

FATIGUE TESTING FOR METAL AM

METAL POWDER IMPACT ON AISI 4140 PARTS

DYNAMIC FLAT BENDING

FATIGUE TESTING ACCORDING TO DIN 50142-2019
THIN-WALLED SPECIMEN (0.3 MM)



TEST SETUP

Material: AISI 4140 (1.7225 / 42CrMo4)

Material density in LPBF produced specimen: > 99.9 %

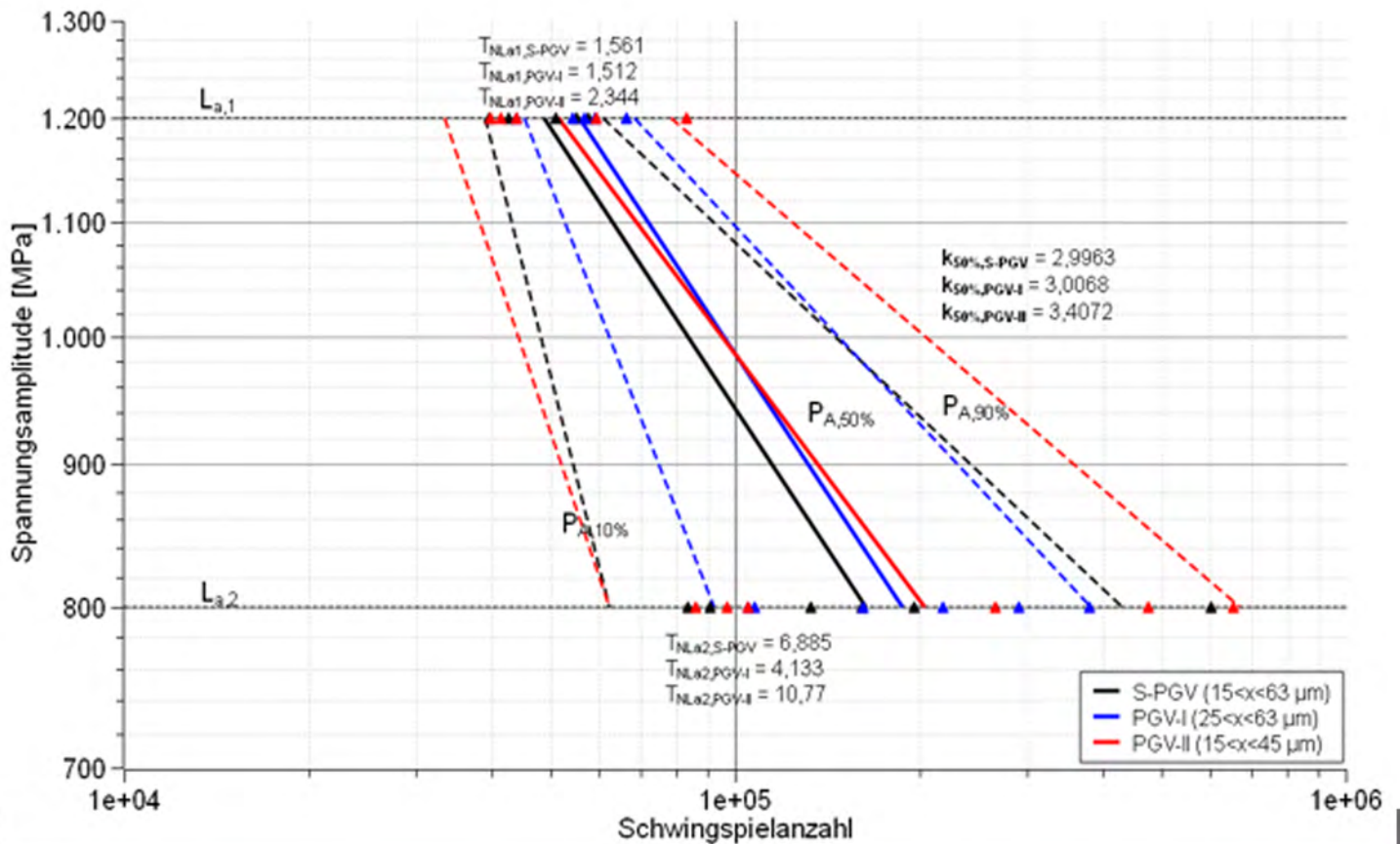
3 PSDs of the metal powder are compared

15 - 63 μm → Standard Powder, 34 specimen

25 - 63 μm → Coarser Powder, 16 specimen

15 - 45 μm → Finer Powder, 16 specimen





RESULTS

- INCLINATION EXPONENT “k”
- SPREAD SPAN “T”
- STANDARD POWDER
- COARSER POWDER
- FINER POWDER



CONCLUSION



- NO MAJOR INFLUENCE OF THE EXAMINED POWDER FRACTIONS ON FATIGUE STRENGTH OF THE SPECIFIC PARTS
- A COARSER POWDER FRACTION MAY LEAD TO A LOWER VARIANCE OF THE FATIGUE STRENGTH