

ILC/PT Preliminary Report

Tachometer Stopwatch / NAPT-TACH/WATCH-107

Date of Issue: 01/31/2008

National Association for Proficiency Testing

A Non-Profit Organization Dedicated to Excellence in Metrology & Test Measurement

This report documents the preliminary results for the ILC/PT listed above, including data presented by Digital Measurement Metrology to NAPT for evaluation.

Because this is only the Preliminary Report, reference values and uncertainties are subject to change between issuance of the Preliminary Report and the Final Report. The changes are based on accepted methods for determination of reference data. These requirements are defined in the NAPT Quality Procedure 304-1 "Data and Statistical Analysis Procedure."

In this preliminary evaluation, your reported values are compared against **initial established reference values only**. Please refer to NAPT's supplemental guide to interpretation of reports for in-depth guidance on reports issued by NAPT.

The main purpose of the preliminary report is to provide a means by which to share the data initially submitted to NAPT. Participants are given 10 days to inform NAPT of any errors reported in the data. If changes need to be made, NAPT will need to verify all re-submitted data and require objective evidence be submitted before any modifications can be made to the original data. Objective evidence may include original observations, data collection sheets, uncertainty budgets, procedures used and other pertinent documentation.

Please contact NAPT with any questions regarding this Preliminary Report.

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**Organization Participating
Reported To:
Performed By:
Date of Participation:**

Digital Measurement Metrology
Raj Sharma
Raj Sharma
01/31/2008



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ILC/PT PRELIMINARY REPORT

Tachometer Stopwatch/NAPT-TACH/WATCH-107
Digital Measurement Metrology

Report Date: 01/31/2008
Date of Participation in ILC/PT: 01/31/2008

All artifacts used in this ILC/PT are commercially available instruments, chosen based on their ability to provide the wide characterization and spectrum needed. A description of the artifacts utilized in this ILC is listed below.

Model	Serial Number	Attribute	Manufacturer
DT-205L	C38B0357	Mechanical/Tachometer	Shimpo Instruments
SC-505	NAPT-SW001	Mechanical / Stopwatch	Robic

During the course of each ILC/PT, NAPT's Technical Director and the Technical Advisor(s) assigned to the ILC/PT conduct comprehensive technical reviews. Data analyses are conducted before, during, and after the artifacts are put into distribution. This is done to assure test integrity and look for trends or anomalies in the data.

Only after a careful review of all the data does NAPT assign an established reference value. To prematurely assign a reference value could be inaccurate and may result in a value that would not pass a robust analysis. Doing so would not ensure confidence in the reference value assigned.

Making an assumption that a single measurement is the correct measurement is not a technically sound process for ensuring the validity of the data in any ILC/PT, after all, no single laboratory is infallible. That is why only after a thorough technical review, will NAPT assign a reference value to an ILC/PT.

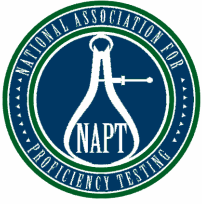
Likewise, if you suspect or question any of the preliminary data do not hesitate to contact us.

The Final Report will also include a detailed comparison to the results reported by other participants in this ILC/PT and a graphical presentation of all results submitted.

All NAPT programs are conducted in accordance with ISO/IEC Guide 43-1 and ILAC-G13:2000 requirements for proficiency testing providers.

Table Descriptors: Following bullets are meant to assist reader of this report in reviewing table.

- Values are rounded to the resolution of the reference data. Rounding does not affect the data analysis and is for reporting purposes only
- All uncertainties are at (or normalized to) $K=2$ (coverage factor associated with a 2-sigma, 95%, normal distribution)
- $E_n = (\text{Participant's Reported Value} - \text{Reference Value}) / \text{SQRT}(\text{Participant's Reported Uncertainty}^2 + \text{Reference Uncertainty}^2)$
- S (Satisfactory): Participant's Computed E_n is within range of +1 to -1
- U (Unsatisfactory): Participant's Computed E_n is outside range of +1 to -1
- I (In Range): Participant's Reported Value falls within established reference uncertainty
- W (Within Range): Participant's Reported Value and associated uncertainty overlaps the reference uncertainty.
- O (Out of Range): The Participant's Reported Value and associated uncertainty falls outside the uncertainty limits of the established Reference Value. No agreement in measurements



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PRELIMINARY REPORT: PARTICIPANT DATA

Tachometer Stopwatch/NAPT-TACH/WATCH-107
Digital Measurement Metrology

Report Date: 01/31/2008
Date of Participation in ILC/PT: 01/31/2008

Preliminary analysis of the data, Digital Measurement Metrology, submitted to NAPT is shown below.

Individual performance indicators include:

- Your measurement data at each set point
- Preliminary established reference values and uncertainties of artifact(s)
- Preliminary Participant's E_n values, S/U (satisfactory/unsatisfactory) and IWO (in/within/out of range) rating
- Established reference values and uncertainties are subject to change between issuance of the Preliminary and Final Report, changes are based on accepted methods for determination of established reference values

Measurement Description	Reported Value / Reference Value	Reported Uncertainty / Reference Uncertainty	E_n	S/U	IWO
Set Point 1) 500 RPM Contact	499.95 / 500.12	0.17 / 0.10	-0.85	S	W
Set Point 2) 2000 RPM Contact	1,999.9 / 2,000.8	0.2 / 1.0	-0.91	S	I
Set Point 4) 1000 RPM Non-Contact	1,000.1 / 1,000.0	1.4 / 0.0	0.07	S	W
Set Point 5) 5000 RPM Non-Contact	5,000.0 / 5,000.0	1.8 / 0.0	-0.02	S	W
Set Point 6) 20,000 RPM Non-Contact	19,999 / 20,000	2 / 1	-0.11	S	I
Set Point 7) 40,000 RPM Non-Contact	40,000 / 40,000	2 / 1	-0.21	S	I
Set Point 8) 60 Seconds	59.998 / 60.018	0.133 / 0.058	-0.14	S	I
Set Point 9) 300 Seconds	300.00 / 300.01	0.13 / 0.07	-0.05	S	I
Set Point 10) 3600 Seconds	3,600.0 / 3,600.1	0.1 / 0.4	-0.06	S	I
Set Point 11) 21600 Seconds	21,600 / 21,600	0 / 1	-0.31	S	I
Set Point 12) 86400 Seconds	86,399 / 86,400	1 / 1	-0.64	S	W