

Technical Definition

High Cycle Fatigue Test – TA6V (Ti 6-4)

You shall respect the HSE policy of your laboratory for each performed test.

Please read these instructions carefully BEFORE starting the tests.

- 10 blanks (\varnothing 25 x 110 mm) in Titanium TA6V (Ti 6-4) are supplied to each participant.
10 specimens shall be machined in sequence with the same operator, machine, and process.
9 specimens will be tested, and 9 results must be provided.
1 specimen shall be kept aside and sent back to PTP for potential investigations.
If one result is missing, your test will be considered as an outlier. A RCA shall be completed.
- The 10 specimens shall be machined according to figure 1 and table 1.

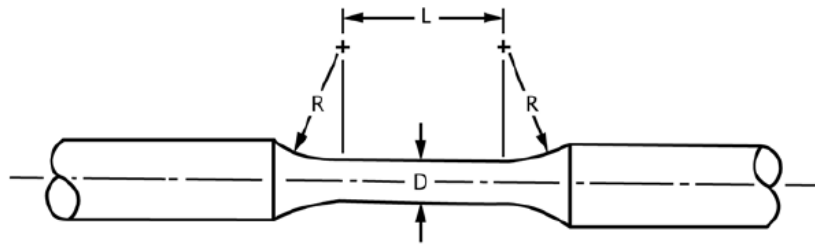


Figure 1

R	D	L
12.70 mm \pm 0.25	5.080 mm \pm 0.025	19.05 mm \pm 0.25
0.50 in \pm 0.01	0.200 in \pm 0.001	0.75 in \pm 0.01

Table 1

Machining parameters: **grinding + polishing**

- The tests shall be performed respecting the following conditions:
 - One operator only
 - One testing machine only
 - Tests performed in sequence

Revision No. 2	Page 2 of 5	<div>Technical Definition</div> <div>High Cycle Fatigue Test – TA6V (Ti 6-4)</div>
<div>ptp.</div>		
<div>Kit 9-3-2022 PTP Metallic</div>		

4. Tests are to be performed in accordance with the **ASTM E466-15** or **EN 6072-2012** and the below requirements and test conditions:

Temperature (°C)	Room Temperature
Ratio	0.1
Wave form	Sinus
Specimen #1 – Imposed max stress (MPa)	950
Specimen #2 – Imposed max stress (MPa)	925
Specimen #3 – Imposed max stress (MPa)	900
Specimen #4 – Imposed max stress (MPa)	875
Specimen #5 – Imposed max stress (MPa)	850
Specimen #6 – Imposed max stress (MPa)	825
Specimen #7 – Imposed max stress (MPa)	800
Specimen #8 – Imposed max stress (MPa)	775
Specimen #9 – Imposed max stress (MPa)	750
N stop (cycles)	3 000 000

Table 2

5. Each participant is required to determine and report the below information:

Characteristic	Unit	Significant digits	Mandatory / Not mandatory	Evaluated Yes/no
Diameter of the specimen	mm	X,XX	Mandatory	No
Machining (turning, grinding, polishing)	N/A	N/A	Mandatory	No
Type of machine (hydraulic or resonance-pulsator)	N/A	N/A	Mandatory	No
Temperature	°C	XX,X	Mandatory	No
Frequency	Hz	XX	Mandatory	No
Life duration (Number of cycle) - To the nearest cycle	Cycles	XXXXXX	Mandatory	Yes
Maximal net stress at 100.000 cycles	MPa	XXX	Mandatory	No
Upload of one overview picture of the 9 tested specimens	N/A	N/A	Mandatory	No

Table 3

All evaluated characteristics will be analysed according to the algorithm A (ISO 13528 – 2015) and evaluated using z-score. The algorithm will be applied to the logarithm of the number of cycles.

Revision No. 2	Page 3 of 5	<div>Technical Definition</div> <div>High Cycle Fatigue Test – TA6V (Ti 6-4)</div>
<div>ptp.</div>		
<div>Kit 9-3-2022 PTP Metallic</div>		

6. Testing shall start **as soon as test specimens are received**. Please contact the following e-mail address for any technical or administrative query.

Submission date :	15th January 2023
Technical and administrative support :	info@ptpscheme.com

Table 4

7. Instructions for submission of results are detailed on the website:

<https://ptpscheme.com>

8. To ensure the confidential treatment of your results in the final report, you will be allocated a unique identity number when you register for the program.
9. Collusion and falsification of your PTP results are totally forbidden. In case of identification or suspicion of collusion or falsification, the laboratory will be excluded from the program and the sponsors will be immediately informed. The sponsors could ask you proofs of your records and analyses, so be sure to conserve data, curves and specimens.
10. The 10th specimen shall be sent back to the PTP office:

PTP
17 avenue Didier Daurat
Immeuble Thales
31700 Blagnac
France

Revision No. 2	Page 4 of 5	<div>Technical Definition</div> <div>High Cycle Fatigue Test – TA6V (Ti 6-4)</div>
<div>ptp.</div>		
<div>Kit 9-3-2022 PTP Metallic</div>		

APPENDIX: Instructions for IRR participation

The Internal Round Robin participation (IRR) is **optional** and **independent** from your PTP participation.

Confidentiality: The IRR results and reports are confidential and only accessible by your laboratory. They are not shared with the scheme sponsors or any other accreditation or certification bodies.

The extra samples shall be tested according to the following table:

	Operator 1	Operator 2	Operator 3	Operator 4	Operator X
Test machine 1	PTP kit (9 samples)	1 + 1 samples	1 + 1 samples	1 + 1 samples	1 + 1 samples
Test machine 2	1 + 1 samples				
Test machine 3	1 + 1 samples				
Test machine Y	1 + 1 samples				

Table 5

Operator 1 (OP1) is to be the most experienced operator currently conducting tests on a regular basis and shall perform tests on all machines (TM1, TM2, TM3...)

Test Machine 1 (TM 1) is to be the most utilised machine for this test in your laboratory and shall be tested by all operators (OP1, OP2, OP3...)

Example: A laboratory has 2 operators and 3 test machines. They receive a PTP kit and 3 + 3 extra specimens.

Operator 1 shall test the PTP kit on TM1, 1 + 1 specimens on TM2 and 1 + 1 specimens on TM3.

Operator 2 shall test 1 + 1 specimens on TM1.

IRR Test parameters:

Temperature (°C)	Room Temperature
Ratio	0.1
Wave form	Sinus
IRR Specimen #1 – Imposed max stress (MPa)	900
IRR Specimen #2 – Imposed max stress (MPa)	800
N stop (cycles)	3 000 000

Table 6

The IRR results have to be submitted on a separate results form available on the PTP website.

The identification of operators and test machines you provide will appear on the IRR final report. These identifications will not be seen by other laboratories.

The IRR results will be classified against the acceptance classes of the kit 9-3-2022.

Reminder: Laboratories are not permitted to switch specimens between the PTP kit and IRR samples. The traceability of the samples will be checked during the evaluation. Laboratories found to have switched samples will invalidate their PTP participation.

Revision No. 2	Page 5 of 5	<div>Technical Definition</div> <div>High Cycle Fatigue Test – TA6V (Ti 6-4)</div>
<div>ptp.</div>		
<div>Kit 9-3-2022 PTP Metallic</div>		

REVISION HISTORY

Issue Date	Issue N°	Changes
27/01/2022	1	Document creation
26/10/2022	2	Material and samples quantity modification. Testing parameters added.