

Supporting Information

Table S1. Tensile test results of additively manufactured conventional (equiaxed, lamellar) material and literature data of conventional material for reference. RT = Room Temperature

| RT | | | | | | | | | |
|-------------------------|---------------|---------------|----------|------|----------|------|------|-----------------------------|--|
| | DED-L | | Equiaxed | | Lamellar | | | DIN EN 3312 ^[18] | |
| | Top | Bottom | | | | | | | |
| R _{p0.2} (MPa) | 878 | 858 | 952 | 951 | 947 | 940 | 946 | ≥830 | |
| R _m (MPa) | 1006 | 989 | 1042 | 1040 | 1047 | 1038 | 1043 | 900 to 1160 | |
| A (%) | 14.5 | 16.5 | 16.5 | 18 | 5.5 | 6 | 5.5 | ≥10 | |
| Z (%) | 63 | 67 | 50 | 49 | 9 | 10 | 9 | ≥25 | |
| 400 °C | | | | | | | | | |
| | DED-L | | Equiaxed | | Lamellar | | | Comparison Data | |
| | Top | Bottom | | | | | | | |
| R _{p0.2} (MPa) | 533 | ^{a)} | 598 | 589 | 592 | 536 | 533 | 537 | 540 ^[27] 488 ^[47] |
| R _m (MPa) | 689 | 676 | 702 | 708 | 706 | 665 | 658 | 666 | 660 ^[27] 562 ^[47] |
| A (%) | ^{a)} | 20.0 | 21 | 22.5 | 22 | 10.5 | 9 | 11.5 | -- |
| Z (%) | ^{a)} | 78 | 64.2 | 64.1 | 61 | 28 | 26 | 25 | -- |

^{a)} These values could not be determined

Table S2. Model measurement uncertainty (U_M) of characteristic values obtained for the DED-L material.

| RT | | | |
|--------|-----|-----------|-----------|
| | | Top | Bottom |
| R_m | | ± 1.2 | ± 1.2 |
| A | (%) | ± 1.0 | ± 0.9 |
| Z | | ± 0.8 | ± 0.7 |
| 400 °C | | | |
| | | Top | Bottom |
| R_m | | ± 1.2 | ± 1.2 |
| A | (%) | | ± 0.8 |
| Z | | | ± 0.6 |