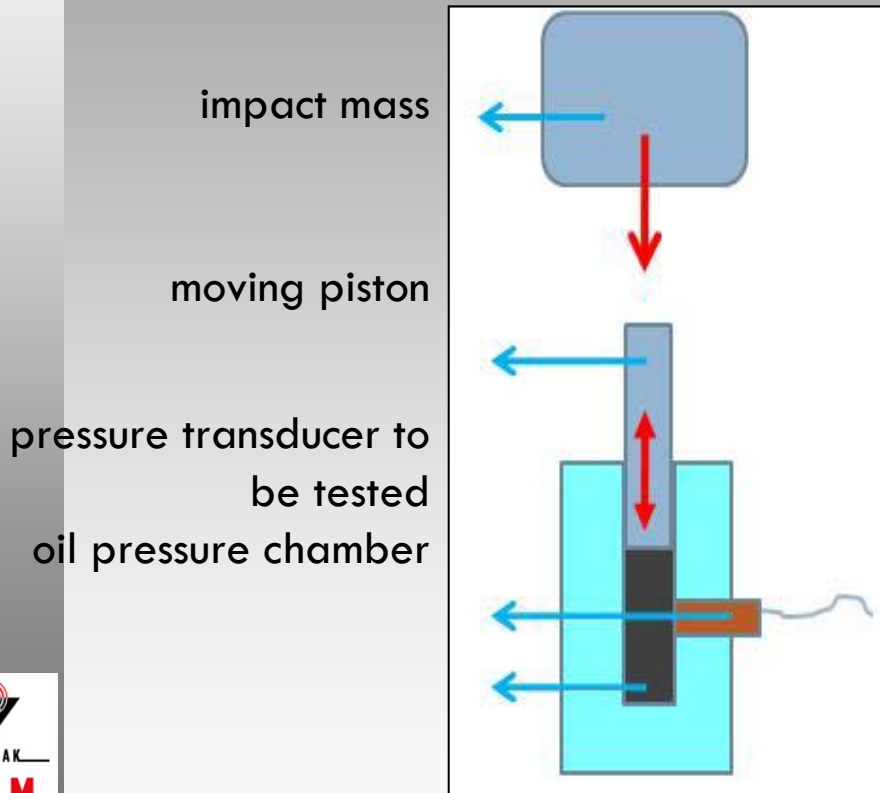


# Traceability in dynamic measurements

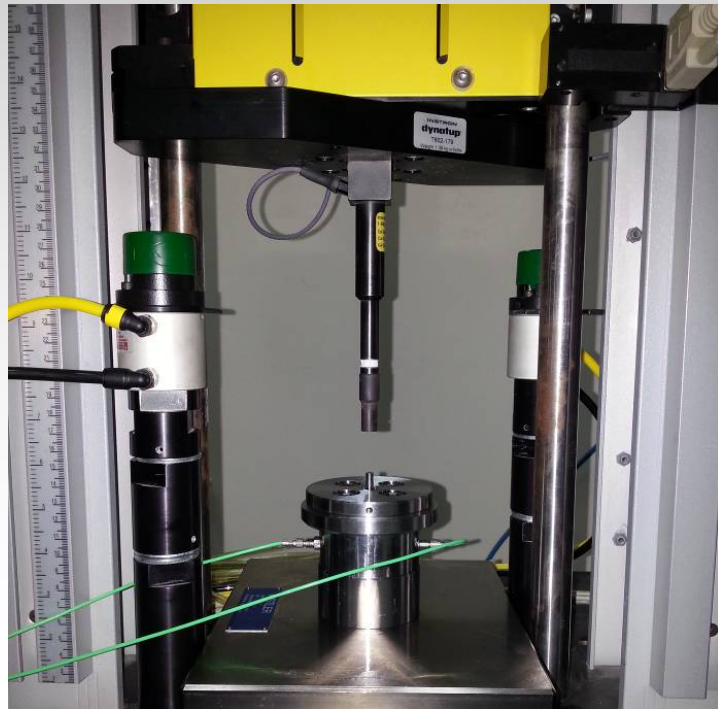
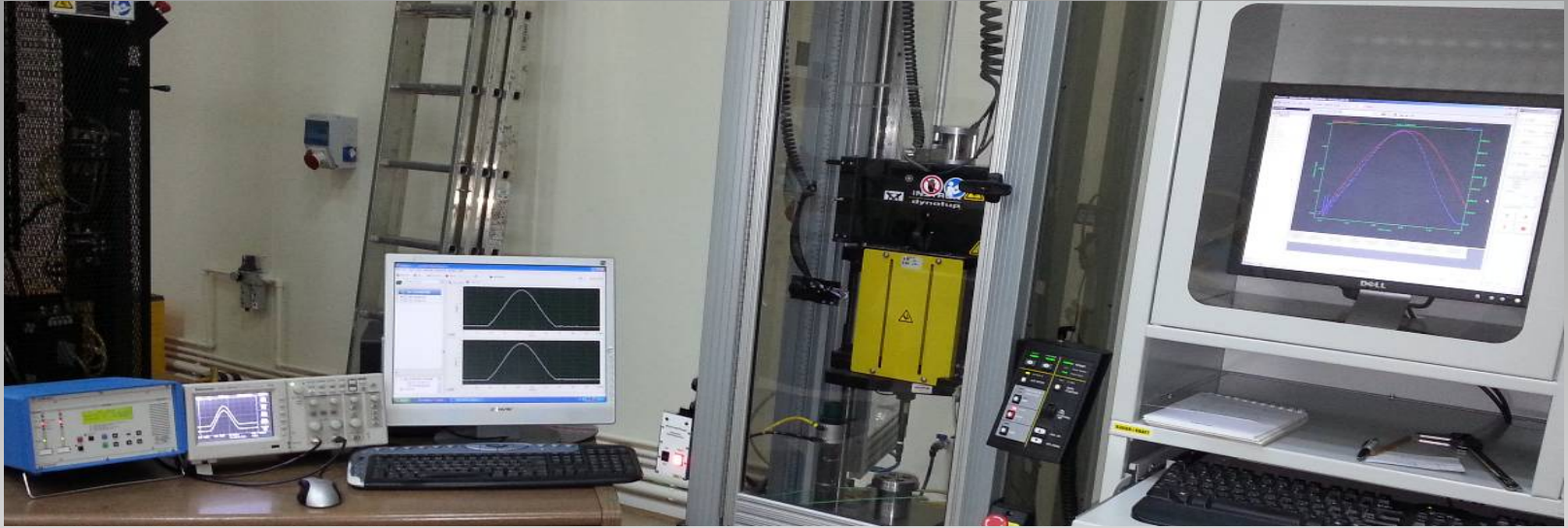
Dynamic pressure measurements are traceable to static pressure measurement.

We need dynamic calibration ...

# Schematic diagram for drop mass system



# Measurement setup



Measurement setup for secondary level dynamic pressure measurement



# Measurement results

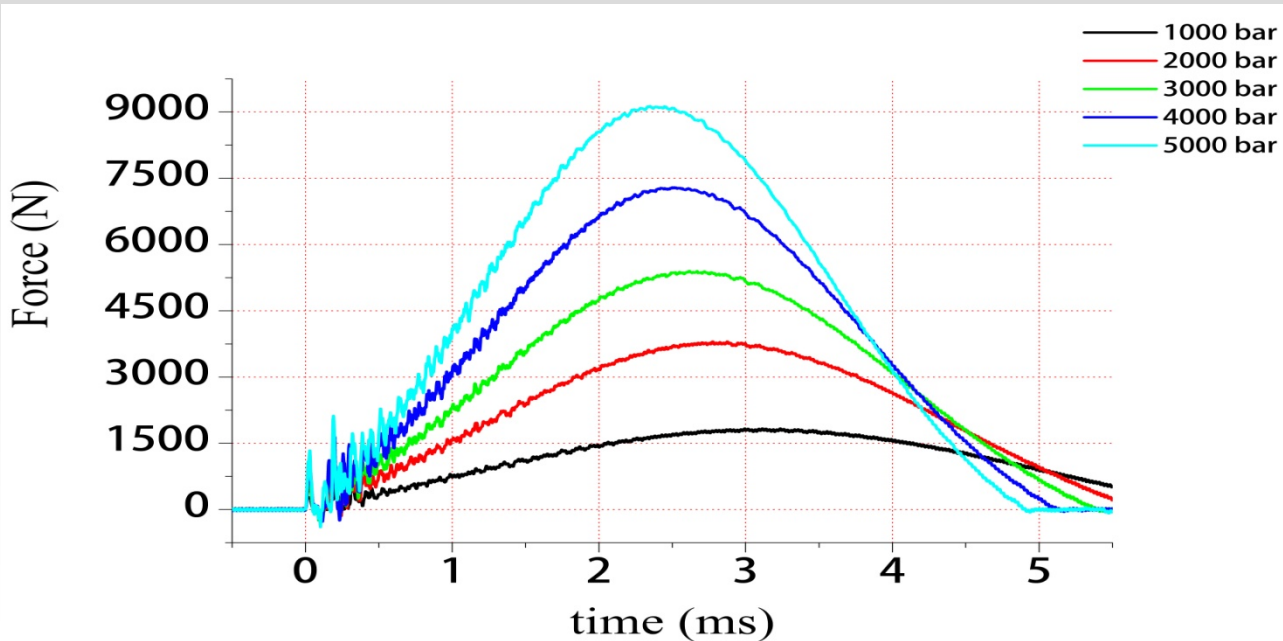
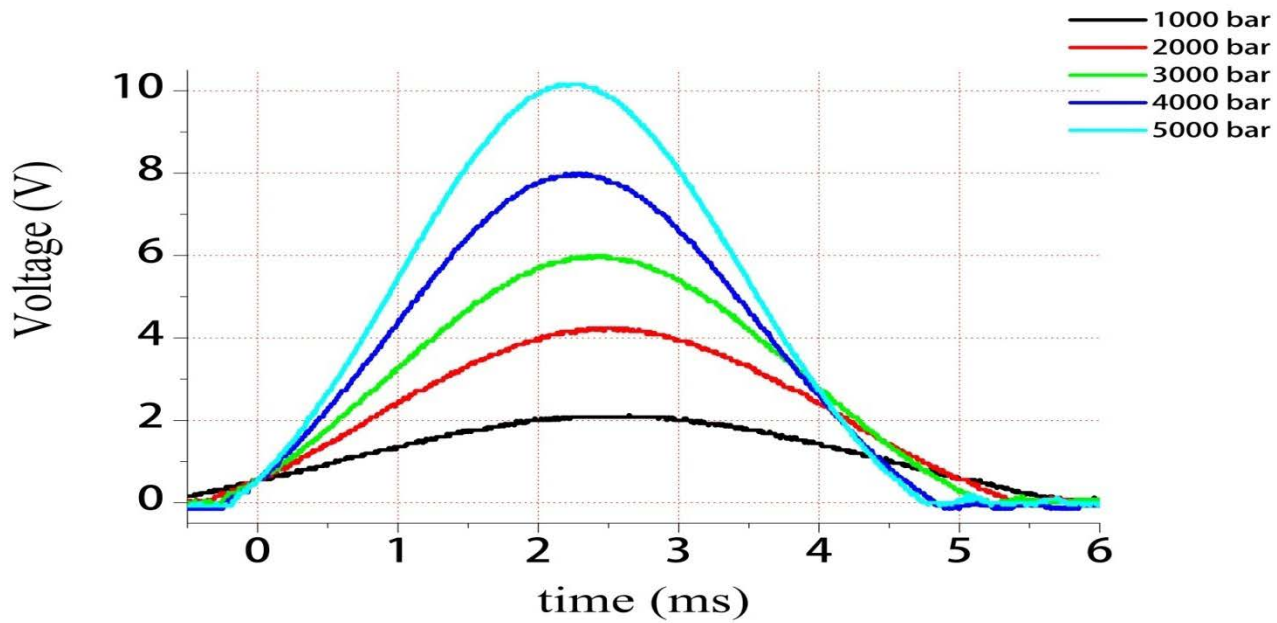
Type of Media	Nominal Pressure (bar)	Test Pressure (bar)	Max. Load (N)	Drop Height (m)	Impact Velocity (m/s)	Drop Energy (J)	Mass (kg)	Max. Penetration (mm)	Durati on Time (ms)
Drosera	1000	1090	1835	0.0275	0.734	1.350	5.01	-	6.226
	2000	2080	3801	0.0917	1.340	4.499	5.01	2.748	5.691
	3000	2945	5402	0.163	1.787	7.999	5.01	3.391	5.386
	4000	3930	7294	0.2588	2.252	12.700	5.01	4.079	5.120
	5000	5025	9136	0.367	2.681	18.000	5.01	4.651	4.907

# Transmission Media

## Physical and Chemical Properties of Drosera MS5

Color	colorless To light yellow	
Physical State @20°C	Liquid	
Flash point	$\geq 110$ °C	ISO 2719
Density	818 kg/m <sup>3</sup>	@ 15 °C
Viscosity, kinematic	4.6 mm <sup>2</sup> /s	@ 40 °C, ISO 3104

# Measurement results



# Future works

- This the secondary system:  
So;
- investigation of drop drop mass guding system, friction loss
- Evaluation of phsical and mathematical model
- Improvement in automatization systems
- Determination of net obtained pressure should be calculated
- Evaluation of uncertainty parameters, an uncertainty value should be determined on the net pressure

Thank you for your kind attention

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