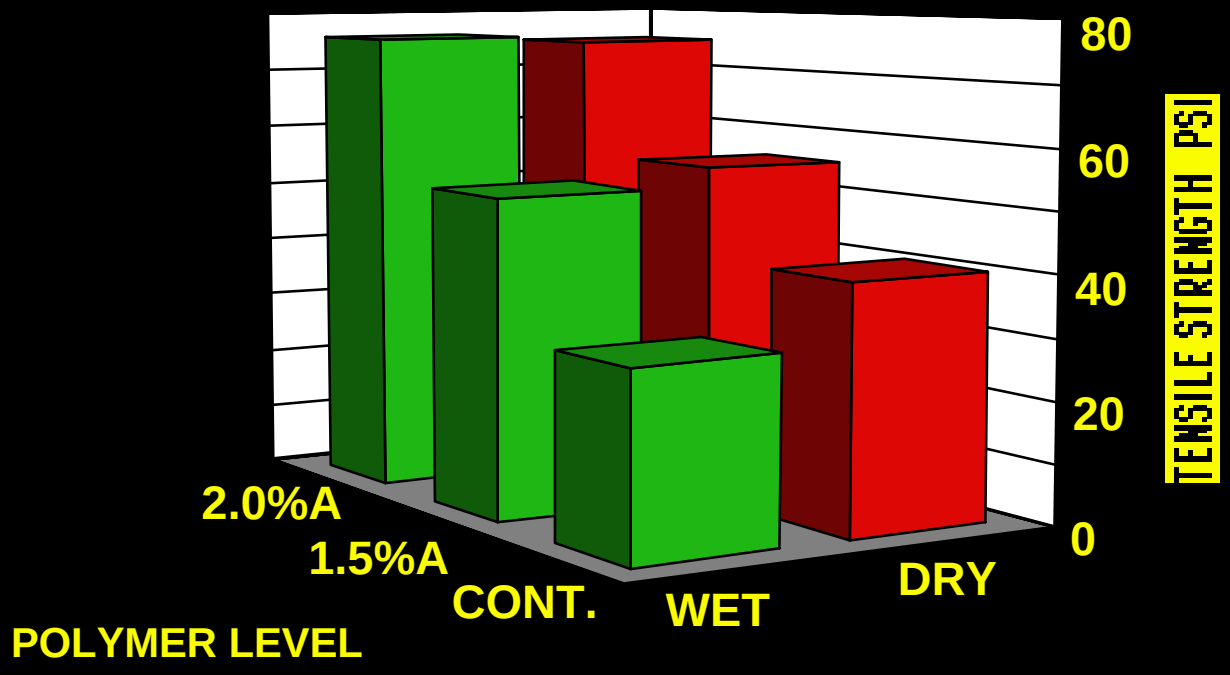
EVALUATION OF ASPHALT USING LAP SHEAR SPECIMENS

- TECHNICAL PAPER PRESENTED AT THE PETERSEN CONFERENCE JUNE 2005

Cheyenne, Wyoming

SPLIT TENSILE STRENGTH LIMESTONE



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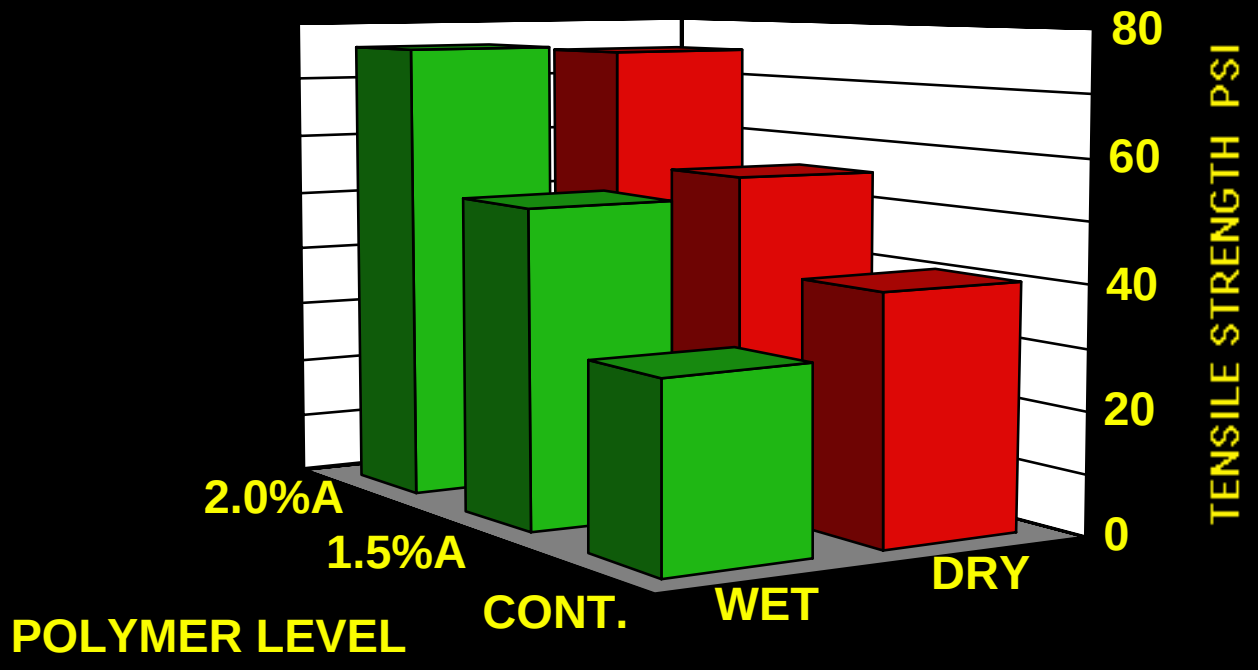
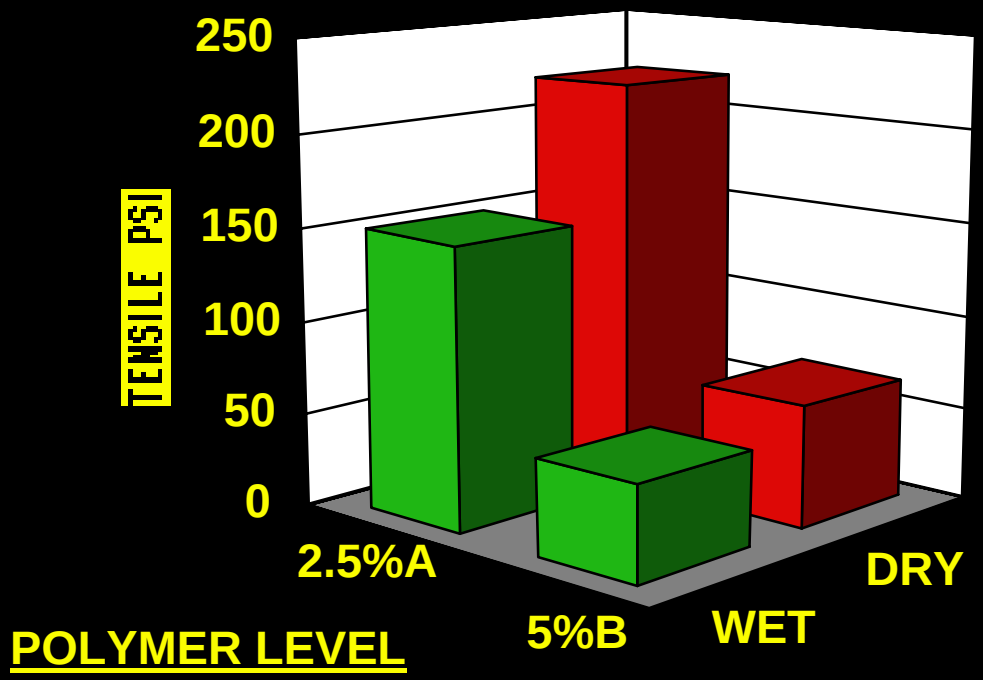


SPLIT TENSILE ON WATSONVILLE GRANITE



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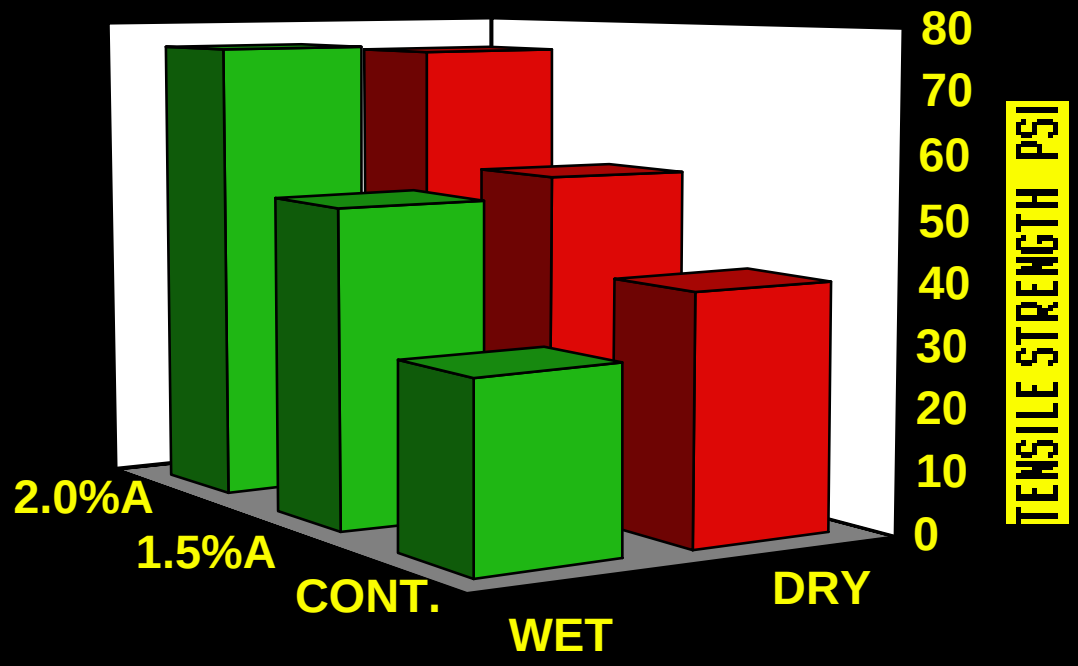
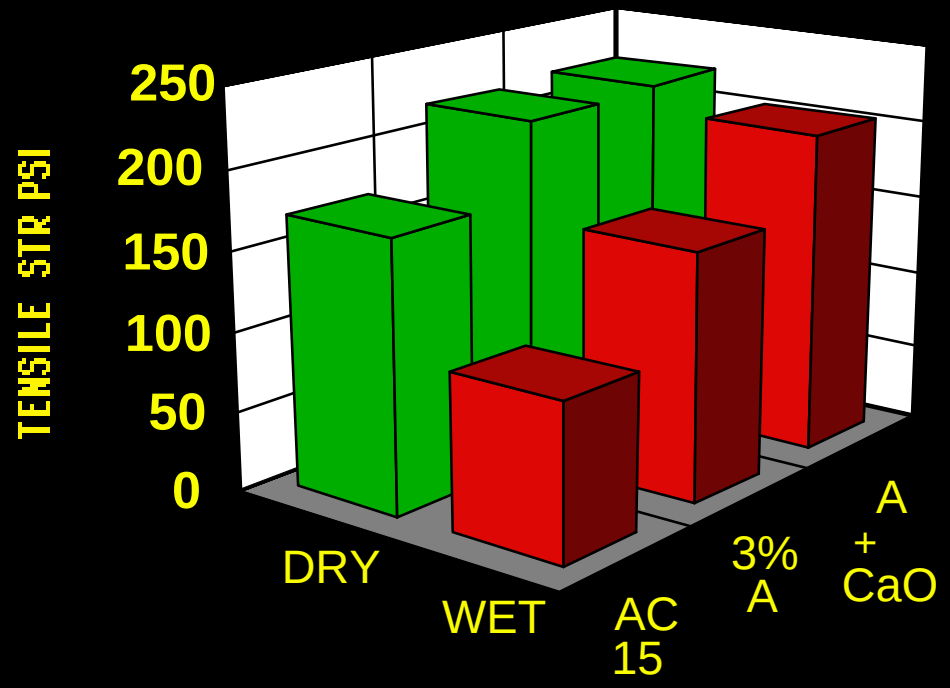
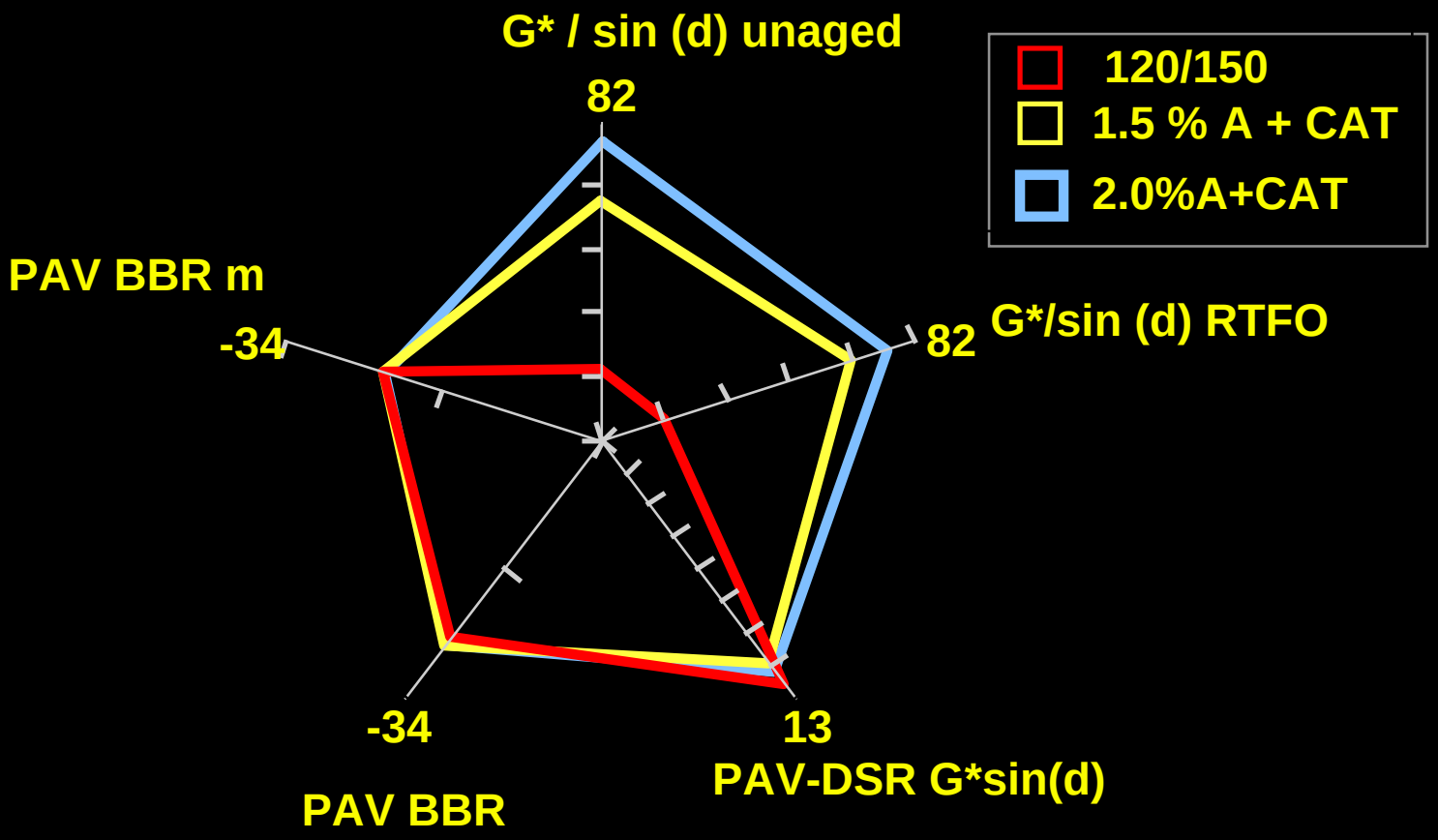


SPLIT TENSILE ON WATSONVILLE GRANITE



A PLUS CATALYST

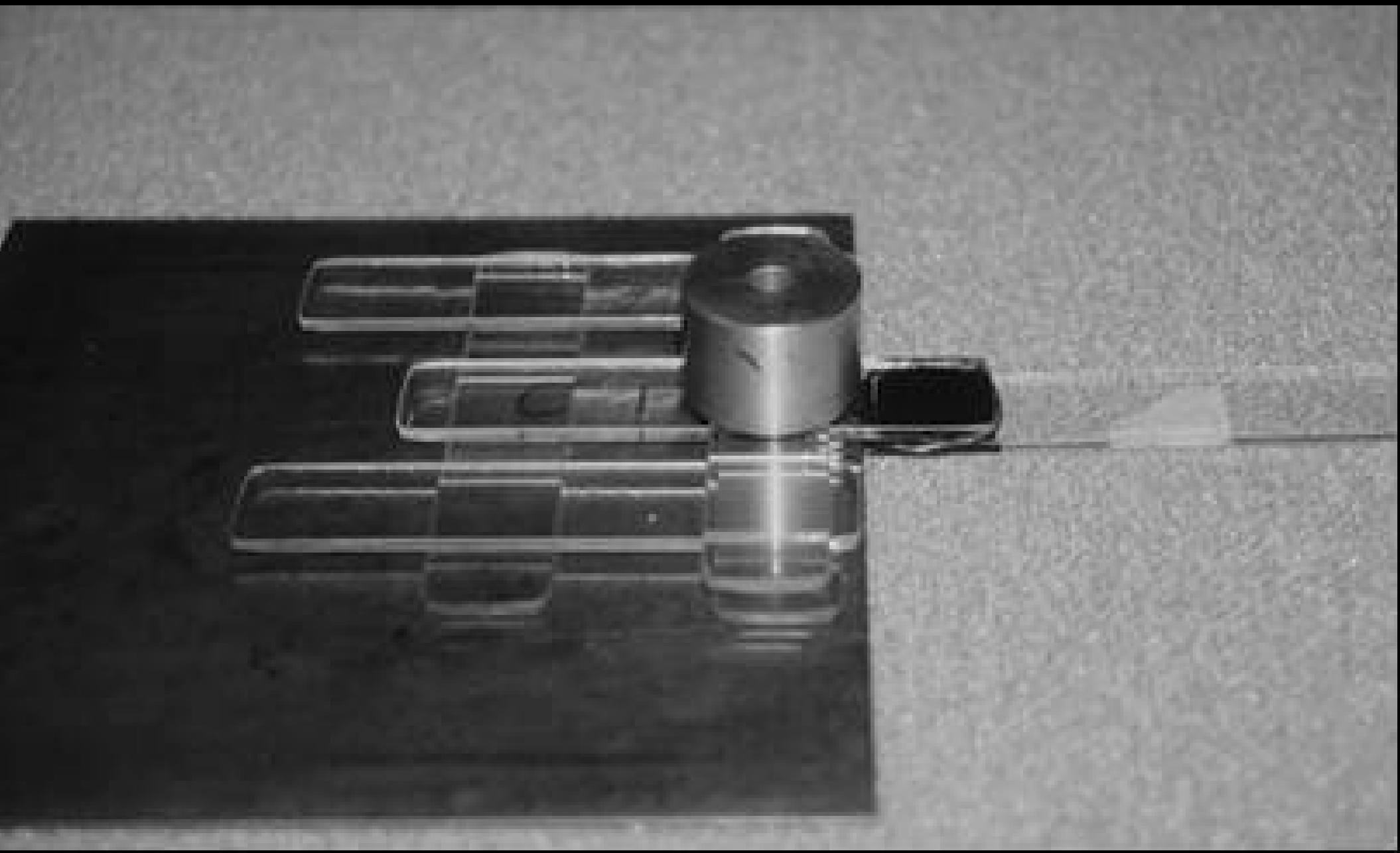


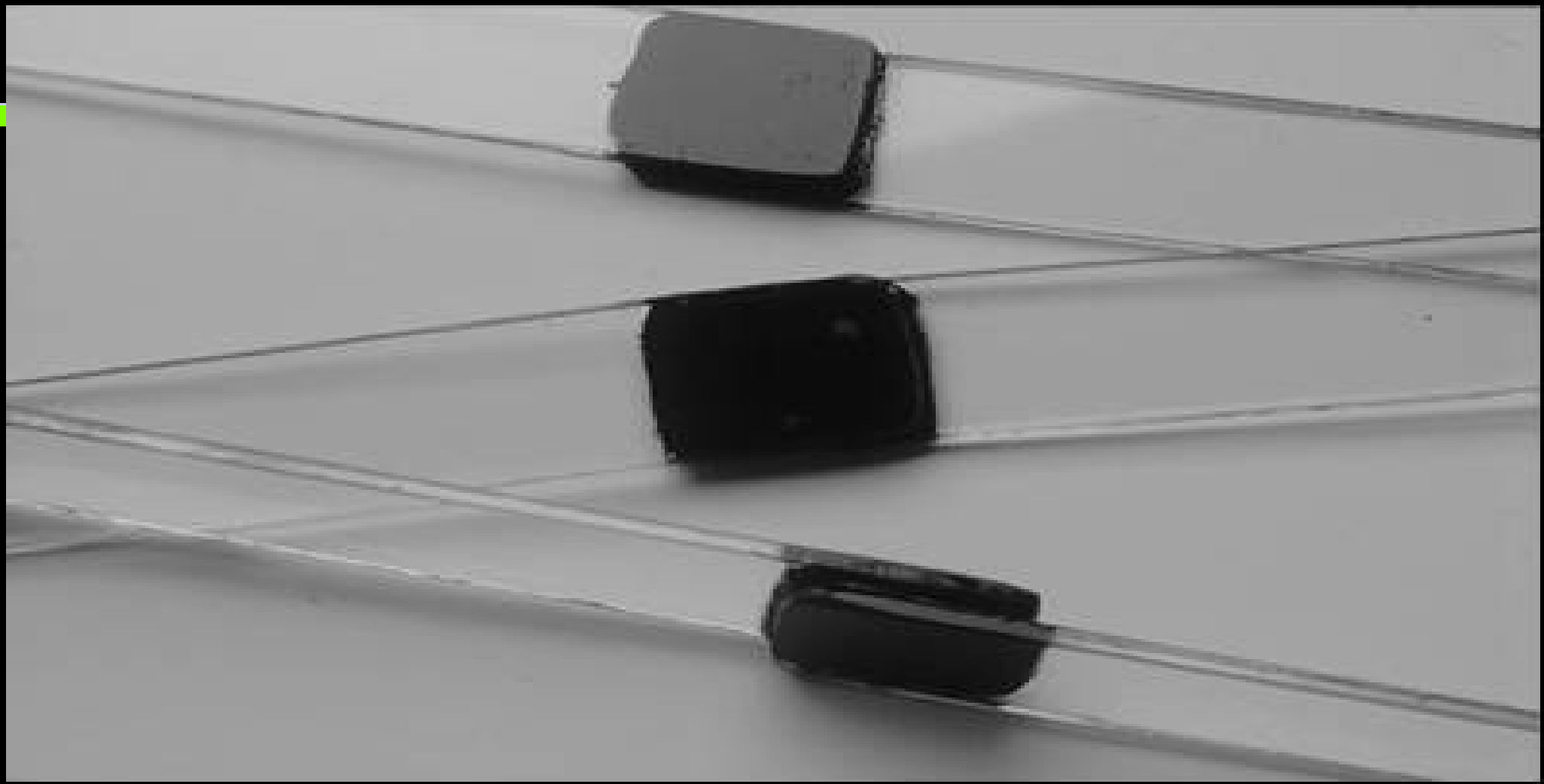
ASPHALT PREPARATION

- POLYMER BLENDED AND OR REACTED
- RTFO RESIDUE OBTAINED USING STD CYCLE

SAMPLE PREPARATION

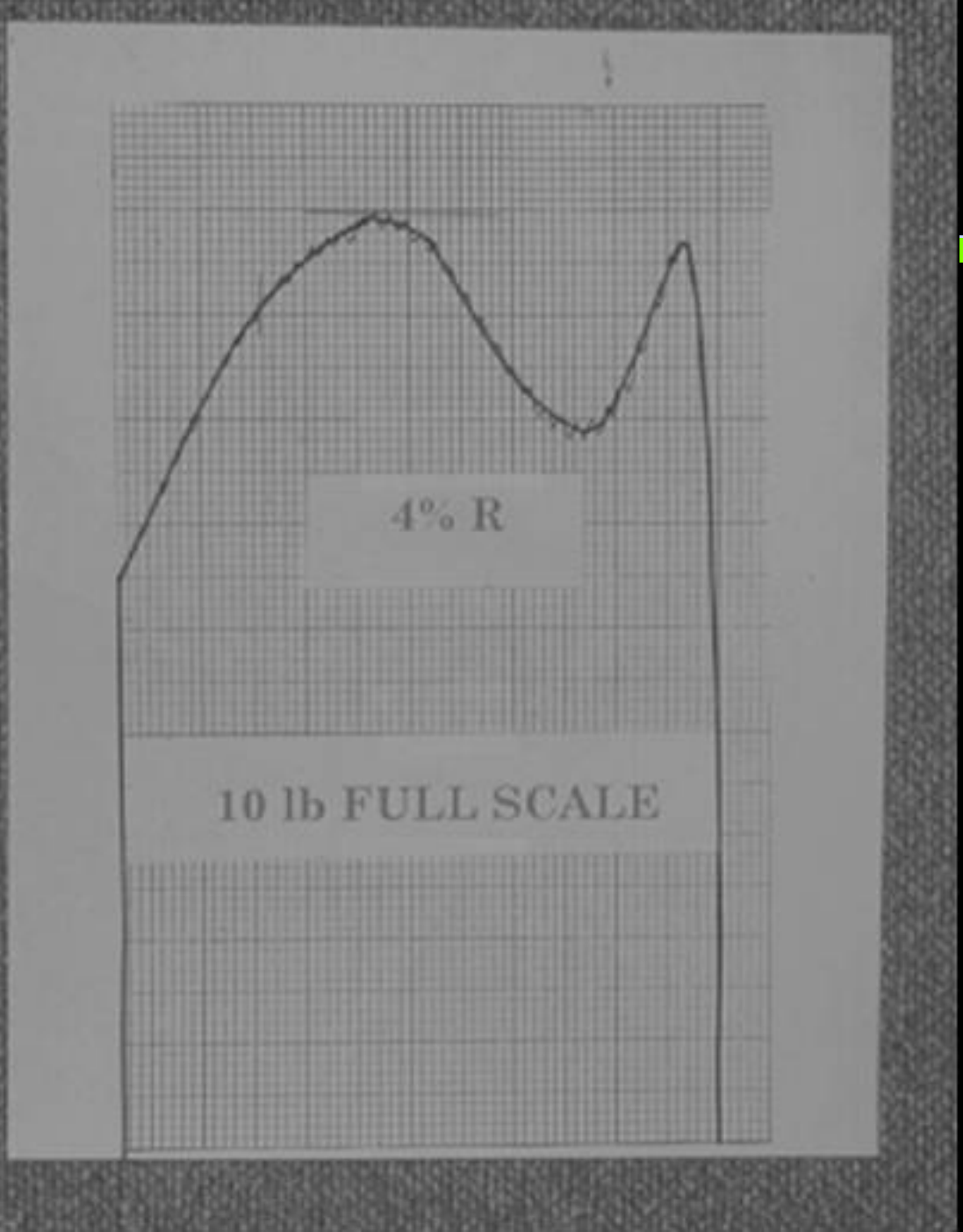
- GLASS SLIDES 3 INCHES X 1 INCH
- CLEANED AND DRIED
- HEATED TO 140 C
- OVERLAPPED I INCH
- 1 TO 1.2 GRAMS OF HOT ASPHALT APPLIED
- SAMPLES SHIMMED TO 1.6 mm
- 1 kg WEIGHT PLACED ON SAMPLE
- SAMPLED ALLOWED TO COOL
- TRIMMED AT EDGES



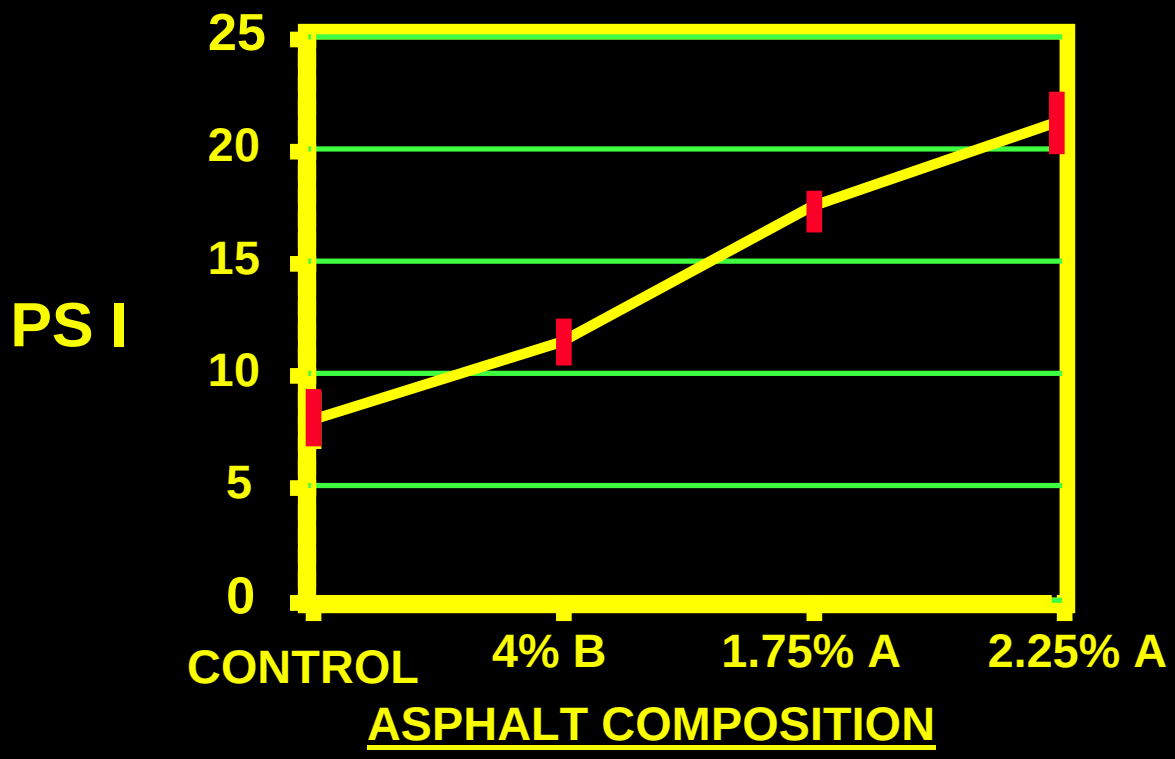


TENSILE LAP SHEAR METHOD

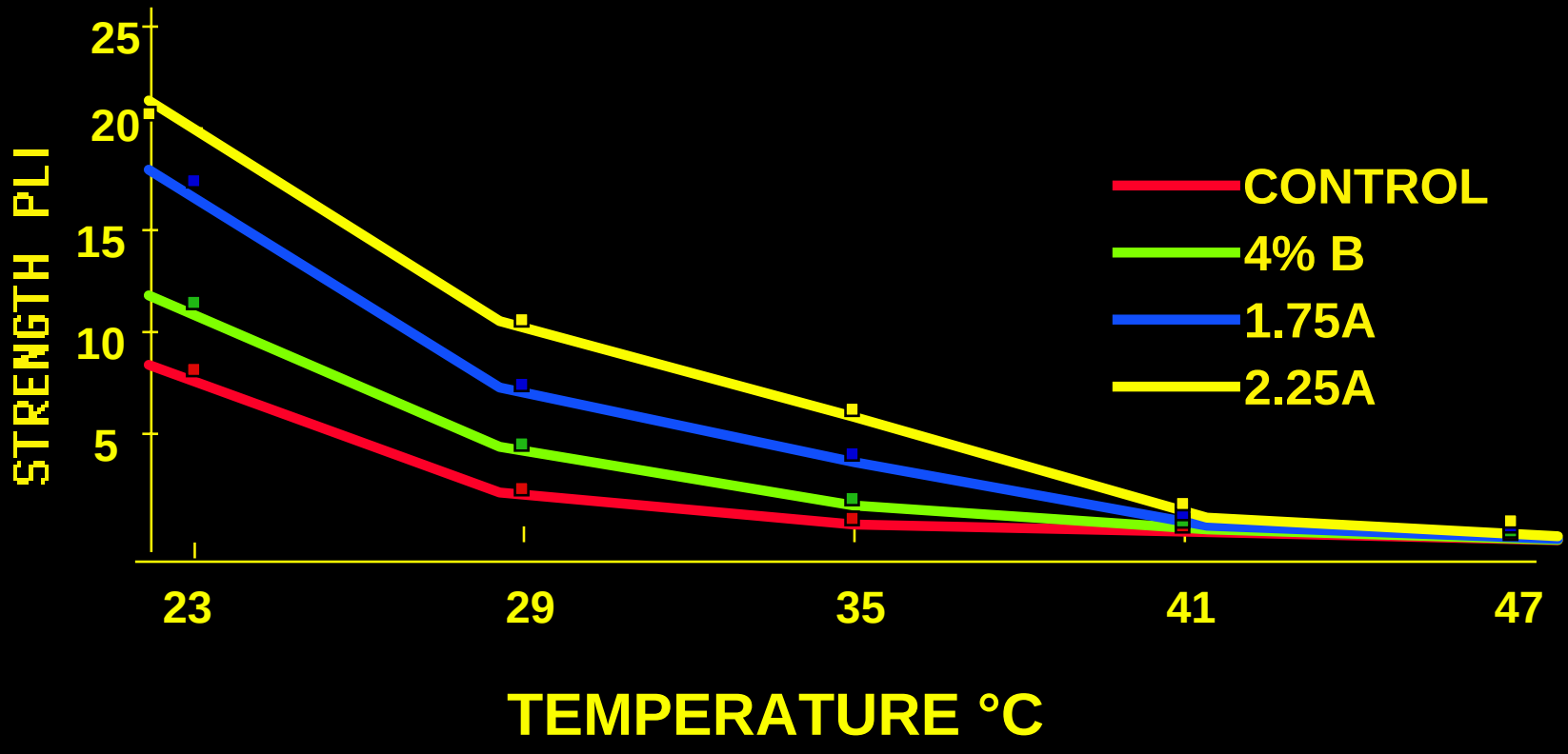
- MASKING TAPE PLACED AROUND GLASS
- PLACED IN ENVIRONMENTAL CHAMBER OF TENSILE TESTER
- PULLED AT RATE OF 0.2 INCHES/ MIN.
- CHART SPEED OF 1 INCH / MIN
- LOW TEMP. PROPERTIES DONE ON METAL


4% R
10 lb FULL SCALE

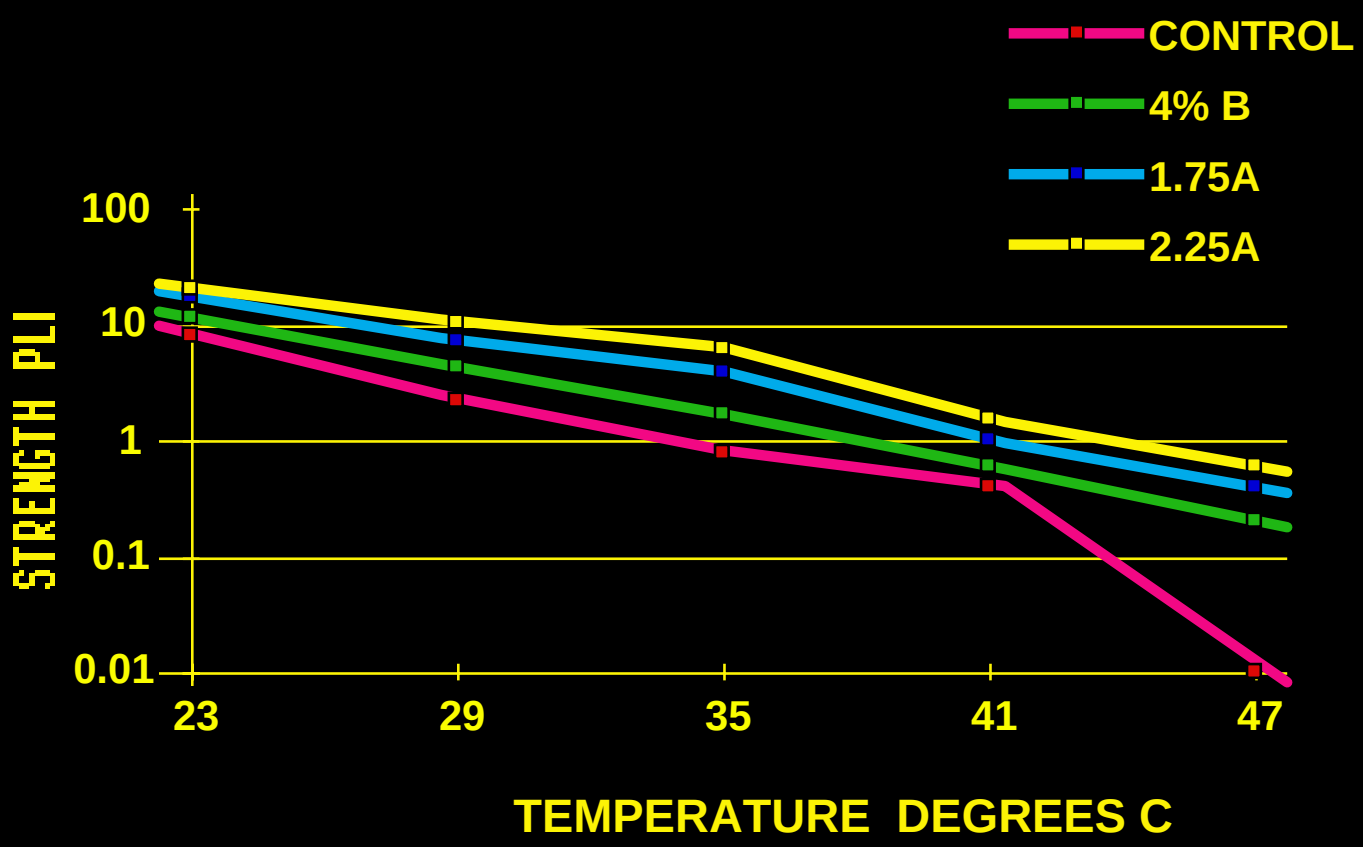
ERROR BARS FOR LAP SHEAR TEST



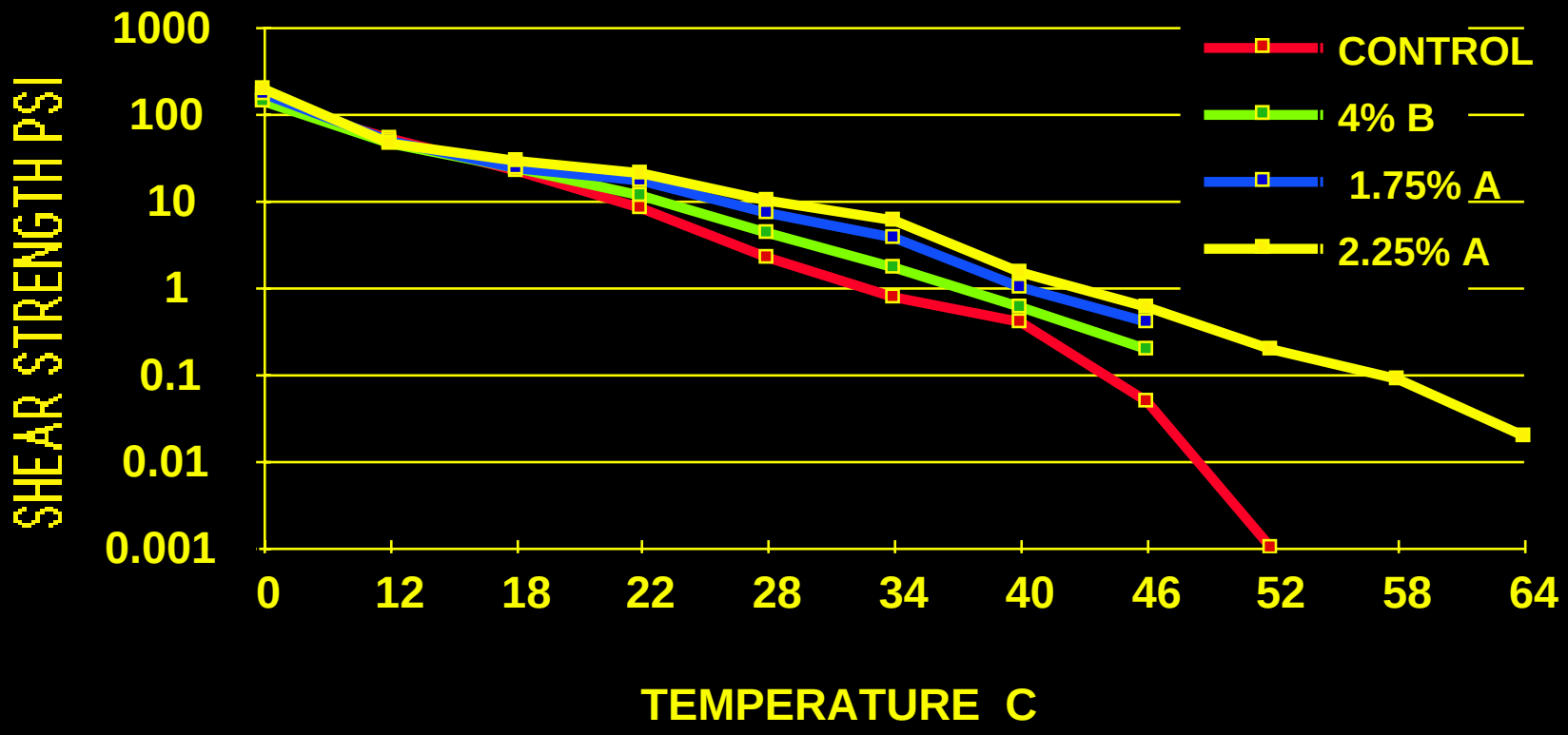
LAP SHEAR VERSUS TEMPERATURE



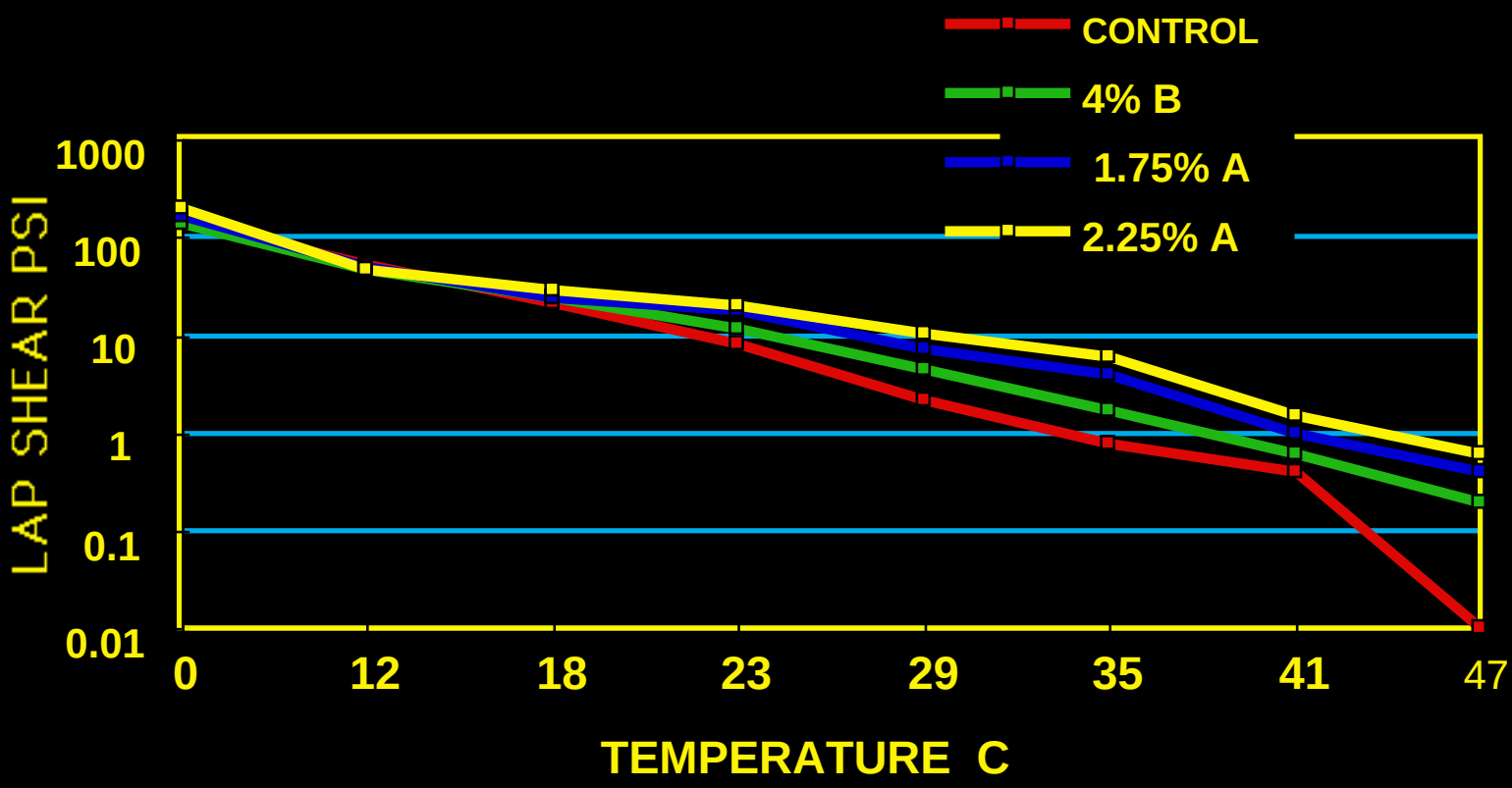
LAP SHEAR STRENGTH VERSUS TEMPERATURE



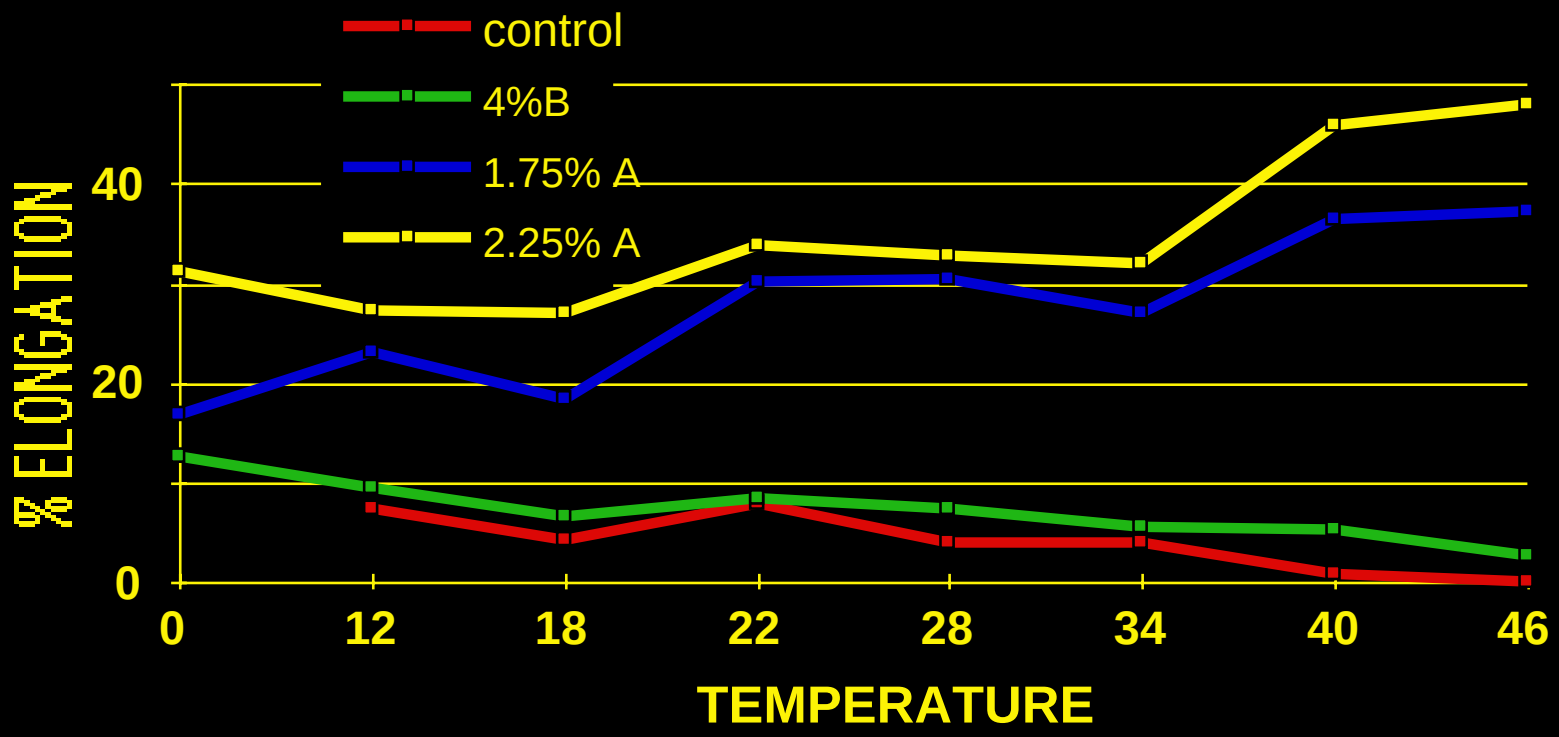
LAP SHEAR VERSUS TEMPERATURE



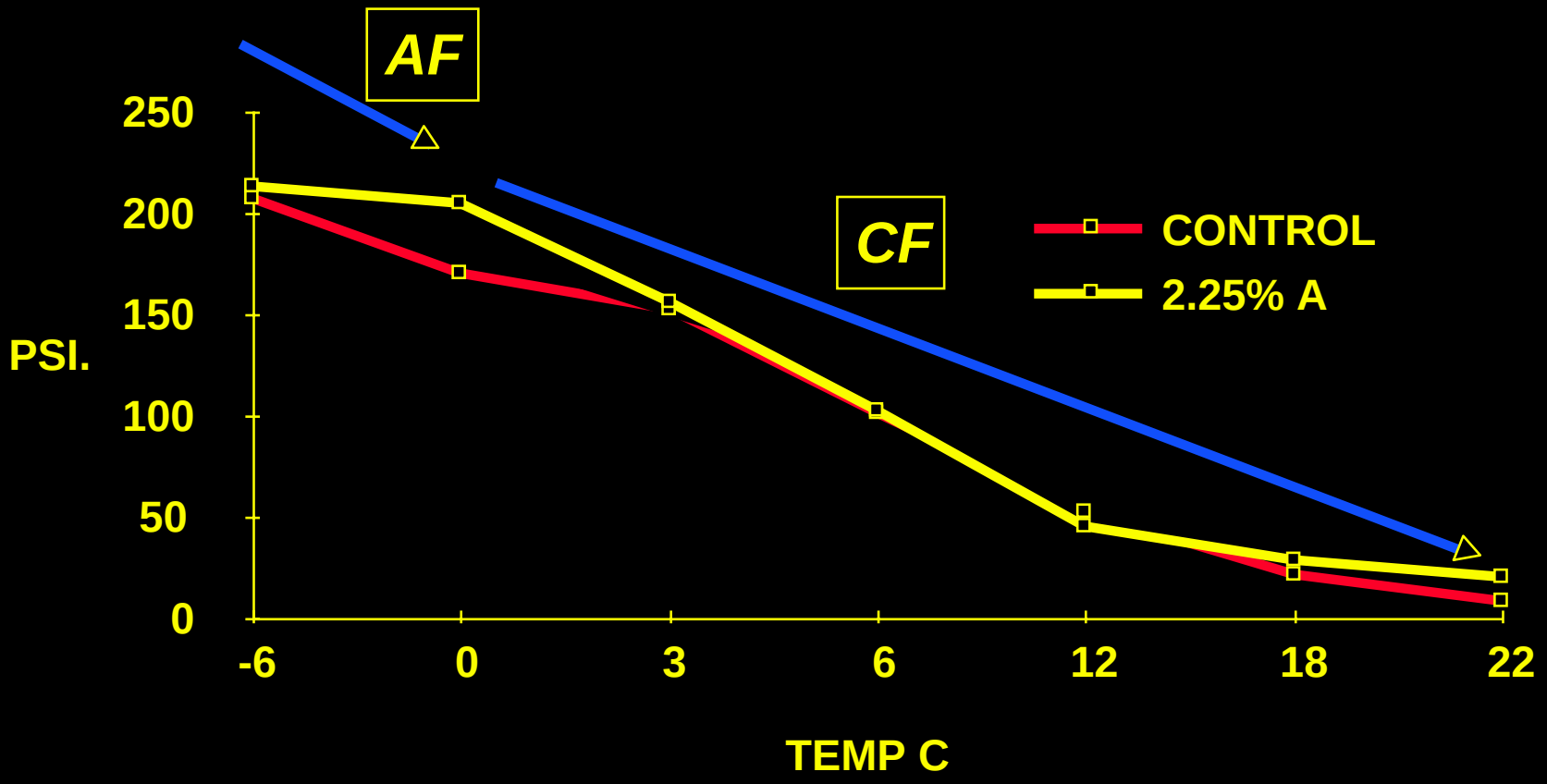
SHEAR STRENGTH VERSUS TEMPERATURE



ELONGATION VERSUS TEMPERATURE



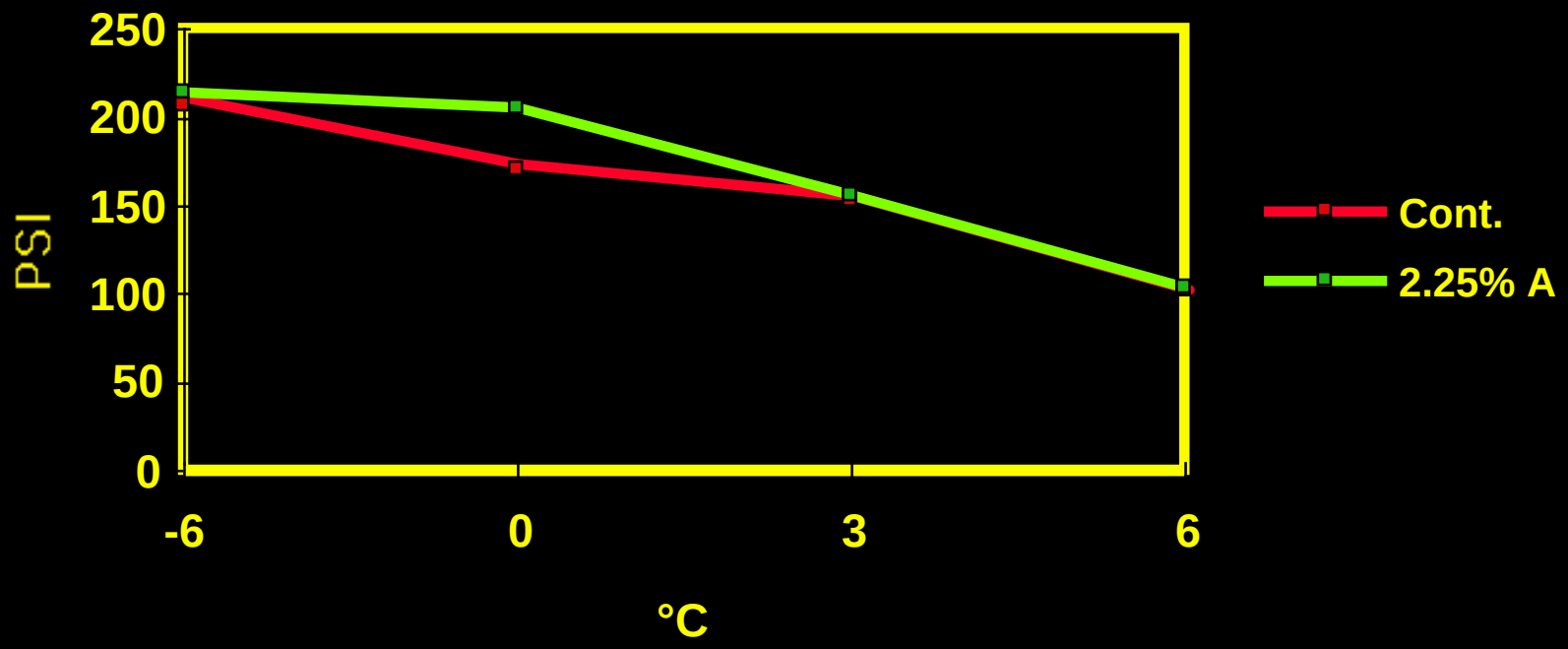
LAP SHEAR VERSUS TEMP



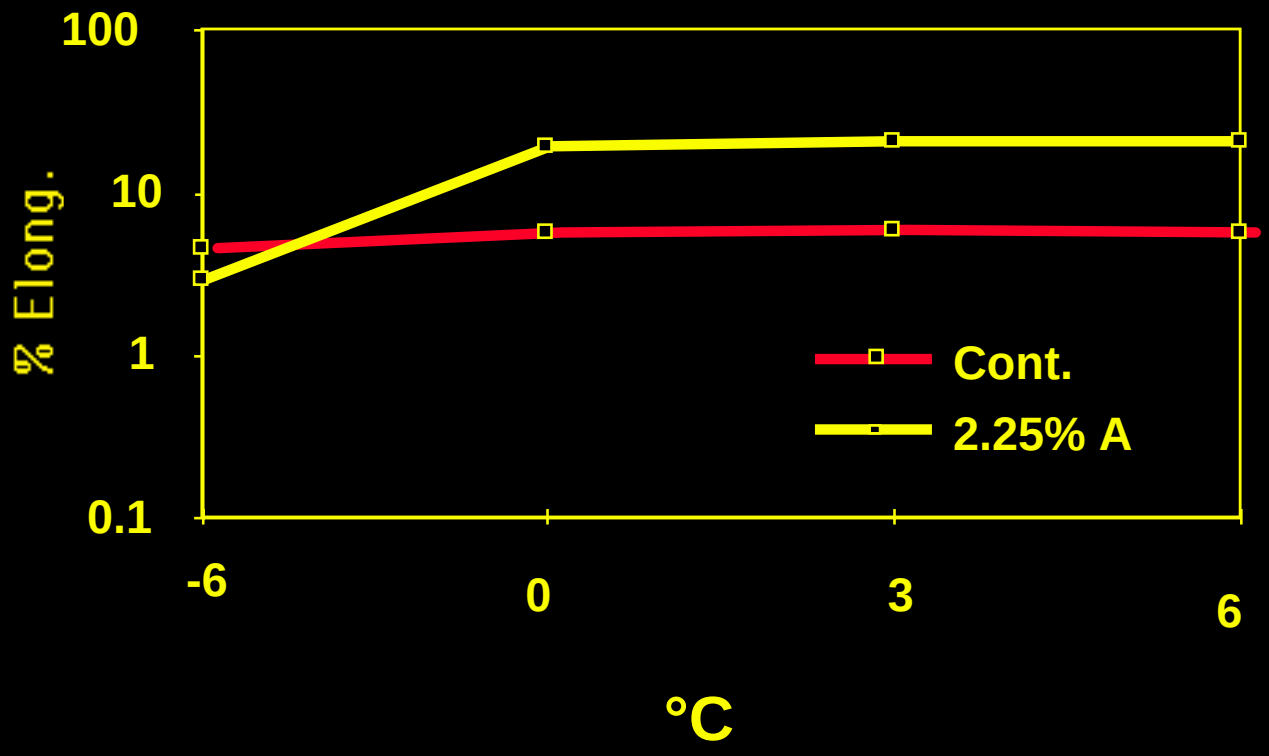
TRANSITION FROM COHESIVE TO ADHESIVE FAILURE

- TRANSITION HAPPENS AT 6 TO 0 DEGREES C
- GLASS SLIDES BREAK AT ABOUT THIS TEMP.
- METAL SPECIMENS MORE FORGIVING

LAP SHEAR VS. TEMP. (Metal)



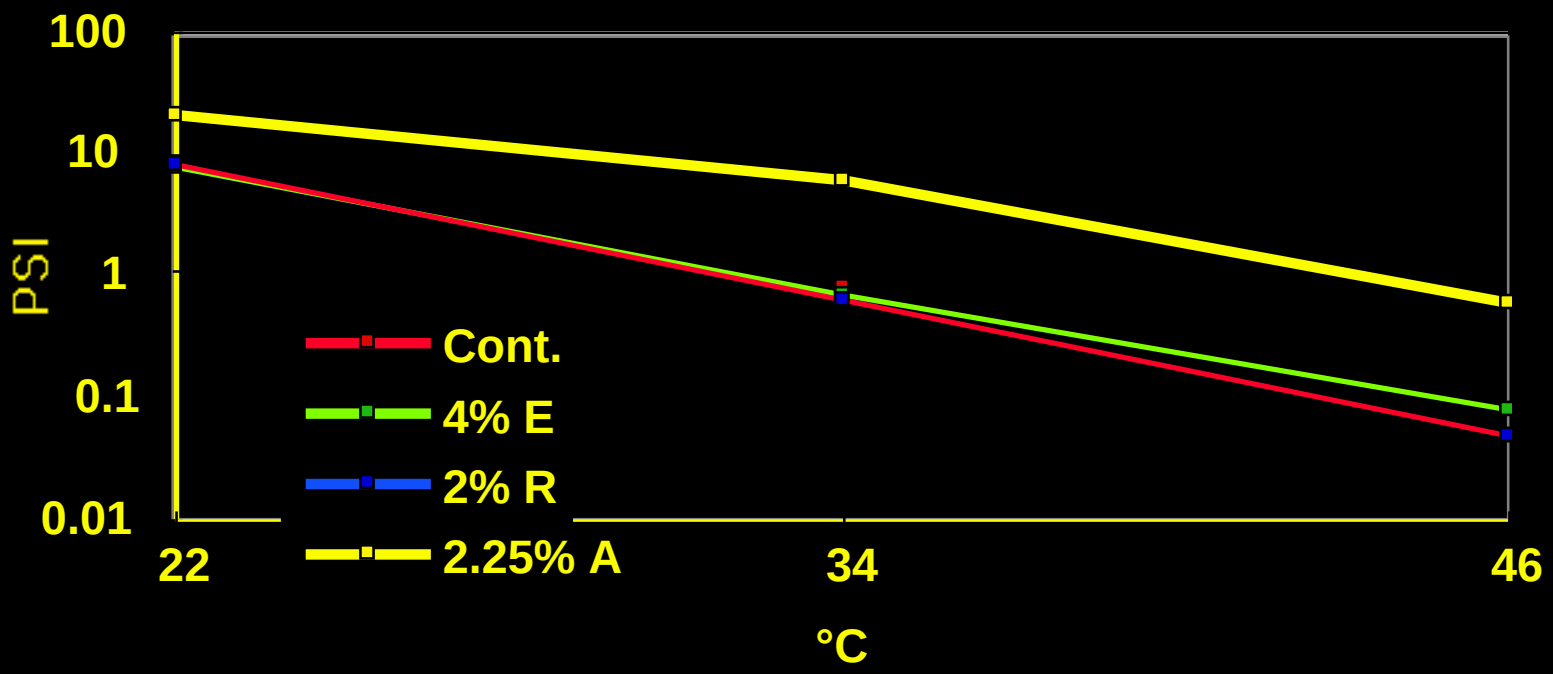
% ELONG. VS. TEMP. (METAL)



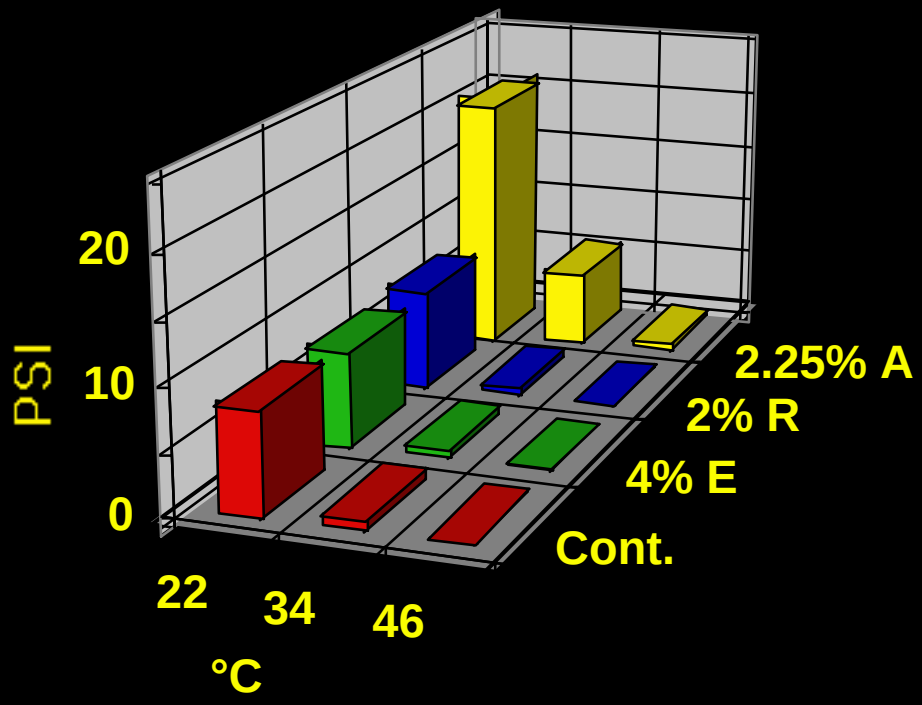
METAL RESULTS

- TRANSITION FROM CO TO AD BETWEEN 0 AND MINUS 6 C

Lap Shear vs. Temp.



Lap Shear vs. Temp.



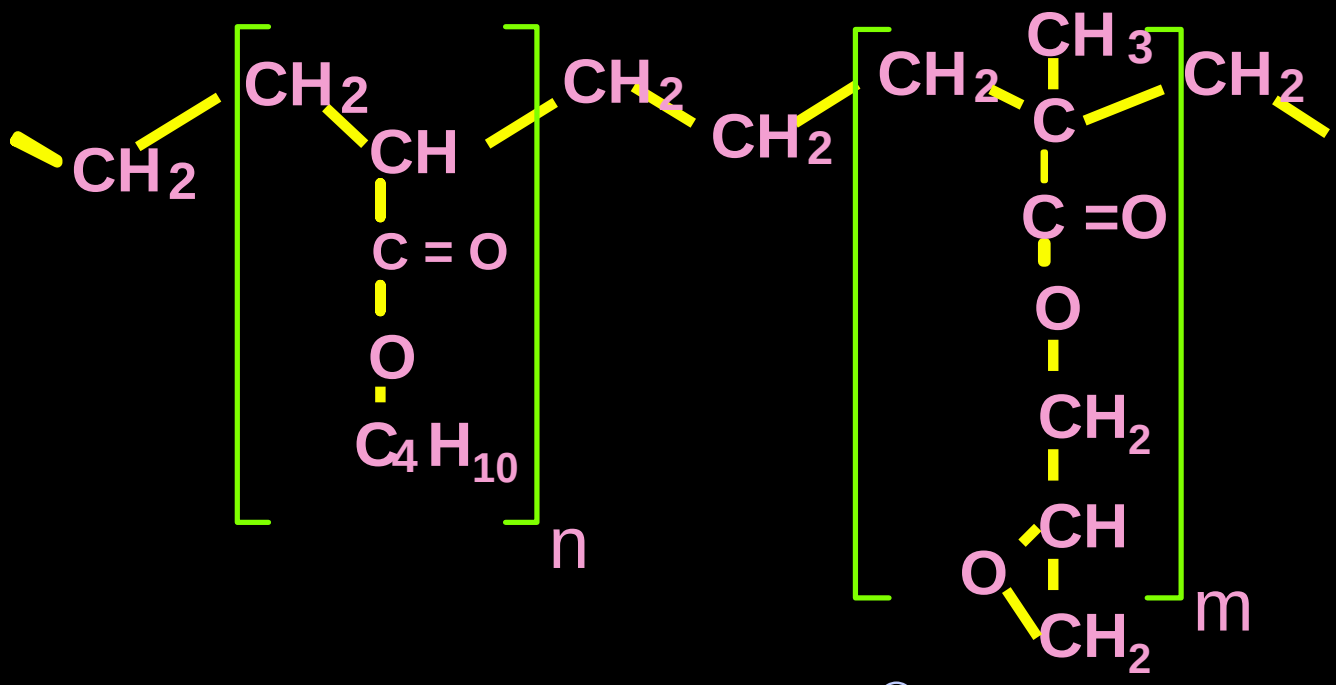
STRIPPING RESULTS

- Begin to loose adhesion after 1 to 2 weeks
- Not reflected in tensile properties

CONCLUSIONS

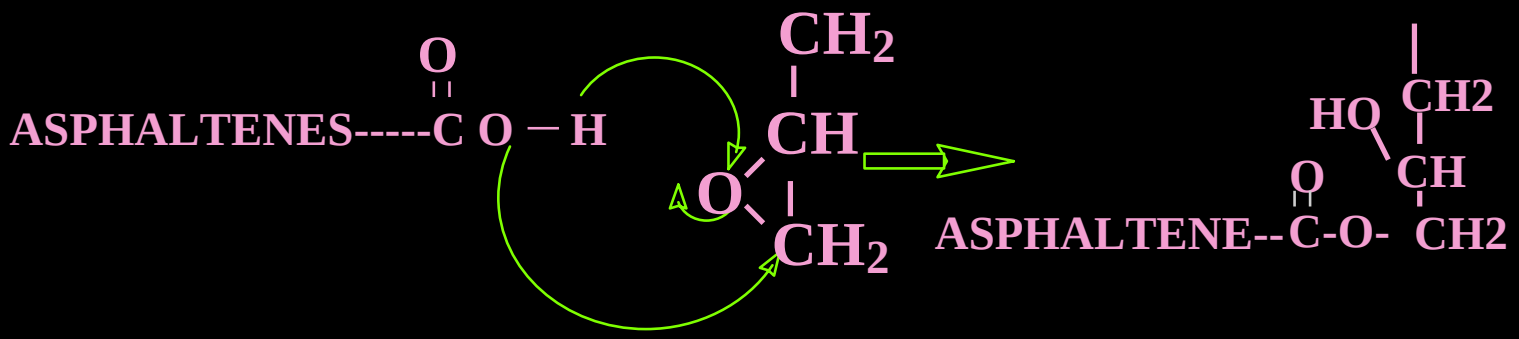
- Lap shear specimens simple to make
- Results in tensile tester are reproducible
- Low temperature and high temperature data available from same sample and same machine
- Shows benefits for polymer modification
- Do results correlate with SHRP ?

STRUCTURE OF AM



ELVALOY® AM

REACTION OF ASPHALTENES WITH GMA



- ADDITION REACTION
- NO SIDE PRODUCTS
- NO VOLATILES FORMED
- STANDARD EPOXY CHEMISTRY

FUTURE RESEARCH

- Evaluate granite and limestone substrates
- Evaluate thicker glass
- Evaluate low temp properties
- Look at rough surfaces

CODE

- A = ELVALOY AM
- B = SBS
- E = EVA ELVAX 150
- R = SBR