

Residual Stress Measurement of Additive Manufacturing

- ◆ Evaluation of residual stress (occurred by solidification and shrinkage) by heat of laser/electron beam.
- ◆ Residual stress mapping before and after removal of support structure.
- ◆ Comparison between simulation and actual measurement. → Cost-down to decrease the number of prototypes.

【Comparison】 Before and After Cutting Support Structure

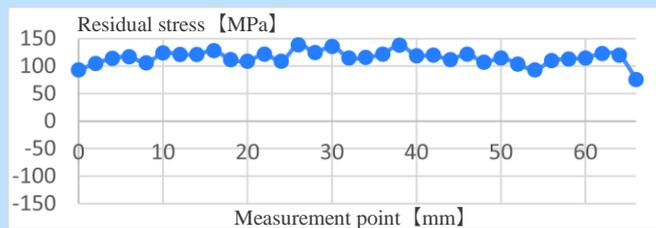
< Before Cutting >



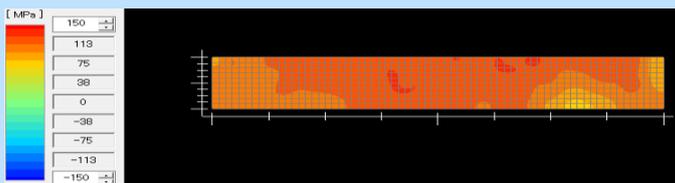
(Material : Al alloy)



< Line Measurement (2mm steps on center of top surface) >



< Residual Stress Mapping on Top Surface >



Approx. 120 MPa of tensile stress is applied.

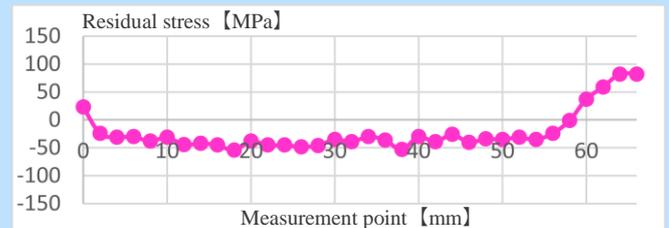
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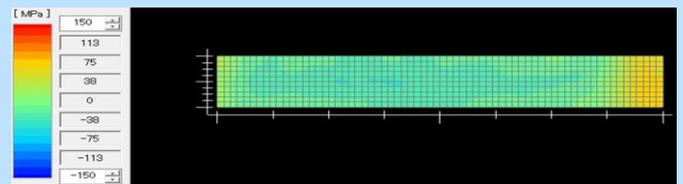
(Material : Al alloy)



< Line Measurement (2mm steps on center of top surface) >



< Residual Stress Mapping on Top Surface >



Distortion occurs due to release of stress.



< System Configuration >



Specification

| | |
|-------------------------|-------------------------|
| Measurement system | Pulstec μ-X360s |
| Measurement method | cosα method |
| Spot size | Approx. φ2.0mm |
| X-Y stage travel length | Max. 150mm |
| Experienced materials | Fe, SUS, Al, Ti, Ni, Cu |

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