Solid-state UV Lasers Reliability Test Report

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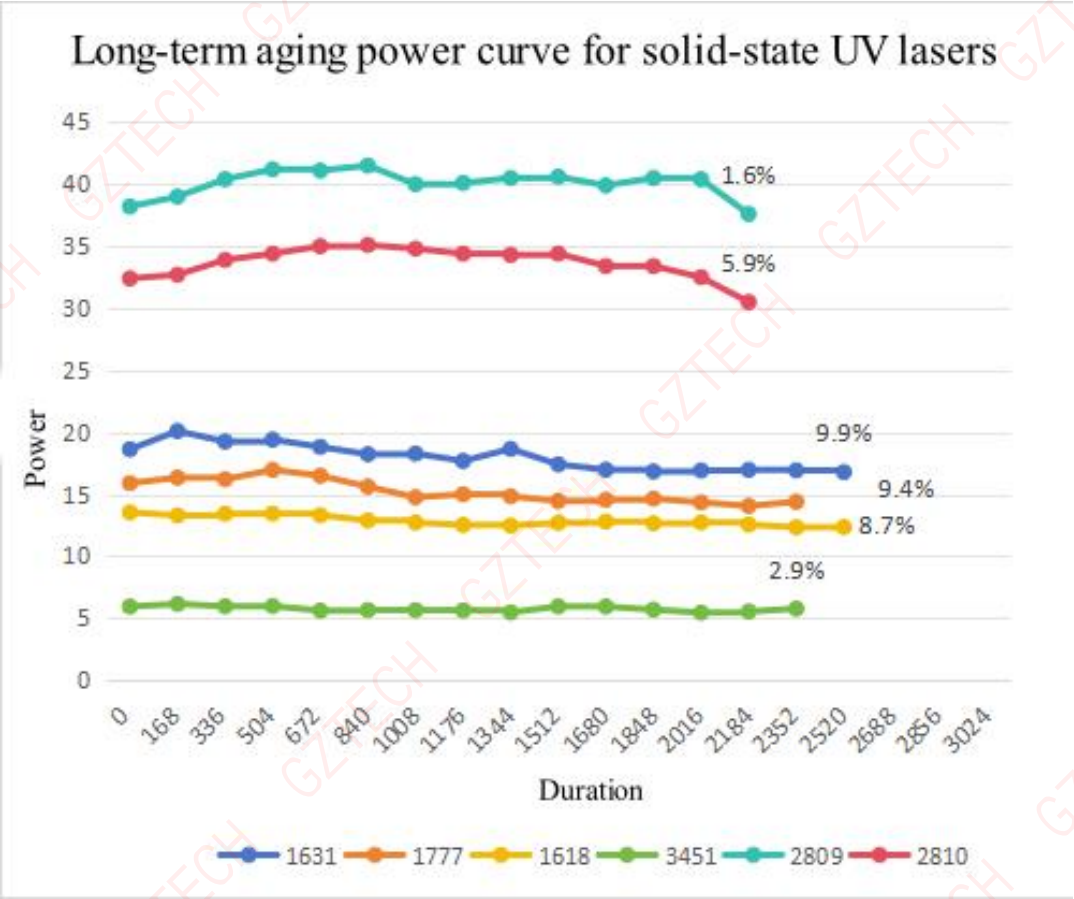
GZTECH

I. Solid-state UV Lasers Reliability Test

Test items	Standards	Samples	Result
Long-term aging	Continuous aging for 3000 hours with power decay less than 10%	6	PASS
Temperature cycle pass rate	Temperature cycling between -10°C and 50°C with a 100% pass rate	24	PASS
Vibration	Vibration at a fixed frequency of 18Hz for 4 hours, repeated 5 times; Sweep frequency vibration from 1 to 500Hz for 4 hours, repeated 5 times, with power variation less than 3%	2	PASS
Sideways and vertical placement	Sideways aging for 720 hours with power variation less than 5%; Vertical aging for 720 hours with power variation less than 5%	2	PASS
Long-term static placement	Static placement for 720 hours, repeated 6 times, with power variation less than 5%	15	PASS

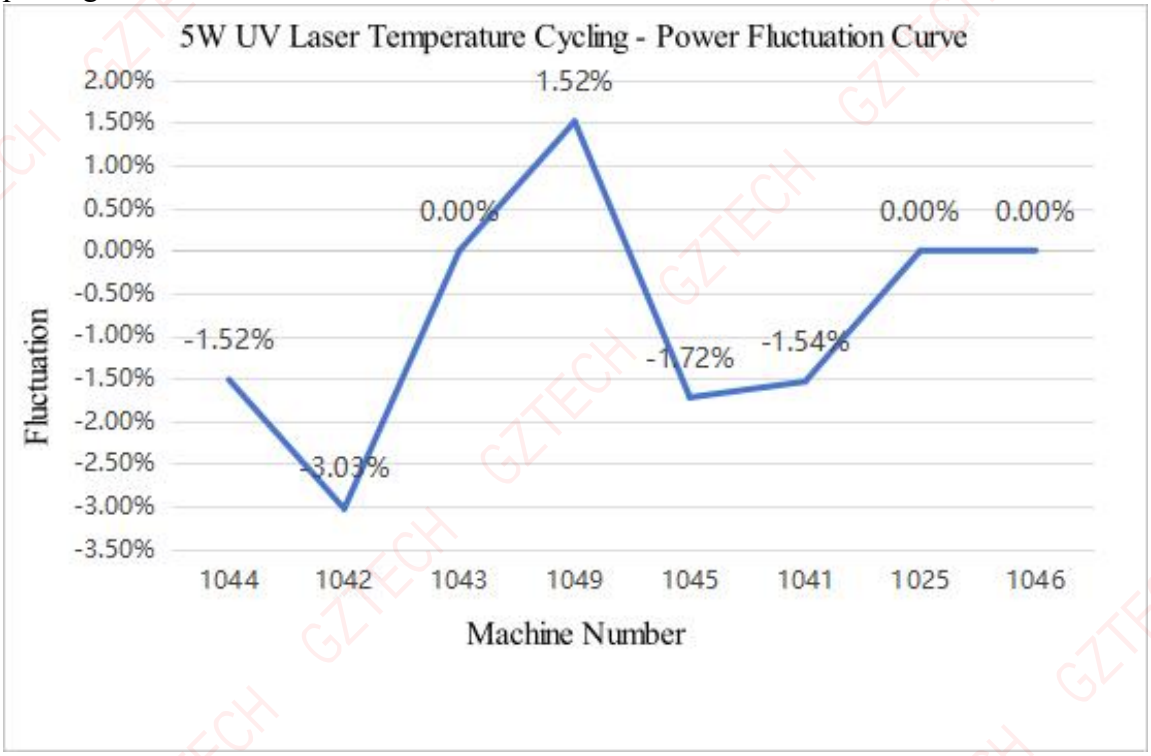
1. Long-term Enduring

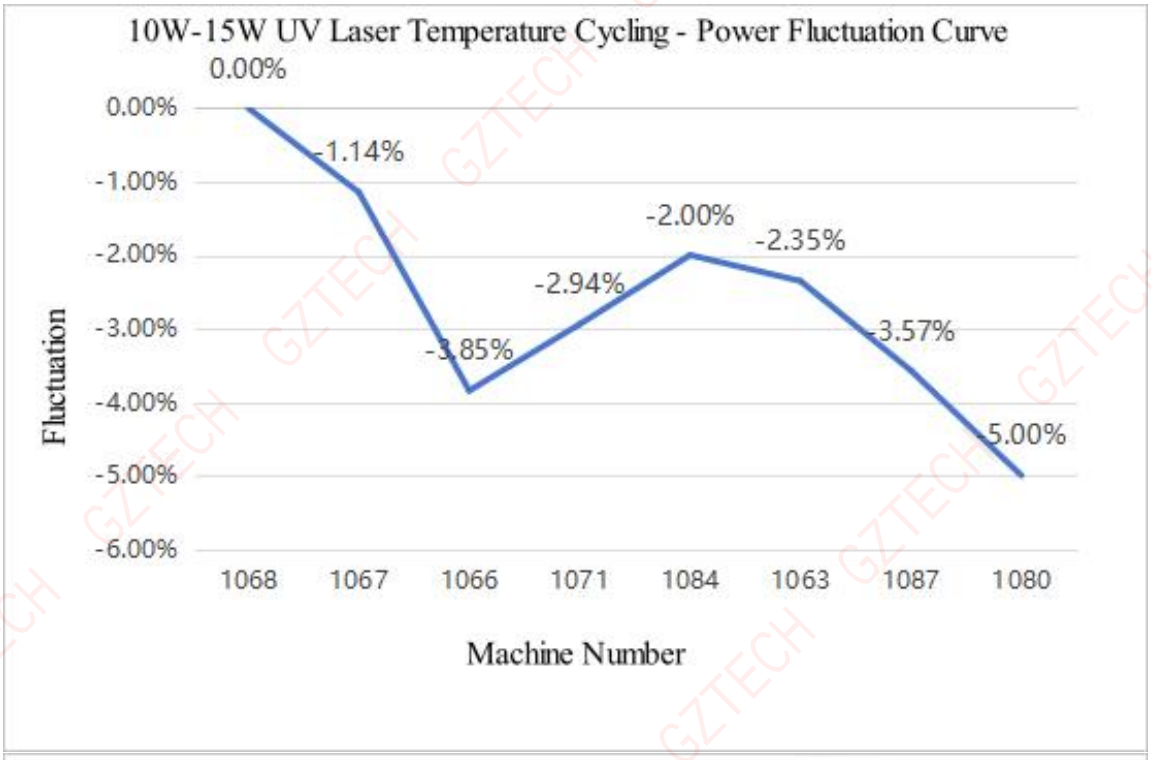
Four samples underwent aging for over 3000 hours, with power tested once every week (168 hours). By comparing the final power with the initial power, the power drop for all samples was less than 10%, meeting the test criteria for qualification.

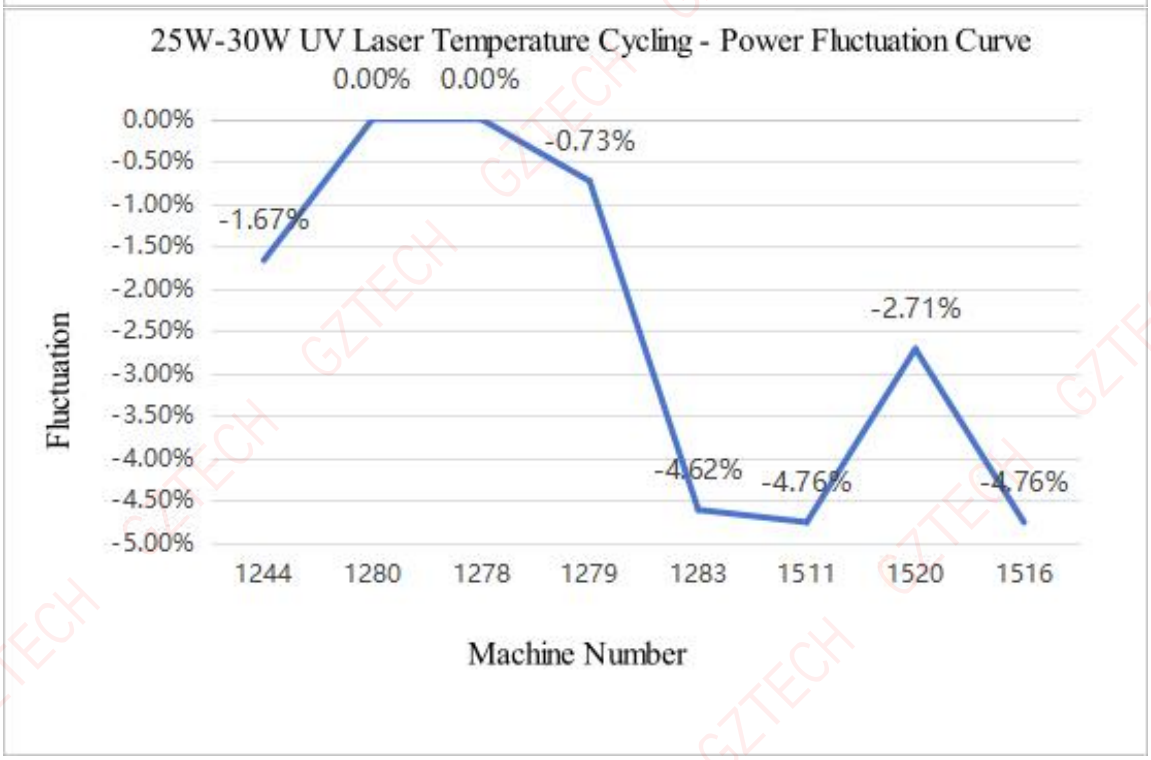


2. Temperature Cycle Pass Rate

After undergoing temperature cycling, 24 water-cooled samples were subjected to continuous changes in ambient temperature ranging from -10°C to 50°C. The difference between the highest and lowest power was less than 5%, which qualified as passing the test.







3. Vibration Test

Each of the two samples undergoes vibration for 4 hours per round, with a total of 5 consecutive rounds of vibration. There should be an interval of more than 6 hours between each round. After each vibration test, the power is measured and compared with the power before the current vibration. The sample is considered qualified if the power difference is less than 3%.

SN	Vibration times	Power before vibration	Power after vibration	Difference
1311	5	6.66	6.67	0.15%
1501	5	15.18	14.75	-2.83%

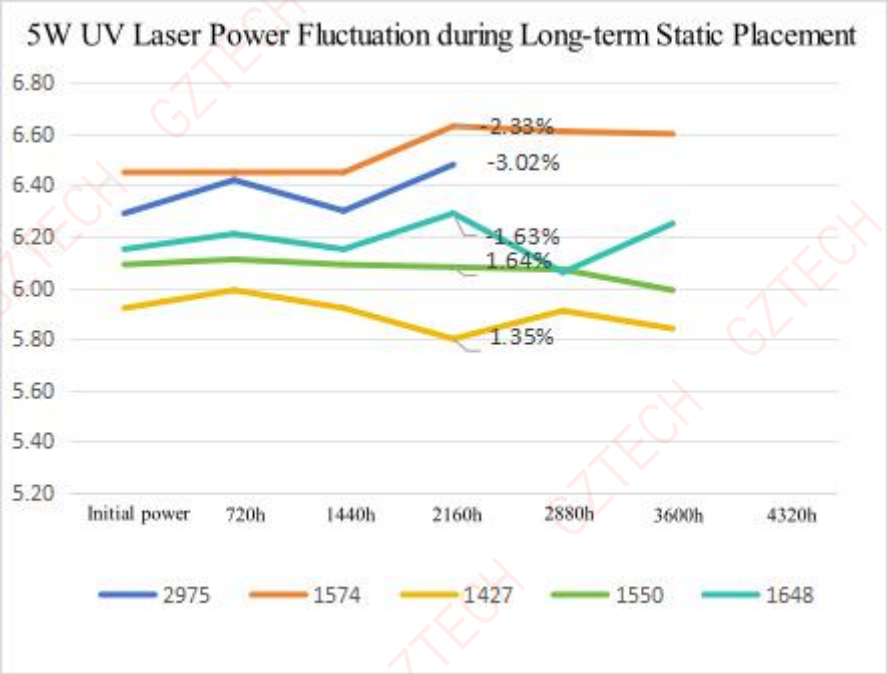
4. Power in Sideways and Vertical Placement

Two samples are stored on their sideways for 30 days and vertically for another 30 days. After each storage period, the power is tested and compared with the power before the start of that particular storage period. The samples are considered qualified if the power difference is less than 5% after each storage period, and if the power difference between the final stored state and the initial state is also less than 5%.

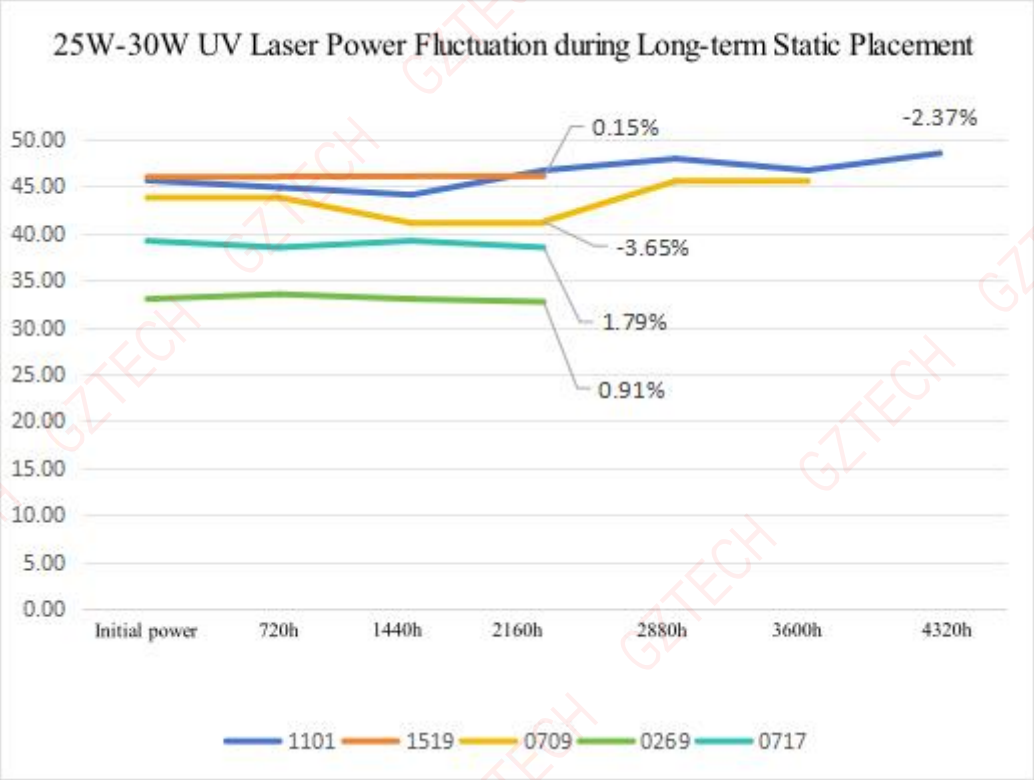
SN	Verification scheme	Power before verification /W	Power after verification /W	Fluctuation
1501	Vertically hung for one month without water and power supply	14.4	15.1	4.86%
1359	Sideways standing for one month without water and power supply	13.4	14.05	4.93%

5. Static Storage

Fifteen samples undergo static storage for a period of six months (4320 hours), with power tested once every month (720 hours). The power difference compared to the power before storage should be less than 5% after each testing interval. Additionally, the power difference between the final stored state and the initial state should also be less than 5% for the samples to be considered qualified.






25W-30W UV Laser Power Fluctuation during Long-term Static Placement
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Initial power
720h
1440h
2160h
2880h
3600h
4320h
0.15%
-2.37%
-3.65%
1.79%
0.91%
1101
1519
0709
0269
0717