NANOVEA

FIBERGLASS SURFACE TOPOGRAPHY

USING 3D PROFILOMETRY

Prepared by

CRAIG LEISING

INTRODUCTION

Fiberglass is a material made from extremely fine fibers of glass. It is used as a reinforcing agent for many polymer products; the resulting composite material, properly known as fiber-reinforced polymer (FRP) or glass-reinforced plastic (GRP), is called "fiberglass" in popular usage.

IMPORTANCE OF SURFACE METROLOGY INSPECTION FOR QUALITY CONTROL

Although there are many uses for Fiberglass reinforcement, in most applications it is crucial that they are as strong as possible. Fiberglass composites have one of the highest strength to weight ratios available and in some cases, pound for pound it is stronger than steel. Aside from high strength, it is also important to have the smallest possible exposed surface area. Large fiberglass surfaces can make the structure more vulnerable to chemical attack and possibly material expansion. Therefore, surface inspection is critical to quality control production.

MEASUREMENT OBJECTIVE

*In this application, the **NANOVEA** ST400 is used to measure a Fiberglass Composite surface for roughness and flatness. By quantifying these surface features it is possible to create or optimize a stronger, longer lasting fiberglass composite material.*

CLICK HERE TO LEARN MORE
ABOUT THE INSTRUMENT

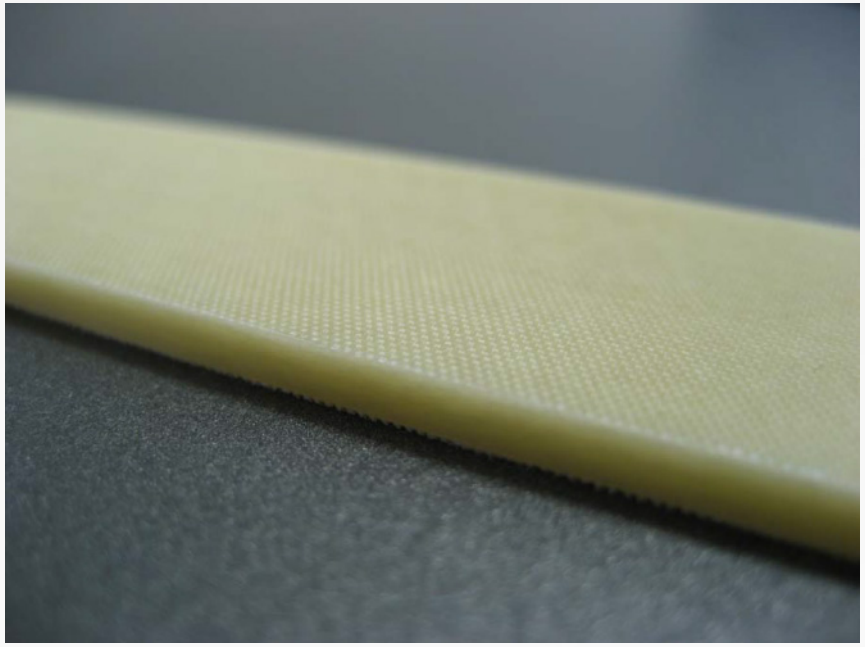
NANOVEA
ST400

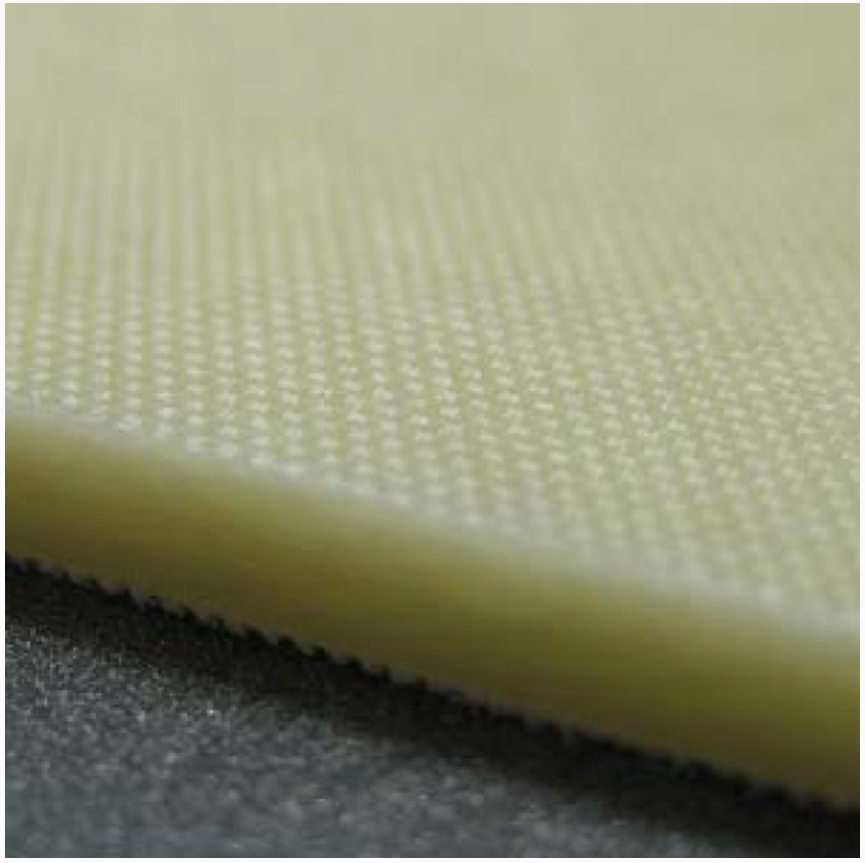
MEASUREMENT PARAMETERS

PROBE	1 mm
ACQUISITION RATE	300 Hz
AVERAGING	1
MEASURED SURFACE	5 mm x 2 mm
STEP SIZE	5 µm x 5 µm
SCANNING MODE	Constant speed

PROBE SPECIFICATIONS

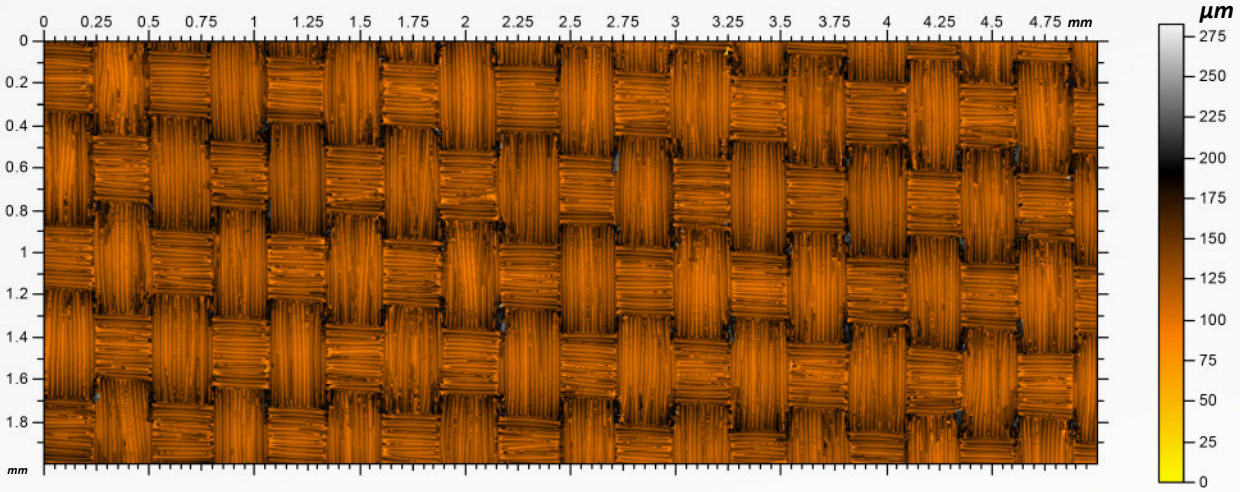
MEASUREMENT RANGE	1 mm
Z RESOLUTION	25 nm
Z ACCURACY	200 nm
LATERAL RESOLUTION	2 µm



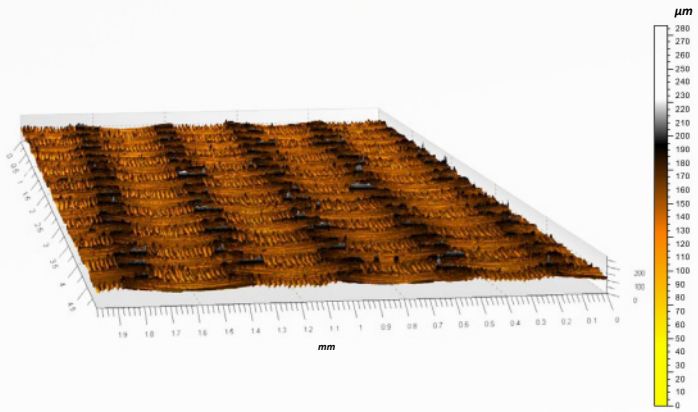


RESULTS

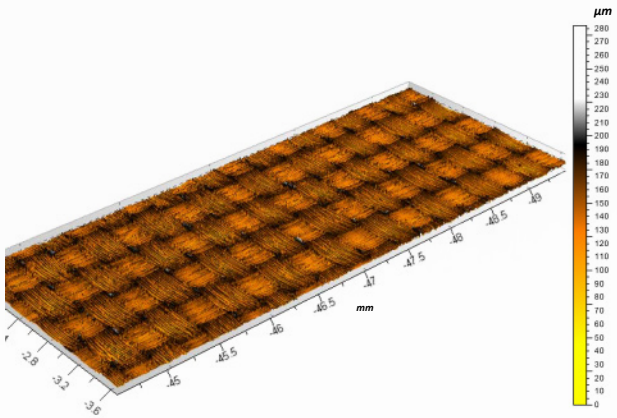
FALSE COLOR VIEW



3D Surface Flatness



3D Surface Roughness



ROUGHNESS RESULTS

Sa ..... 15.716 µm ..... Arithmetical Mean Height
Sq ..... 19.905 µm ..... Root Mean Square Height
Sp ..... 116.74 µm ..... Maximum Peak Height
Sv ..... 136.09 µm ..... Maximum Pit Height
Sz ..... 252.83 µm ..... Maximum Height
Ssk ..... 0.556 ..... Skewness
Ssu ..... 3.654 ..... Kurtosis

CONCLUSION

As shown in the results, the ***NANOVEA*** ST400 Optical Profiler was able to accurately measure the roughness and flatness of the fiberglass composite surface. Data can be measured over multiple batches of fiber composites and or a given time period to provide crucial information about different fiberglass manufacturing processes and how they react over time. Thus, the ST400 is a viable option for strengthening the quality control process of fiberglass composite materials.