T.O. 33K-1-100-1

TECHNICAL MANUAL

CALIBRATION PROCEDURE

FOR

MAINTENANCE DATA COLLECTION CODES

AND

CALIBRATION MEASUREMENT SUMMARIES

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SECTION 1

INTRODUCTION

1.1 PURPOSE AND SCOPE.

This Technical Order (TO) is to be used with TO 33K-1-100-2, *TMDE Calibration Notes, Calibration Interval, Technical Order and Work Unit Code Reference Guide*, as a guide for determining calibration responsibility, Work Unit Code assignment, Calibration TO, and calibration interval for Test, Measurement, and Diagnostic Equipment (TMDE) and other Support Equipment (SE). It applies to all work centers possessing TMDE. Items are listed by model number, type number, part number, drawing number and Military Specification (MIL-SPEC) number in alphanumeric order. CAGE codes are listed as info only (manufacturer name takes precedence over the CAGE code when they are in conflict). All Calibration Interval listings are in months. See Section 7 for details on TO 33K-1-100-2 distributions through the Air Force Calibration Authority Viewer (AFCAV).

NOTE

The AFLCMC/WNM AFMETCAL Division, Air Force Metrology and Calibration (AFMETCAL) program manager is referred to as AFMETCAL throughout the document.

1.2 GENERAL.

Calibration responsibility and applicable TOs for TMDE are listed in TO 33K-1-100-2 and weapon system Calibration Measurement Summaries (CMS). See Section 4 of this TO for applicable CMS.

1.2.1 If a new item of TMDE cannot be supported using the guidelines of this TO and TO 00-20-14, the calibration responsibility, applicable TO reference, and Work Unit Code (WUC) will be obtained by the Precision Measurement Equipment Laboratory (PMEL) Chief by submitting an AFTO Form 45 in accordance with (IAW) TO 00-20-14, except as indicated in Section 3 of this TO.

NOTE

Questions about specific TO 33K-1-100-2 listings may be directed to the appropriate TCM or to the appropriate email address: AFMETCAL.K100.ELEC@us.af.mil or AFMETCAL.K100.Mech@us.af.mil. General questions regarding T.O. 33K-1-100-1 may be directed to K100@us.af.mil.

1.2.2 Calibration responsibility or TO requests submitted by all activities, including DOD and contractor agencies, will include as an attachment technical data, manufacturers handbooks or any commercial data indicating specifications, accuracies, ranges, and parameters of the equipment. Calibration determination and/or preparation of a calibration procedure will not be accomplished unless data is furnished with the request. All data furnished should be plainly marked with the return address. After action is completed, the data will be returned to the originator.

1.2.3 Requests for determining calibration responsibility and/or the applicable TO will not be submitted for:

1.2.3.1 Equipment part numbers having options (or is the base model) that are subsets of a part number already listed. For example, a determination request would not be submitted on part number 123OPT001 if part number 123OPT001-002 is already listed.

1.2.3.2 Options such as the following where parameters are the same as the original equipment and a 33K-series T.O. exists.

a. Rack mount options (R at the end of a part number, OPT-908, etc.).

b. Warranty options (OPT-W30, OPT-W55, etc.).

c. Service Manuals.

d. Front Handle Kits (OPT-907 etc.).

e. Rear Panel Connectors unless the option changes the equipment specifications.

f. Connector Type options unless the option changes the equipment specifications.

g. Cable length or No Cable Options unless the option changes the equipment specifications.

h. IEEE Bus connector.

i. Calibration Data (OPT-890, etc.).

j. Shipping Instruction Options.

k. Options that provide extra Probes.

1.2.3.3 Equipment part numbers already covered by a SERIES entry in the TO 33K-1-100-2.

a. A SERIES entry in the TO 33K-1-100-2 is a conscious effort to consolidate like items and reduce the number of entries in the TO 33K-1-100-2. SERIES entries will be used to identify equipment part numbers containing characters used by the manufacturer to designate or identify features of the product when those features do not affect the calibration uncertainty of the original equipment. If the manufacturer's literature for the item in question uses Options to specify additional features, the SERIES entry is not applicable to the item.

NOTE

An item listed by an individual part number in TO 33K-1-100-2 will take precedence over a SERIES listing.

b. The features to be included in a SERIES entry are similar to the excluded options listed in Para 1.2.3.2 above (i.e. rack mount, warranty, size, case style, etc.).

c. Entries will appear in the TO 33K-1-100-2 as the base part number followed by the word SERIES (for example E SERIES, 100 SERIES, A12 SERIES, etc.).

d. When receiving an item for the first time, the following should be accomplished to determine if a SERIES entry may be used or if a Calibration Determination Request (AFTO Form 45) shall be submitted:

(1) Look up the part number as identified on the unit in the applicable CMS and TO 33K-1-100-2. If a listing for the item is found, STOP - no Calibration Determination Request (AFTO Form 45) is required. If a listing was not found, go to (2).

(2) Look in the TO 33K-1-100-2 to see if the item is identified with the base part number followed by SERIES. If a SERIES entry is found verify that the manufacturer and noun match the item in question. If these match, go to (3). If they do not match - submit a Calibration Determination Request (AFTO Form 45).

(3) Locate the 33K series TO identified as the calibration authority for the SERIES entry. Ensure that the 33K series TO Table 1 specifications encompass the specifications of the item in question. If the specifications are in agreement, STOP - the SERIES entry may be used and no Calibration Determination Request (AFTO Form 45) is required. If the specifications are not in agreement - submit a Calibration Determination Request (AFTO Form 45).

1.2.3.4 When multiple part numbers appear on a unit and are also listed in TO 33K-1-100-2, the hierarchy for which part number to use is as follows:

a. Manufacturers part number.

b. Government assigned part number.

c. Military assigned part number.

d. Other identified part number.

NOTE

When the TI is a kit or part of a test stand, apply this hierarchy to the complete assembly. For example: an aircraft tire kit, P/N 1064 is a P/N 1064 when all components are original. If a calibrated part is replaced with a different manufacturers part number the most accurate part number for the complete assembly becomes MILG8348SERIES.

This intent is to maintain the system specifications of the complete assembly. Using individual part numbers may result in over/under specification.

For complex test stations, an AFTO Form 45 may be required to accurately list all the components of the test station.

For items that have two or more part numbers (manufacturer, military or government assigned), not all of which are listed in TO 33K-1-100-2, an AFTO Form 45 may be submitted for the unlisted part number(s). In the AFTO Form 45 remarks section clearly state the part number that is listed in TO 33K-1-100-2 so that the additional (unlisted) part number(s) can be properly referenced.

1.2.3.5 Items designated MIL may have more than one manufacturer. If this is the case, the calibration responsibility and/or 33K-series TO indicated in TO 33K-1-100-2, Calibration Requirements List, will be used regardless of the manufacturer. If the item is identified by MIL number and part number, the part number will take precedence.

1.2.3.6 Calibration responsibility for locally manufactured test and calibration aids; i.e., jigs, fixtures, adapters, loads, etc., will be determined jointly by the User and PMEL Chief. Items within this category identified as not being TMDE will not require TMDE related certification or non-certification Labels. Conflicts in determinations will be submitted to AFMETCAL IAW Para 1.2.1.

1.2.3.7 Items designated as Automatic Data Processing Equipment (ADPE) are not considered TMDE and will not be listed in TO 33K-1-100-2.

1.2.4 New equipment entering the Air Force inventory may require calibration, see TO 00-20-14 and review Para 3.1 of this manual for guidance. Some equipment may require calibration methods similar to those used for items covered by existing 33K-series TOs. This equipment may not operate in the same ranges or parameters as those outlined in the existing TO. Activities requesting calibration determination should try using the appropriate TO and advise AFMETCAL if the techniques are satisfactory or if there are recommended changes. This will aid AFMETCAL in preparing revisions or new TOs. If an existing 33K-series TO is used, commercial data would still be the authority used until the equipment can be included in TO 33K-1-100-2 (Equipment Calibration Requirements List). Items listed in TO 33K-1-100-2 are not necessarily identified in the heading of the applicable TO. However TO 33K-1-100-2 (Equipment Calibration Requirements List) identifies the applicable TO that will be used for accomplishing the calibration. If a published TO contains more than one set of accuracy specifications, the applicable specification will be identified in the NOMENCLATURE column by the abbreviation SSA (Same Specifications As).

1.2.5 The Air Force Primary Standards Laboratory (AFPSL) has facilities, equipment, and personnel to perform calibrations in special branches of the metrology science such as photometry, infrared, ultraviolet, and other applications of the electro-magnetic spectrum. This capability permits technical evaluation of equipment and its characteristics, resolution of technical problems, evaluation of techniques, and establishment of procedures for special application calibration support. The information required to establish a specific plan of calibration support is not always available at the time that special systems are introduced into Air Force inventory. PMEL representatives will contact AFMETCAL (see Para 1.2.1) whenever support is required in any of the special applications. Interim procedures will be developed to be used for the required support. The following will be provided:

a. Identification of TMDE and reference usage and requirements for calibration support.

b. Determination of measurement parameters and applicable tolerance requirements.

c. Determination of techniques and procedures to be used to accomplish the calibrations.

d. Assurance that there is a single point of contact with the National Institute for Standards and Technology (NIST), traceability and standardization, and compatibility with the Air Force calibration program.

e. Evaluation of equipment capability to provide desired information.

f. Resolution of technical problems and assistance to personnel concerned with the special application calibration.

g. Determination of the feasibility of and provisions for the exchange of standards.

h. Determination of equipment to be calibrated at the AFPSL and scheduling of equipment to the laboratory.

1.2.6 TMDE listed in TO 33K-1-100-2 and CMSs has a Change Code (CC) field with a code that corresponds to the latest action or status of each entry. Change codes are listed in Table 1.1 below. Entries identified by a "D" code are valid entries. They will be deleted in subsequent technical order revisions (6 months minimum) unless requirements for retention are identified to AFMETCAL.

Table 1.1 Change Codes

Action	**Code**
added	A
automated TO being written	S
changed	C
not changed	N
scheduled for Deletion	D
changed from NCR to scheduled Cal Int	P
TO being written	T

1.2.7 Maintenance TOs are not normally listed in TO 33K-1-100-2. Official guidance to identify Maintenance TOs is provided in the Enhanced Technical Information Management System (ETIMS) Technical Order Catalog via the AF Portal.

1.3 ANALOG TI RESOLUTION.

Unless otherwise directed by the item specific calibration authority, if the TI resolution is such that the manufacturers stated accuracy cannot be realized, the TI shall be limited to the "next greater ½ division". This only applies when the TI reading is outside of the nearest ½ division less than the stated accuracy. If during calibration, the TI is found to be within the nearest ½ division less than the stated accuracy, the TI need not be limited.

NOTE

Provided the dial can be read to ½ division, otherwise the gage is limited to the next greater division. An example when a gage cannot be read to ½ division is when the gage pointer is the same width as the distance between the gage division marks.

A limitation is not required if the TI is calibrated by adjusting the Standard for exact cardinal points on the TI, the indications are taken from the Standard, and the Standard (i.e. digital standard) used for the calibration has the resolution required to fully certify the TI.

Example: A 700 psi gage has an accuracy of 2.5% FS and is scaled in 10 psi divisions. The accuracy converts to 17.5 psi, which for this gage is 1¾ divisions. The standard is set to 200 psi, and the TI reads between 185 to 215 psi, i.e. within 1½ divisions. The gage is not limited. If the gage reads outside of 185 to 215 psi the gage is limited to the next higher ½ division than the reading, e.g., if the gage reads between 215 to 220 psi the gage is limited to the next higher ½ division i.e. to ±2 divisions. Provided the dial can be read to ½ division, otherwise the gage is limited to the next greater division. An example of when a gage cannot be read to ½ division is when the gage pointer is the same width as the distance between the gage division marks.

1.4 TYPICAL SPECIFICATIONS.

Manufacturer’s typical (or operational) specifications generally indicate the manufacturers expected performance of a given product. Typical specifications are not warranted or guaranteed by the manufacturer. Specifications listed as typical are not normally calibrated, unless directed through an official means such as technical order.

SECTION 2

MAINTENANCE DATA COLLECTION CODES

2.1 GENERAL.

The Maintenance Data Collection (MDC) system codes contained in this TO are primarily for recording calibration and repair actions performed by Precision Measurement Equipment Laboratories (PMELs) on Test, Measurement and Diagnostic Equipment.

2.2 SECURITY.

When maintenance is being performed on classified equipment, the listing of a Work Unit Code could possibly lead to a breach of security, such as betrayed mission capability. Extreme caution should be exercised and, if any question exists, contact your local Operations Security Program Manager (OPSEC PM).

2.3 USE OF CODES.

It is necessary to use codes for recording PMEL actions into the MDC system. That data is entered into the PMEL Management Information System such as PAMS. The collected MDC data is used to produce reports in support of various management functions such as setting and adjusting calibration intervals for TMDE. It is important that all codes entered are accurate. The calibration intervals set as a result of these inputs are accurate only if the inputs are accurate.

2.3.1 The Standard Reporting Designator (SRD) consists of three alphanumeric characters and is used to identify equipment for MDC purposes. Typical PMEL used SRDs are "HPA" (Air Force TMDE), "HTE" (Air Force Equipment used in resident training) or "HPB" (non Air Force TMDE).

2.3.2 The Work Unit Code (WUC) consists of five characters. The WUCs listed in TO 33K-1-100-2 will be used for TMDE for which the PMEL has the calibration and repair responsibility. Otherwise, the applicable WUC listed in Section 3, Table 3.1 will be utilized. Section 3, Table 3.2 lists General WUCs used by the PMEL.

2.3.3 The Type Maintenance Codes, defined and listed in Table 2.1, consist of one alphabetic character and are used to identify the type of maintenance being performed.

2.3.4 The When Discovered Codes defined and listed in Table 2.2, consist of one alphabetic character and are used to describe when the discrepancy or maintenance requirement was discovered.

2.3.5 The Action Taken Code, Calibration Condition Received, and Calibration Condition Returned codes, defined and each listed in Tables 2.3, 2.4a, and 2.4b respectively, each consist of one alphabetic or numerical character and taken together are used for calibration interval analysis.

NOTE

The *combination* of accurate Action Taken, Calibration Condition Received and Calibration Condition Returned Codes as recorded in the Maintenance Data Collection system is very important. The *combination* of these three fields is used for calibration interval analysis. Appendix A of this TO lists valid combinations of Action Taken, Calibration Condition Received (by the PMEL), and Calibration Condition Returned (to the owner) Codes. Once the Action Taken Code is selected, the selection of Calibration Condition Received Codes should be restricted. Once the Action Taken and Calibration Condition Received Codes are selected, the selection of Calibration Condition Returned Codes should be further restricted.

Example: If the Action Taken Code is K (Calibrated--Adjusted), the Calibration Condition Received Code is A (In Tolerance), and the Calibration Condition Returned Code is G (In Tolerance), we deduce that a minor adjustment (peak or tweak) was performed, but the item was within tolerance at the start of the calibration.

Collectively, the Work Unit Code, Action Taken Code, Calibration Condition Received code, and Calibration Condition Return code identify a unit of work.

2.3.6 The War Reserve Material (WRM) Codes defined and listed in Table 2.6 are assigned to each item in the PMEL inventory. The One-Digit Code identifies the status of each item as WRM, Deployed or not belonging in either category.

Table 2.1 Type Maintenance Codes For TMDE

TYPE MAINTENANCE DESCRIPTION	CODE
SERVICE: Includes all units of work associated with servicing, cleaning and movement of equipment that is not accomplished concurrently with Type Maintenance Codes B, J, S or T.	**A**
UNSCHEDULED MAINTENANCE: Includes all unscheduled maintenance, inspection, calibration, repair and servicing performed between calibration intervals.	**B**
SCHEDULED CALIBRATION OF EQUIPMENT OR COMPONENTS: Includes all units of work accomplished concurrently with a scheduled calibration.	**J**
SPECIAL INSPECTION: Includes all units of work accomplished during all phases of special inspections, excluding accomplishment of TCTOs.	**S**
TIME COMPLIANCE TECHNICAL ORDER (TCTO): Includes accomplishment of all TCTOs.	**T**

Table 2.2 When Discovered Codes

WHEN DISCOVERED DESCRIPTION	CODE
During Equipment Operation/Caused Equipment Down Time	**C**
During Equipment Operation/Did Not Cause Equipment Down Time	**D**
Unscheduled Maintenance	**F**
Daily Inspection/Shift Verification	**J**
Scheduled Inspection (Not Communications-Electronic Maintenance)	**M**
Operational System Check	**P**
Special Inspection	**Q**
Quality Control Check	**R**
Depot Level Maintenance	**S**
During Scheduled Calibration	**T**
Non-Destructive Inspection, includes optical penetrant, magnetic particle, radiographic, eddy current, ultrasonic, spectrometric oil analysis, etc.	**U**
During Unscheduled Calibration	**V**
In-Shop Repair and/or Disassembly for Maintenance	**W**
Upon Receipt or Withdrawal from Supply Stocks	**Y**
During Initial Equipment Installation	**Z**

Table 2.3 Action Taken Codes

ACTION TAKEN DESCRIPTION	CODE
BENCH CHECKED-NRTS - WARRANTY ITEM: Repair not authorized, item under warranty. Items that are adjusted or repaired at non-AF laboratories (manufacturers, etc.) should have the appropriate action taken code entered when processed back into the PMEL.	**0**
BENCH CHECKED-NRTS - REPAIR NOT AUTHORIZED: Shop is not authorized to accomplish the repair. This code shall only be used when the repair required to return an item to serviceable status is specifically prohibited by current technical directives. This code shall not be used due to lack of authority for equipment, tools, facilities, skill, parts or technical data.	**1**
BENCH CHECKED-NRTS - LACK OF EQUIPMENT, TOOLS OR FACILITIES: Repair is authorized but cannot be accomplished due to lack of authorized equipment, tools or facilities.	**2**
BENCH CHECKED-NRTS - LACK OF TECHNICAL SKILLS: Repair cannot be accomplished due to lack of technically qualified people.	**3**
BENCH CHECKED-NRTS - LACK OF PARTS: Parts are not available to accomplish repair.	**4**
BENCH CHECKED-NRTS - SHOP BACKLOG: Repair cannot be accomplished due to excessive shop backlog.	**5**
BENCH CHECKED-NRTS - LACK OF TECHNICAL DATA: Repair cannot be accomplished due to lack of maintenance manuals, drawings, etc., which describe detailed repair procedures and requirements.	**6**
BENCH CHECKED-NRTS - LACK OF EQUIPMENT, TOOLS, FACILITIES, SKILLS, PARTS OR TECHNICAL DATA: Repair authorized but cannot be accomplished due to lack of authorization to obtain or process required equipment, tools, facilities, skills, parts or technical data.	**7**
BENCH CHECKED-RETURNED TO DEPOT: Return to depot by direction of System Manager (SM) or Item Manager (IM). Use only when items that are authorized for base level repair are directed to be sent to depot facilities by specific written or verbal communication from the IM or SM or when items are to be sent to depot facilities for modification in accordance with a Time Compliance Technical Order (TCTO) or as Unsatisfactory Material Report (UMR) exhibits.	**8**
BENCH CHECKED-NRTS - CONDEMNED: Item cannot be repaired and is to be processed for condemnation, reclamation or salvage. This code will also be used when a "condemned" condition is discovered during field maintenance disassembly or repair.	**9**
BENCH CHECKED-SERVICEABLE-NO REPAIR REQUIRED	**B**
BENCH CHECKED - DEFERRED: Use when Bench Check is deferred to indicate item is being held awaiting parts, a standard, or necessary technical data.	**C**
BENCH CHECKED - OFF BASE SUPPORT: Item is sent Off-Base and is to be returned. This code is also used for items sent to contractors on Base Level contracts. This code will not be used for items returned to a Depot or TRC for overhaul, use applicable “Not Repairable This Station (NRTS) code.	**D**
BENCH CHECKED - SERVICABLE (CANNOT DUPLICATE): Bench checked, cannot duplicate failure/write-up, no repair is required. Item returned to customer.	**E**
REPAIRED	**F**
CALIBRATED - NO ADJUSTMENT: Item is calibrated and no adjustment was made.	**J**
CALIBRATED - ADJUSTED: Item is adjusted and calibrated (includes adjustments to optimize/nominalize)	**K**
RETURNED TO CUSTOMER: Returned to customer un-calibrated.	**M**

Table 2.3 Action Taken Codes (Cont.)

ACTION TAKEN DESCRIPTION	CODE
BENCH CHECKED - STANDARD: Item is an Exchange Standard being returned to the AFPSL. Also, use for Transfer Standards sent to next location or returned to AFPSL.	**S**
TEST/INSPECT - NON AF CALIBRATION	**V**
TEST/INSPECT - AF: Item is tested and/or inspected (other than bench checked) upon being returned from AF Calibration laboratory (e.g., Depot, AFPSL, AF PMEL, etc.). May also be used for other in-house laboratory inspections.	**W**
TEST/INSPECT - QP: Reserved for PMEL Quality Assurance (PQAs) to document QP inspections (i.e. PR, QR,).	**X**
Government Quality Assurance Surveillance or AFMETCAL Audit: Item is surveilled by government quality assurance evaluators or audited by AFMETCAL Program certification evaluators. This code is intended to be used to document time by the technician performing the calibration of the item for the evaluator.	**Y**

Table 2.4a Calibration Condition Received Codes

CALIBRATION CONDITION RECEIVED DESCRIPTION	CODE
IN-TOLERANCE: The measured values of all parameters tested or calibrated were found to be within specification limits.	**A**
OUT-OF-TOLERANCE: One or more of the measured values of the parameters tested or calibrated were found to lie outside specifications limits.	**B**
DEGRADED: Item received with a previous limitation. **NOTE:** Not to be used for items with only a TO directed limitation.	**E**
UNKNOWN OR NOT APPLICABLE: The item was not calibrated by the PMEL and/or the calibration condition as received can **NOT** be determined.	**F**

Table 2.4b Calibration Condition Return Codes

CALIBRATION CONDITION RETURNED DESCRIPTION	CODE
IN-TOLERANCE: Item was calibrated and **ALL** calibration authority parameters were verified and returned with **EACH** parameter meeting the calibration authority specifications. The item may or may not have been adjusted. Includes TO directed limitations.	**G**
CUSTOMER APPROVED LIMITED CALIBRATION: Item was calibrated, may or may not have been adjusted, and did not meet all OEM specifications and/or TO requirements, but met customer calibration requirements.	**K**
NOT CALIBRATED: Item returned to the customer not calibrated.	**L**

Table 2.5 How Malfunction (HOW MAL) Codes

Reserved, HOW MAL codes are no longer required for PMEL MDC reporting. If HOW MAL codes are needed for other reasons refer to Core Automated Management System (CAMS) HOW MAL tables.

Table 2.6 War Reserve Material (WRM) Field Codes (Field Cannot Be Blank)

FIELD DEFINITION	LOGIC TABLE	CODE
Contingency Equipment: TMDE placed in storage for possible military or defense contingencies. The calibration interval of contingency TMDE shall be 18 months	Use if applicable (see TO 00-20-14).	C
Deployed: TMDE, which will deploy with the unit to support Air Expeditionary Force (AEF)/contingency operations.	All TMDE that will be deployed to support AEF operations will be coded "**D**".	**D**
Not WRM TMDE	Use if applicable.	**N**
WRM: status temporarily unknown	This code only authorized on an interim basis. TMDE shall eventually be identified as Contingency (**C**), WRM (**W**) or Not WRM (**N**) or Deployed (**D**).	**U**
War Reserve Material (WRM): TMDE which is packed/stored to support wartime activities and which is placed on an 18 month WRM calibration interval.	Use if applicable (see TO 00-20-14).	**W**

SECTION 3

TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE) CALIBRATION

3.1 GENERAL CALIBRATION TECHNICAL ORDERS.

Calibration of TMDE involves an extensive variety of technical data. The following information will be used for the identification and use of TMDE technical data.

NOTE

Some 33K Calibration TOs reference the manufacturer's specifications with statements such as "See Commercial Data" as the Table 1 Accuracy. End item Table 1 specifications for many of these items can be viewed in AFCAV as detailed in Section 7. Technicians are encouraged to submit vendor information to the AFMETCAL technical staff for the end items covered by those 33K calibration TOs which are listed as N/A in the Specifications field of AFCAV ("Specifications Not Posted"). Vendor information in the form of scanned pages commercial operations manual, facsimile from vendor, and/or websites linking to the operating specifications are acceptable. Please send hard copies of vendor information to: AFMETCAL/WNME, Attn: Spec Data, 813 Irving-Wick Dr., Horton Bldg., Heath OH, 43056-1199. Scanned images or links to vendor specification web pages can be sent via email to: AFMETCAL.K100.ELEC@us.af.mil or AFMETCAL.K100.MECH@us.af.mil (depending on the measurement area). For items listed as N/A ("Specifications Not Posted") continue to use local commercial data until the AFCAV data is updated.

3.1.1 Publication of TOs.

There are instances where two calibration TOs are listed for the same item. This occurs when new measurement technique TOs consolidate like items or when revisions to current publications using new standards or procedures are published. When new calibration TOs are distributed and new standards are available, the previous TOs will be rescinded.

3.1.2 General Calibration TOs.

General Calibration TOs are published to support similar items in one TO. Numerous items may be supported in this manner by grouping the value to be measured and the accuracy and range. TMDE that does not possess sufficient identifiable characteristics; i.e., manufacturer, type number, model number and/or stock number, will be calibrated according to these General Calibration TOs. A request for determination of calibration responsibility is not required for these items. If the accuracy cannot be determined, the User will specify the accuracy requirements. These will be treated as special calibrations. Use the corresponding WUC and Calibration Interval for equipment supported by these General TOs.

Table 3.1 General Calibration TOs

ITEM TYPE	CALIBRATION TO	WUC	CAL INTERVAL
Analog Panel Meter, DCV, ACV, DCI, ACI	33K1-4-1611-1	ZCX70	12 months
Angle Plate	33K6-4-157-1	ZBQDK	12 months
Arbitrary Scale Meter, Panel Mounted	MTO/Com Data	YQC80	12 months
Attenuator, Coaxial Fixed, ±0.03 to ±0.5 dB per 10 dB	33K4-4-25-1	YC870	24 months
Attenuator, Coaxial Fixed, >±0.5 dB per 10 dB	33K4-4-25-1	YC870	ICO
Attenuator, Variable, Step and Toggle Switch	33K4-4-74-1	XCRNA	12 months
Attenuator, Waveguide Fixed	33K4-4-80-1	WSBSC	12 months
Attenuator, Waveguide Variable	33K4-4-30-1	STBSC	24 months
Bore Gage	33K6-4-992-1	XCMAC	12 months

Table 3.1 General Calibration TOs (Cont.)

ITEM TYPE	CALIBRATION TO	WUC	CAL INTERVAL
Caliper	33K6-4-552-1	XCUQF	12 months
Current Shunt	33K1-4-947-1	WAMAM	24 months
Depth Gages	33K6-4-17-1	YEF20	12 months
Dial and Digital Indicator, Incremental Probe and Test Indicators	33K6-4-889-1	YEF30	12 months
Directional Coupler, coaxial	33K4-4-2-1	WGMWE	36 months
Directional Coupler, hybrid	33K4-4-44-1	ZCQBN	24 months
Directional Coupler, waveguide	33K4-4-53-1	WGMWF	24 months
Dynamometer and Force Gage	33K6-4-433-1	XCVYH	12 months
Fiber Optics Attenuator	33K4-4-391-1	ZBZNH	12 months
Fiber Optics Power Meter	33K4-4-385-1	ZBZNH	12 months
Fiber Optics Power Meter, Programmable	33K4-4-381-1	ZBZNK	12 months
Fiber Optics Source	33K4-4-394-1	ZBZNJ	12 months
Filter	MTO/Com Data	ZCT50	N14
Flowmeter, Gas Turbine	33K6-4-1708-1	WMBSC	12 months
Flowmeter, Liquid Turbine	33K6-4-900-1	WNBSC	6 months
Frequency Counter	33K3-4-53-1	WUBSC	6 months
Frequency Meter, Reed types	33K3-4-1077-1	XCERJ	12 months
Frequency Meter, Resonant Cavity	33K4-4-196-1	WXBSC	6 months
Gear Wire	33K6-5-385-1	ZBQDH	36 months
Height Gage	33K6-4-1626-1	WELCP	12 months
Height Transfer Standard	33K6-4-673-1	WBDAA	12 months
Level	33K6-4-54-1	YNL30	12 months
Load Cell with Indicator	33K6-4-3670-1	WYBSC	12 months
Load Cell without Indicator	33K6-4-3196-1	WZBSC	12 months
Micrometer, Inside	33K6-4-661-1	WELCR	12 months
Micrometer, Outside, Head	33K6-4-15-1	WELCS	12 months
Microphone	33K3-4-3399-1	WDSDN	12 months
Network	MTO/Com Data	YKG20	N14
Optical Flat and Mirror	33K6-4-168-1	ZBPHJ	12 months
Parallel Bar	33K6-4-731-1	XCHXC	18 months
Plug Gage	33K6-4-121-1	YHK20	12 months
Plug Gage, Class XXX	33K6-5-255-1	WCPKA	24 months
Power Divider, Coaxial, Resistive Type (Non 50 Ohm Equivalent Source Impendence; Non 1:1 Equivalent Source SWR; e.g. 3-resistor configuration)	33K4-4-597-1	ZCQBP	12 months
Power Splitter, Coaxial, Resistive Type (50 Ohm Equivalent Source Impendence; 1:1 Equivalent Source SWR; e.g. 2-resistor configuration)	33K4-4-510-1	WAMAN	12 months
Power Supply, DC	33K1-4-25-1 or 33K1-4-1000-1	XBPFW	12 months
Pressure Gauge	33K6-4-427-1	XBLMS	12 months
Pressure Gauge, Absolute	33K6-4-1121-1	WGCSC	12 months
Pressure Gauge, Compound	33K6-4-428-1	WGUHN	12 months
Pressure Gauge, Differential	33K6-4-557-1	ZAWKH	12 months
Pressure Gauge, Oxygen	33K6-4-427-1	XCHYV	12 months
Pyrometer	33K5-4-75-1	ZBPFB	12 months
Relief Valve	33K6-4-278-1	ZCGCB	12 Months, see Note N38

Table 3.1 General Calibration TOs (Cont.)

ITEM TYPE	CALIBRATION TO	WUC	CAL INTERVAL
Resistance, HI Ohms	33K8-4-368-1	WZFSC	12 months
Ring Gage	33K6-4-2-1	ZCYZE	12 months
Ring Gage, Class XXX	33K6-5-255-1	WEPKA	24 months
Rotameter, Gas	33K6-4-26-1, or 33K6-4-872-1	XBWHV	12 months
Rotameter, Liquid	33K6-4-817-1	XBWHW	12 months
Scale and Balance, Analog and Digital Readout, 0 to 500 lbs	33K6-4-3356-1	WGMRV	12 months
Scale, Spring	33K6-4-18-1	XBUTL	15 months
Scale, Weighing, 500 lbs and above	33K6-4-3554-1	WGMRV	12 months
Sine Block, Sine Plate and Sine Bar	33K6-4-120-1	YNV50	12 months
Snap Gage	33K6-4-1678-1	ZASVN	12 months
Sound Level Calibrator	33K3-4-2961-1	WFCSC	12 months
Surface Plate	33K6-4-10-1,or 33K6-4-33-1,or 33K6-4-137-1,or 33K6-4-2696-1	YL380	24 months
Termination, Mismatch and Offset, 2.4 mm Connector	33K4-4-589-1	WELDJ	24 months
Termination, Mismatch and Offset, 2.92 mm Connector	33K4-4-589-1	WELCV	24 months
Termination, Mismatch and Offset, 3.5 mm Connector	33K4-4-589-1	WELCX	24 months
Termination, Mismatch and Offset, 7 mm Connector	33K4-4-589-1	WELCY	24 months
Termination, Mismatch and Offset, BNC Connector	33K4-4-589-1	WELCT	24 months
Termination, Mismatch and Offset, GR Connector	33K4-4-589-1	WELCU	24 months
Termination, Mismatch and Offset, TNC Connector	33K4-4-589-1	WELDK	24 months
Termination, Mismatch and Offset, Type N Connector	33K4-4-589-1	WELCW	24 months
Thermistor	33K5-4-1-1-16	WGUHP	12 months
Thermistor Mount, RF	33K4-4-52-1	WVBSC	12 months
Thermometer	33K5-4-42-1	XBLMR	24 months
Thermometer, Dial	33K5-4-28-1	WGMTA	12 months
Threaded Gaging Element, Internal and External	33K6-4-2883-1	ZBKWE	12 months
Threaded Plug Gage	33K6-4-203-1	ZAUDR	24 months
Threaded Ring Gage, Solid	33K6-4-2867-1	ZAUDQ	6 months
Thread Wires	33K6-5-385-1	ZBQDJ	36 months
Torque Wrench	33K6-4-2193-1	YEN30	3 months
Tripod Jack Gage/Ram Area	33K6-4-499-1	ZBVXD	12 months
Tuning Fork	33K3-4-966-1	WDPBK	36 months
V-Block	33K6-4-553-1	ZBWNM	12 months
Vacuum Gauge	33K6-4-430-1	XCEUM	12 months
Voltmeters, AC/DC Analog	33K1-4-1586-1	WWBSC	6 months
Wattmeters, RF (Panel Mounted)	33K4-4-69-1	YC790	6 months
Weights, Class 3, 4, 5 (old S1, P, Q)	33K6-4-763-1	ZCQBQ	12 months
Weights, Class M2, C, T, F, 6	33K6-4-815-1	ZCQBR	12 months
Weights, Dental office weights	33K6-4-164-1	ZCQBS	12 months
Weights, Troy and Apothecary weights	33K6-4-228-1	ZCQBT	12 months

NOTE

TMDE that does not possess sufficient identifiable characteristics; i.e., manufacturer, type number, model number and/or stock number will have a general WUC assigned. General WUCs will not be used for specific items identified in TO 33K-1-100-2 and CMSs with individual WUC assigned.

Table 3.2 General Work Unit Codes (WUC)

ITEM TYPE	CALIBRATION TO	WUC	CAL INTERVAL
TMDE Not Otherwise Coded (NOC). To be used for TMDE (for which coding requests have been submitted) awaiting an individual code.	MTO/Com Data	ZZ999	Maximum 12 months
Support Equipment (SE) without an assigned WUC. This WUC will be used for all SE not having a specific WUC listed elsewhere.	MTO/Com Data	ZZ300	N14

3.2 SPECIFIC TMDE AND EQUIPMENT.

3.2.1 Aerospace Audio-Visual Services (AAVS) Video TMDE.
AAVS Video TMDE that is used to give visual indications of the video signal and is not used to broadcast or measure broadcast signals is not normally calibrated in the PMEL. The calibration support for this equipment will be mutually agreed to by the PMEL Chief and the User. A calibration responsibility request will be submitted IAW TO 00-20-14 to resolve any disagreement.

3.2.2 Automatic Data Processing Equipment (ADPE).
ADPE is not considered TMDE and will not be listed in TO 33K-1-100-2.

3.2.3 Automotive Test Equipment.
Torque wrenches and the more sophisticated engine analyzing equipment that verify equipment performance factors, make absolute measurements, or affect safety are considered TMDE and calibration should be accomplished IAW published calibration determinations in TO 33K-1-100-2 or an appropriate CMS TO. Requests for calibration responsibility determination, AFTO Form 45, should be submitted if no calibration determination has been published and user applications do not allow NPC designation. Test equipment used solely for routine automotive support (tire gages, tach-dwell meters, compression testers, etc.) do not normally require calibration and requests for calibration responsibility determination should not be submitted for these items. If the User requires calibration for this equipment, calibration support will be mutually agreed to by the PMEL Chief and the User.

3.2.4 Computer/PC Clock.
Computer/PC Clocks do not require calibration when used for program timing events; i.e., data printouts, delays, settling time, etc.

3.2.5 Electrical Meter.
The Electrical Meters referred to in the General Calibration TOs are those used for measuring voltage, current or other properties as an entity and not those incorporated in combination test sets such as multimeters. General Calibration TOs are being prepared in such a way that calibration may be accomplished with the standards presently available. Calibration TOs for panel meters will not be prepared because the applicable TO for the TMDE, subsystems, or facilities will include calibration of these items. Requests for determination of calibration responsibility should include the application and nomenclature of the end item on which the meter is a component part.

3.2.6 Fire Suppression Systems
TMDE installed in Fire Protection systems will be maintained, tested, and repaired in accordance with AFI 32-2001, Fire Emergency Services (FES) Program, UFC 3-601-02, Operations and Maintenance: Inspection, Testing , and Maintenance of Fire Protection Systems, and UFC 3-230-02, Operation and Maintenance: Water Supply Systems. Pressure gauges utilized in the fire protection systems are common and used in other applications. AFTO 45s will be submitted on all individual gauges that are not listed in TO 33K-1-100-2. The calibration determination will be made as

if it was a normal pressure gauge. The customer will need to identify to the PMEL if it is a Fire Protection Gauge. The PMEL will calibrate these gauges as a special calibration, assign Type Maintenance Code "S" and When Discovered Code "Q". In the certification label remarks section put the interval of 120 months and make the due date NPC.

3.2.7 Gage Block Accuracies.
AFMETCAL approved Type IIA and IIC PMELs will provide calibration support for working class short gage block sets up to 4 inches in length to an uncertainty of ±12 or ±20 μin and working class long gage block sets, 5 to 20 inches in length, to an uncertainty of ±2 and ±3 μin per inch. If a PMEL customer requires an uncertainty better than those provided at the PMEL, forward a "Request to Deviate from the Published Calibration Determination" form to the PMEL MFM, who will in turn forward to AFMETCAL. The request must include documentation and justification for uncertainties better than those provided by the PMEL. Customers with a valid requirement will be supported by the AFPSL after approval by AFMETCAL.

NOTE

Ceramic Gage Block Sets will not be supported by the AFPSL.

3.2.8 Gage Block Packing.
All Gage Block sets will be pre-packaged before they leave the laboratory to avoid damage of the Gage Blocks. The packaging includes oiling the Gage Blocks and placing packing inside the case to hold Gage Blocks in position. The case will then be taped shut both lengthwise and widthwise.

3.2.9 Gage Block Set.
The number of Gage Blocks in a set will be the part number for that Gage Block Set. All Gage Blocks sets, individual Gage Blocks, and Gage Block accessories will identify the manufacturer as Federal Specifications promulgated by GSA.

3.2.10 Gage Blocks and Gage Block Accessories Individual.
Gage Blocks and Gage Block Accessories are generally listed in the TO 33K-1-100-2 as sets. Individual Gage Blocks and Gage Block Accessories will not normally be listed in TO 33K-1-100-2. Individual Gage Blocks and Gage Block Accessories shall be calibrated IAW TO 33K6-4-1-1, Cal Int 12 months. The WUC for individual Gage Blocks and Gage Block Accessories will be ZCVXP.

3.2.11 Gear Wire.
Gear Wires come in pairs and the individual pairs will not normally be listed in TO 33K-1-100-2. Gear Wire pairs will be calibrated at AFPSL, Cal Int 36 months. The WUC will be ZBQDH.

3.2.12 Liquid in Glass (LIG) Thermometer(s).
LIG thermometers that are to be used for fuel accountability purposes shall be certified using the General Calibration TO at least once a year IAW MIL-HDBK-201B (SA). Range and accuracy shall be supplied by the user (if not already listed in TO 33K-1-100-2) and annotated on the Certification Label. Part or type numbers for these LIG thermometers shall be listed in the TMDE Calibration Interval, Technical Order and Work Unit Code Reference Guide (33K-1-100-2) and the "Remarks" section shall indicate the thermometer is only to be calibrated if used for fuel accountability. Refer to TO 00-20-14, for further guidance, if needed, with special calibrations.

3.2.13 Medical Equipment (MED)/Unique Medical TMDE.
Equipment unique to the medical industry for patient care, first aid response or test equipment, designed exclusively to simulate human physiology to facilitate testing and calibration of patient care equipment. Some examples (not all inclusive): patient simulators, defibrillator analyzers, vital signs simulators, electrosurgical analyzers.

All equipment falling under this definition is managed under the AF Biomedical Engineering Maintenance Program by Biomedical Equipment Maintenance Technicians (BMETs) in accordance with AFIs 41-201 and 41-209. Medically unique equipment will be published in TO 33K-1-100-2 with the Cal TO, Cal Responsibility, and Cal Interval fields all marked as MED. Requests for calibration determinations (AFTO Form 45) may be submitted to AFMETCAL for a determination of Medical TMDE used in Medical Treatment Facilities (MTF). For further information regarding support of medical equipment/unique medical test equipment used in MTFs contact HAF AFMOA/SGALE (AF Clinical Engineering).

General purpose test equipment (not unique to the medical industry such as oscilloscopes, digital multimeters, frequency counters, etc.) used by BMETs to maintain and/or certify medical equipment/unique medical TMDE used in MTFs must be calibrated in accordance with AFI 21-113, TO 00-20-14 and TO 33K-1-100-2. Calibration determinations will be published in TO 33K-1-100-2 for general purpose test equipment used by BMETs. BMETs will submit calibration determination requests (AFTO Form 45) through HAF AFMOA/SGALE, AF Clinical Engineering, to AFMETCAL for any general purpose test equipment items not already listed in TO 33K-1-100-2.

3.2.14 Microwave.

a. General Lab TMDE.
Adapters, tees (coaxial and waveguide), isolators, cables, circulators, filters, shorts, opens, switches, RF Limiters and waveguides (flex, bends, twist, etc.) that cannot be repaired or adjusted are not listed in TO 33K-1-100-2 (Equipment Calibration Requirements List). These items are considered NCR and will not be calibrated unless a special application (quantitative measurements) requires their characterization. In that case, the item will be calibrated or characterized before use in that application.

b. Microwave Vector Network Analyzer Calibration and Verification Kits.
If a Calibration Kit or Verification Kit for a Vector Network Analyzer contains a Torque Wrench and/or Connector Gauge, the Torque Wrench and/or Connector Gauge is not defined as part of the Vector Network Analyzer Calibration Kit or Verification Kit. Although the Torque Wrench and/or Connector Gauge can be stored/travel with the kit for the convenience of the Owner/User, it is not assigned the same WUC as the kit. The Torque Wrench and/or Connector Gauge part number should be assigned the appropriate WUC as referenced in TO 33K-1-100-2, as a stand-alone item. If the Torque Wrench and/or Connector Gauge is not listed in TO 33K-1-100-2 as a stand-alone item, then an AFTO 45 is required to be submitted.

c. RF Power Meters and Thermistor Mounts or Power Sensors.
If the User submits these items simultaneously for calibration, the PMEL may choose to assign all the items a calibration interval equal to the shortest interval listed for any one of the components individually.

3.2.15 Plant and Facilities Equipment.

A physical plant or other facility such as a power station, heat plant, or desalinization plant shall have a TMDE coordinator, as specified in TO 00-20-14, and shall work with the local PMEL to submit calibration determinations for applicable TMDE. TMDE are those devices used to maintain, evaluate, measure, calibrate, test, inspect, diagnose, or otherwise examine materials, supplies, equipment, and systems to identify or isolate actual or potential malfunction, or decide if they meet operational specifications established in technical documents.

Equipment that is used solely for the daily operation of a facility does not require calibration by the PMEL if the TMDE User has designated an item No Periodic Calibration (NPC). NPC is applicable if the TMDE performance is verified, checked, or monitored by other PMEL certified TMDE, or does not affect safety and is not used to verify equipment performance factors or make absolute measurements. The NPC equipment will be tested, serviced, maintained, and verified as required by the plant operation guides, TOs, or procedures. However, any test equipment used for the verification, maintenance, or alignment will fall under the requirements of AFI 21-113 and TO 00-20-14 and be calibrated IAW TO 33K-1-100-2. The PMEL Chief and the User will mutually agree to the calibration support for this equipment and submit a Request for Calibration Determination (AFTO Form 45) for that test equipment not already identified in TO 33K-1-100-2.

3.2.16 Plug Gage.

Individual Plain Plug Gages will not be identified in TO 33K-1-100-2 if their specifications are identified as Class tolerances in 33K6-4-121-1. Individual Plain Plug Gages other than Class XXX will be calibrated by PMEL using TO 33K6-4-121-1, calibration interval 12 months, WUC YHK20.

3.2.17 Plug Gage, Class XXX.

Individual Plain Plug Gages, Class XXX, will not be identified in TO 33K-1-100-2. Individual Plain Plug Gages, Class XXX, will be calibrated by the AFPSL using TO 33K6-5-255-1, calibration interval 24 months, WUC WCPKA.

3.2.18 Power Supply.
Not all TMDE related Power Supplies are used in applications requiring calibration. It is the responsibility of the User and the PMEL to review each application and determine which Power Supplies require periodic calibration. Special attention should be given to those identified in the Calibration Measurement Summaries (CMS) and T.O. 33K-1-100-2. Power Supplies that do not require periodic calibration may be made NPC IAW TO 00-20-14. Work Unit Code XBPFW will be used to report maintenance actions for Power Supplies not listed in T.O. 33K-1-100-2 or the CMS.

3.2.19 Pressure Gauge, General Purpose.
Large quantities of General Purpose Pressure Gauges are used throughout the Air Force, which are not listed in T.O. 33K-1-100-2 (Equipment Calibration Requirements List). The following applies:

a. If the gauge has a manufacturers name, part number, and verifiable specifications, an AFTO Form 45 shall be submitted.
b. If the gauge has no identifiable manufacturer, part number or specifications, a special calibration may be performed (T.O. 00-20-14) using General Calibration T.O.s 33K6-4-427-1, 33K6-4-428-1 and 33K6-4-430-1.

3.2.20 Pressure Measuring Equipment.
A Skydrol fluid pressure standard shall be used to calibrate Skydrol Fluid Pressure Gauges. Owner/Users of Skydrol Fluid Standards/Gauges must obtain calibration support from commercial sources.

3.2.21 Pressure Regulator.
Pressure Regulators and associated pressure measuring or indicating devices used with gas supply bottles or with non-critical piped gas or fluid apparatus, such as air or water lines, are not considered to be TMDE and do not require calibration. If the user identifies a critical application, provide the regulator along with range and accuracy requirements to the PMEL for calibration as a SPECIAL calibration. Pressure gages used on liquid oxygen servicing carts will be calibrated/verified as listed in TO 33K-1-100-2 (Equipment Calibration Requirements List) or IAW the applicable maintenance manual.

3.2.22 Ring Gage.
Individual Plain Ring Gages will not be identified in TO 33K-1-100-2 if their specifications are identified as Class tolerances in 33K6-4-2-1. Individual Plain Ring Gages other than Class XXX will be calibrated by PMEL using TO 33K6-4-2-1, calibration interval 12 months, WUC ZCYZE.

3.2.23 Ring Gage, Class XXX.
Individual Plain Ring Gages, Class XXX, will not be identified in TO 33K-1-100-2. Individual Plain Ring Gages, Class XXX, will be calibrated by the AFPSL using TO 33K6-5-255-1, calibration interval 24 months, WUC WEPKA.

3.2.24 Scales.

a. Commissary/all Food Service Scales. Scales will be certified every 12 months or as required by state law. It is the responsibility of the User to provide funding and to provide calibration support from one of the following:
   (1) Contract Calibration
   (2) Local PMEL (by support agreement when required)

b. Dental Weights. Weights supplied with the Dental scales will be calibrated as E617 class 5 Dental Weights.

c. Fitness Program Scales. Scales used to compute official USAF Fitness Program (FP) results will require PMEL support (see AFI 41-201 or AFI 36-2905). Squadron/Organizational scales not used to manage AF Fitness Program DO NOT require PMEL support.

   Scales utilized by the Air Force Reserve Officer Training Corps (AFROTC) as part of their official Fitness/weight assessment program are to be calibrated IAW TO 33K-1-100-2. The AFROTC center should contact the closet PMEL for support. Requests for deviation should be processed in accordance with T.O. 00-20-14.

d. Hospital and Medical Scales. Scales normally used in Medical Treatment Facilities (MTFs) and managed under the AF Biomedical Engineering Maintenance Program will be supported by Biomedical Equipment Maintenance Technicians (BMETs) in accordance with AFI 41-201, *Managing Clinical Engineering Programs* and AFI 41-209, *Medical Logistics Support*. The PMEL will calibrate the weights used by BMETs to calibrate the scales. If the BMETs do not have the necessary weights to calibrate the scales they may request assistance from the PMEL. All hospital/medically-related cases not covered by this paragraph shall be identified in accordance with AFI-41-209, by the User.

e. Passenger Terminal Scales:
(1) Federal Aviation Administration (FAA) regulations or host nation law take precedence over TO 00-20-14 requirements for calibration of Passenger Terminal Scales. If these regulations or law requires calibration of a Passenger Terminal Scale, PMEL shall provide support unless prohibited by these regulations/laws. If calibration support is not available from a PMEL, or is beyond PMEL capability, then the User shall submit a commercial calibration request IAW TO 00-20-14. It is the responsibility of the User to identify the calibration requirements to the PMEL. Use a support agreement when applicable. Submit and AFTO 45 Form IAW TO 00-20-14 for scales that require calibration and are not listed in TO 33K-1-100-2.

(2) Where FAA regulations or host nation laws do not apply, and the scale must be used to determine aircraft fuel calculations/load balancing requirements, PMEL shall calibrate and certify the scale. It is the responsibility of the User to identify their calibration requirements to the PMEL. Use a support agreement when applicable. Submit an AFTO 45 Form IAW TO 00-20-14 for scales that require calibration and are not listed in TO 33K-1-100-2.

(3) Passenger Terminal Scales that are not required to be calibrated by FAA regulations or host nation law and are not used to determine aircraft fuel calculations/load balancing requirements are not considered TMDE, and will not be listed in TO 33K-1-100-2. PMEL support is not authorized for these scales. If the User desires a calibration, the User must fund a contract calibration. Do not submit an AFTO 45 for these scales.

f. Postal Scales. Intervals on scales used in Post Offices or mail rooms will not exceed 12 months, even if a longer interval is listed.

g. Scales Supporting Interstate Commerce. Scales used for weighing in support of interstate commerce shall be certified by the state. Scales will be certified as required by state law. It is the responsibility of the User to provide funding and to negotiate calibration support. Scales used solely for interstate commerce will not be listed in TO 33K-1-100-2. Scales used to support aircraft will be listed in a CMS or TO 33K-1-100-2.

3.2.25 Stopwatch.
Calibration of a stopwatch is not required. However, periodic maintenance including cleaning, lubricating, and adjustment by qualified personnel should be performed. This determination is based on the following: A Stopwatch in actual usage is subject to large human error, as much as 0.2 seconds to more than one (1) second depending on whether the start and stop signals can be anticipated. Attempting to increase the accuracy of the watch by accurate calibration will not ensure overall accuracy in its use. The tolerance specified in Federal Specification A-A-55811 is considered to be within the ability of a watch repairman without using calibration standards. The normal cleaning, lubricating, repair, and adjusting procedures that are followed are considered adequate. This will satisfy the requirements for RADIAC.

3.2.26 Surface Plate.
The following are methods to calibrate a Surface Plate. Grade A Surface Plate will be calibrated using the method with the highest precedence for which the PMEL has capability:

Method 1	Laser Interferometer	TO 33K6-4-10-1	Grade AA
Method 2	Leveling System	TO 33K6-4-2696-1	Grade AA
Method 3	Autocollimator	TO 33K6-4-137-1	Grade AA
Method 4	Planekator	TO 33K6-4-33-1	Grade A

NOTE

When calibrating a Surface Plate, methods 1, 2 and 3 are of equal precedence. Method 4 is the lowest precedence.

3.2.27 Tape Measure and Rules (Metal).
In general, Metal Tape Measures and Rules do not require calibration. United States manufacturing processes for Metal Tape Measures and Rules comply with NIST Handbook 44, Section 5.52., T1 or T2, which satisfy all requirements for AFMETCAL Program Calibration Procedures.

3.2.28 Thermo Luminescent Dosimeter.
Thermo Luminescent Dosimeters (TLD) used to monitor occupational exposure to ionizing radiation are provided, processed and analyzed by the USAF Personnel Dosimetry Program IAW AFMAN 48-125. For TLDs used solely to monitor occupational exposure to ionizing radiation as defined in AFMAN 48-125, requests for calibration determination should not be submitted to AFMETCAL.

3.2.29 Thermocouples, Thermocouple Probes, and Thermocouple Wires.
Thermocouples, Thermocouple Probes, and Thermocouple Wires that are to be used with calibrated indicators need not be calibrated if they bear the designation K, T, J, R, E or S. These designations show that the thermocouple or wire has been manufactured IAW one or more of the following standards for the wire type indicated, ANSI/MC96.1, BS 1843, DIN 43714, JIS C 1610-1981 or NF C 42-323. Thermocouple wires manufactured to these specifications have been certified by the manufacturer and do not require initial or subsequent calibration.

3.2.30 Thread Plug Gage, Plain and Truncated.
Individual Thread Plug Gages, Plain and Truncated will not be identified in TO 33K-1-100-2. Individual Thread Plug Gages, Plain or Truncated will be calibrated by PMEL using TO 33K6-4-203-1, calibration interval 24 months, WUC ZAUDR.

3.2.31 Thread Ring Gage, Adjustable.
Refer to TO 33K-1-100-2, WUC WAAZA

3.2.32 Thread Ring Gage, Solid.
Individual Solid Thread Ring Gages will not be identified in TO 33K-1-100-2. Individual Solid Thread Ring Gages will be calibrated by PMEL using TO 33K6-4-2867-1, calibration interval 6 months, WUC ZAUDQ.

3.2.33 Thread Wires.
Thread wires come in sets of three, and the sets will not normally be listed in TO 33K-1-100-2. The sets will be calibrated at AFPSL, Cal Int 36 months. The WUC will be ZBQDJ.

3.2.34 Torque Indicating Devices.

a. Torque Indicating Devices are TMDE and will be listed in TO 33K-1-100-2. If the Torque Indicating Device has a manufacturers name, part number and verifiable specifications, an AFTO Form 45 shall be submitted.

b. If the device cannot be identified by manufacturer, part number or accuracy a special calibration may be performed (TO 00-20-14) using the General Calibration TO. These torque devices will be calibrated in one direction only (either CW or CCW) as stated by the User.

c. Repair information for Hand Torque Devices may be found in T.O. 32B14-3-1-101.

SECTION 4

CALIBRATION AND MEASUREMENT SUMMARY (CMS) TOs

The following list of active Calibration and Measurement Summary (CMS) TOs is being included in this Technical Manual. A CMS is a categorical summary which identifies a systems measurement parameters and support equipment necessary to ensure the systems operational readiness. The summary describes the systems calibration concept, calibration workloads within the using activity and performing work center, identification of requirements for new calibration standards, equipment locations and the need for additional 33K series Calibration TOs.

Table 4.1 Calibration Measurement Summaries (CMS)

TO NUMBER	SYSTEM DESCRIPTION	SYSTEM NAME/NOMENCLATURE
1A-10C-37	A-10	Thunderbolt II
1B-1B-37	B-1	Lancer
1B-2A-37	B-2	Spirit
1C-17A-37	C-17	Globemaster III
1E-3A-37	E-3	AWACS
1F-15A-37	F-15	Eagle
1F-16A-37	F-16	Fighting Falcon
1F-22A-37	F-22	Raptor
1F-35A-37	F-35	Lightning II
1V-22(C)B-37	CV-22	OSPREY
11F1-AAQ13-12	AN/AAQ-13 & AN/AAQ-14	LANTIRN
11F1-AAQ33-12	AN/AAQ-33	Sniper Advanced Targeting POD
2J-1-105	Jet Engines	Jet Engine Systems (Turbo- Prop/Turbo-Shaft/Turbo-Jet)
21M-AGM86-27	AGM-86	ALCM
31P1-2FPS133-42	AN/FPS-133	AFSSS (Air Force Space Surveillance System)
33K-1-11	Ballistic Missiles	Ballistic Missile Systems
33K-1-71	AEDC	Arnold Engineering Development Center
33K-1-72	AFRL	Air Force Research Laboratories

SECTION 5

RESERVED

SECTION 6

RESERVED

SECTION 7

AIR FORCE CALIBRATION AUTHORITY VIEWER (AFCAV)

7.1 PURPOSE.

This section defines the use of AFCAV for viewing the information contained in TO 33K-1-100-2 and the individual Calibration Measurement Summary (CMS) TOs. Developed by AFMETCAL, AFCAV is the official viewer for the data contained in these TOs. It also provides ad-hoc reporting capability and methods for applying periodic updates in the form of TO revisions and updates. Each of these TOs is distributed on CD and each CD contains the AFCAV setup program. Users must install AFCAV on their computer in order to use it. Refer to Table 7.1 for a complete listing of the AFCAV data fields and their definitions.

Table 7.1 AFCAV Data Fields

DATA FIELD	DEFINITION
Automated Cal TO	Automated version of the Calibration Technical Order. For usage, see TO 00-20-14, Section 3, Calibration Software.
Base Meas Standard	Equipment certified by the AFPSL or AFMETCAL approved sources. These standards are used by an Air Force PMEL as a measurement reference. Reference TO 00-20-14, Figure 1-2.
Cage Code	A five character data element assigned to entities which are manufacturers or have design control of items of supply procured by the Federal Government.
Cal Interval	The period of time in which the equipment shall perform its mission (or function) with a statistically derived end-of-period reliability as determined by AFMETCAL. For more information, see TO 00-20-14, Section 3, Calibration Intervals.
Cal Responsibility	Identifies the entity who has calibration/maintenance responsibility.
Cal TO	Displays the applicable calibration authority required to calibrate the item.
Change Code	List the latest action or status of each TO 33K-1-100-2 entry. Reference, TO 33K-1-100-1, Table 1.1.
Change Date	Date Change Code field was updated.
History	Displays "Yes" if transaction history exists. Clicking the corresponding button will display the transaction data (Change Date, Technical Content Manager name, Action performed and/or Column updated, Old Value, and New Value).
LOM	Defines level of maintenance for repair/calibration of TMDE (i.e. Depot, Intermediate, and Organizational). Provided in CMS TOs only (if assigned).
Maintenance TO	Technical Order which provides instructions for operation and maintenance of Air Force military systems and end items. Note: AFMETCAL does not manage/maintain Maintenance Technical Orders.
Manufacturer	Full name of the corporate or government entity that manufactured the item.
Noun	The title/name of the item.
NSN	13 digit numeric code identifying all the standardized material items of supply. Provided in CMS TOs only (if assigned).
Part Number	The part number of the item.
Remarks	List specific information/instructions for the TMDE.
SERD	Support Equipment Requirements Document: used by contractors to define requirements for equipment that they suggest is required for maintenance of the end item/system. Provided in CMS TOs only (if assigned).

Table 7.1 AFCAV Data Fields (Cont.)

Source Name	Unique code that is assigned to the individual calibration responsibility TO For instance, K100 is assigned to TO 33K-1-100-2.
Source TO	Technical Order number of the calibration responsibility TO reference document.
Specifications	Displays "Yes" if specifications exist for the selected item. Clicking the corresponding button displays the specification data. The use of these specifications is explained in TO 00-20-14.
Technical Data	Displays “View Technical Data” if technical data is available, or “No Technical Data” if none is available.
Work Unit Code	Consist of five characters designed to identify system, subsystem, and component relationships within end items. WUC provides a standard method of sorting maintenance data.
NOTE: When an AFCAV field contains additional information/data the right side of the screen will display a toggle button. To view the information/data click on the corresponding button.	

7.2 DISTRIBUTION METHOD.

AFCAV maintains current TO 33K-1-100-2 and CMS data by relying on database imports and/or overwrites to apply TO revisions and downloadable update files to apply TO updates. Complete instructions for applying TO revisions and updates are contained in the accompanying HELP file. A brief summary follows:

7.2.1 TO Revisions.

AFMETCAL releases revisions of TO. 33K-1-100-2 and CMS TO on CD as required. When Users receive one of these TOs, they must import the data into their AFCAV database. If the TO already exists in the User’s database, AFCAV performs a Database Overwrite from the CD. This process completely replaces all data pertaining to that TO in the User’s AFCAV database with the data from the new TO on the CD thereby applying the TO revision. If the TO does not exist, AFCAV simply imports the new TO.

7.2.2 TO Updates.

AFMETCAL releases updates in the form of encrypted update files. These files are normally released on a monthly basis. The update files contain changes that have occurred since the last revision or update was released. All released update files must be applied sequentially. In addition, update files released after a TO revision cannot be applied to AFCAV until that TO revision has been applied. Refer to the Who to Contact section in the AFCAV Help file for download locations.

7.2.3 Verifying TO Dates.

Refer to the TO Indexes to verify the most current TO is contained in AFCAV. A list of source document dates can be viewed in AFCAV from the Help→About AFCAV menu (see Figure 7.1). The date reflected will be the date of the last applied TO revision or update.

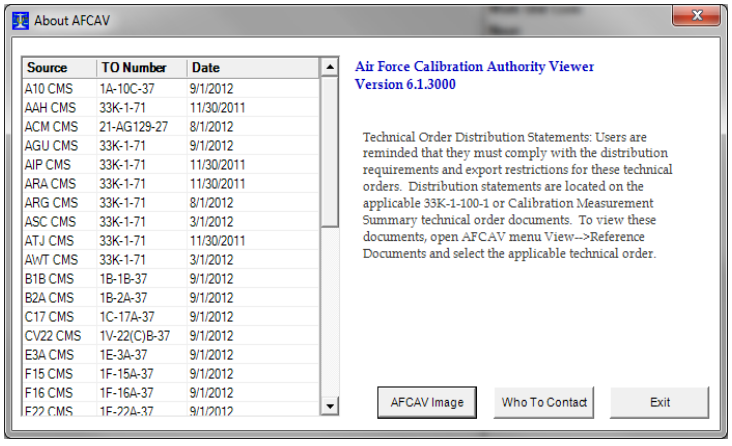

Figure 7.1 AFCAV About Screen

7.3 SPECIFICATION DATA.

AFCAV displays the TMDE specifications identified in TO 33K-1-100-2 and CMS technical orders. The *Specifications* data field identifies the Specification Type, as TABLE 1 or N/A.

7.3.1 TABLE 1.
Indicates the specifications shall be used by the calibration laboratory as the Air Force calibration performance specifications/requirements (i.e. Table 1) during calibration of the equipment item IAW the listed calibration authority.

7.3.2 N/A.
Indicates specifications have not yet been posted.

7.4 WebAFCAV.
WebAFCAV is a web-enabled version of AFCAV. It is available only to personnel within the Metrology community, primarily personnel assigned to a Precision Measurement Equipment Laboratory (PMEL) and their MAJCOM Functional Mangers (MFM). Users are reminded that AFCAV and WebAFCAV are actually viewers for specific technical orders and access to technical orders is based on a user's TODO account. Consequently, access to the technical orders displayed in WebAFCAV is based on the PMEL's TODO account. The TODO responsible for that PMEL must first establish a requirement for the CD version of the technical order before PMEL personnel can access that data in WebAFCAV. For instance, to view the Jet Engine CMS in WebAFCAV, the TODO must establish a requirement for TO 2J-1-105-CD-1.

SECTION 8

AUTOMATED CALIBRATION TECHNICAL ORDERS

8.1 GENERAL.

Automated calibration procedures are assigned TO numbers and are managed under the TO system. These TOs will contain a "-10"suffix to indicate they are automated procedures, i.e., 33Kx-x-x-10. The Automated Calibration TO is listed in the "Auto CTO" field of TO 33K-1-100-2. The Automated Calibration TO and the Manual Calibration TO will be listed in TO 33K-1-100-2 and either calibration procedure may be used with equal authority and precedence as the calibration authority for the TMDE calibration. Both the manual and automated TO will be listed in the TO Index but may have different publication dates since some changes may not apply to both TOs. See Figure 8.1 for an example of an AFCAV listing showing Manual and Automated Calibration TOs.

8.2 MULTIPLE MEASUREMENT DISCIPLINE TOs.

Automated Calibration TOs that support TMDE calibrations for multiple measurement areas (K3, K4, K6, etc.) are assigned "33K10" TO numbers. If a 33K10 TO contains selectable sub procedures, and a specific sub procedure is used to support the specific TMDE part number, the Auto CTO field will contain the TO number followed by a colon and the sub procedure identifier, i.e., 33K10-4-1-10:AF1041, where 33K10-4-1-10 is the TO number and AF1041 is a sub procedure which supports the 8662A Signal Generator. The TO Index listing will identify the latest release of TO 33K10-4-1-10 but will not list sub procedures. If there is no specific overriding direction in the Automated Calibration TO, the AUTHORITY block on the Certification Label shall include the entire Auto CTO entry, including sub procedure identifier (in this example, 33K10-4-1-10:AF1041 is the Auto CTO and would be entered in the AUTHORITY block on the Certification Label for Automated Calibration of the Signal Generator).

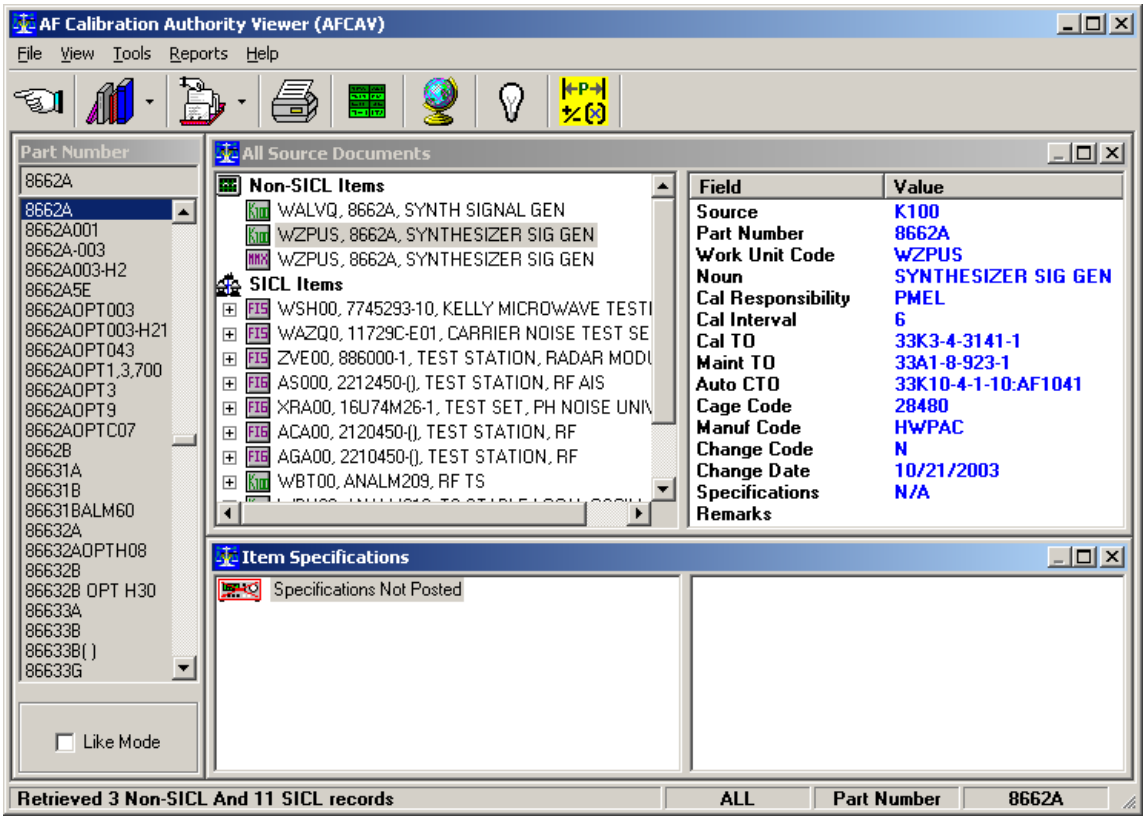

Figure 8.1 AFCAV Automated Calibration TO Listing

APPENDIX A

GUIDANCE FOR DOCUMENTING THE PROPER ACTION TAKEN, CALIBRATION CONDITION RECEIVED AND CALIBRATION CONDITION RETURN CODE

Action Taken Code	Calibration Condition Received Code	Calibration Condition Returned Code	Action Taken Code	Calibration Condition Received Code	Calibration Condition Returned Code
0	Does Not Apply	Does Not Apply	K	A	G
1	Does Not Apply	Does Not Apply	K	A	K
2	Does Not Apply	Does Not Apply	K	B	G
3	Does Not Apply	Does Not Apply	K	B	K
4	Does Not Apply	Does Not Apply	K	E	G
5	Does Not Apply	Does Not Apply	K	E	K
6	Does Not Apply	Does Not Apply	K	F	G
7	Does Not Apply	Does Not Apply	K	F	K
8	Does Not Apply	Does Not Apply	M	A	L
9	B	L	M	B	L
9	E	L	M	E	L
9	F	L	M	F	L
B	F	L	S	Does Not Apply	Does Not Apply
B	F	L	V	A	G
C	Does Not Apply	Does Not Apply	V	A	K
D	Does Not Apply	Does Not Apply	V	B	G
E	A	L	V	B	K
E	B	L	V	E	G
E	F	L	V	E	K
F	A	G	V	E	L
F	A	K	V	F	G
F	A	L	V	F	K
F	B	G	V	F	L
F	B	K	W	A	G
F	B	L	W	B	G
F	E	G	W	B	K
F	E	K	W	B	L
F	E	L	W	E	G
F	F	G	W	E	K
F	F	K	W	E	L
F	F	L	W	F	G
J	A	G	W	F	K
J	A	K	W	F	L
J	B	K	X	Does Not Apply	Does Not Apply
J	E	G	Y	Does Not Apply	Does Not Apply
J	E	K			
J	F	G			

APPENDIX B

ABBREVIATIONS AND TERMS

ABS
A designation assigned in the CAL INT column of the Equipment Calibration Requirements List that identifies an ABSOLUTE Standard.

ABSOLUTE
An item with a Cal/Resp of ABSOLUTE is a measurement standard based on an inherent and reproducible property of a phenomenon or substance. Also known as an Intrinsic Standard. Examples are LASER length Standards, Josephson Junction Voltage Standards and Hall Effect Magnetic Field Standards. An Absolute standard may be subject to periodic verification. Unless otherwise noted, these items will have a calibration TO of ABSOLUTE, a Cal Interval of ABS, and a Calibration Due Date of ABS.

AFPSL
Items calibrated by the Air Force Primary Standards (AFPSL) at Heath, Ohio. The AFPSL funds maintenance incidental to calibration of operational items only.

APT
A designation assigned in the CAL INT column of 33K-1-100-2, *TMDE Calibration Notes, Calibration Interval, Technical Order and Work Unit Code Reference Guide*, that identifies TMDE calibrated by the AFPSL and used solely for Artifact Proficiency Testing (APT)

CALIBRATION NOTES
Specific calibration determination instructions that cannot be accommodated by the other defined Abbreviations and Terms. Individual calibration notes (NXX) are detailed in TO 33K-1-100-2 and may be viewed in AFCAV. All new K100 note codes will be approved by AFMETCAL senior staff and coordinated with the MFMs prior to publication.

CBU
Calibrate before Use

COM DATA
Commercial data that has been approved for use in performing calibration and/or maintenance.

CONTINGENCY EQUIPMENT
TMDE placed in storage for which there exists no foreseen requirement, but which it has been determined should be retained for possible military or defense contingencies.

CONTRACT
Calibration obtained from a contracted source, funded by the User or an Item/Program Manager. Neither the PMEL nor AFMETCAL centrally manages or funds these calibrations. All CONTRACT TMDE shall be coordinated with the PMEL for reporting purposes.

DEPOT INDUSTRIAL METROLOGY FLIGHT (DIMF)
DIFM is a specialized calibration activity physically located on Air Logistics Complex's (ALC). Calibration Responsibilities assigned to the DIMF will be listed in TO 33K-1-100-1, TO 33K-1-100-2, and/or CMS TOs with a Calibration Responsibility designation of DIMF. See TO 00-20-14, Chapter 13 for policy guidance.

ETIMS (Enhanced Technical Information Management System)
ETIMS is an integration of custom developed software with new and existing Global Combat Support System – Air Force (GCSS-AF) services, and Defense Automated Printing Service (DAPS) On-Demand printing and distribution. The purpose of ETIMS is to provide a combination of services and interim capabilities to support TO management and use.

ICO (Initial Calibration Only)
A designation assigned in the CAL INT column of the Equipment Calibration Requirements List to TMDE that does not require periodic calibration per TO 00-20-14.

IM
The calibration of items with "IM" in the Cal Resp column will be obtained via Contractor Logistic Support (CLS) arranged by the Item Manager and coordinated with AFMETCAL. Contact the Item Manager if you have funding concerns. These calibrations are not funded through AFMETCAL.

MED
Reserved see 3.2 Specific TMDE

NCR
No Calibration Required

NEC
No End-Item Calibration. NEC in the calibration interval denotes TMDE designated See Individual Component Listing (SICL) that does not have an end-item calibration requirement. NEC only applies to the end-item, not subcomponents listed with separate calibration intervals. NOTE: For scheduling systems that have not been updated to process NEC, load as NCR. Bar code and Certification Labels are not required on NEC coded SICL end-items that do not physically exist.

NHA
Next Higher Assembly (NHA) in the calibration interval field of TO 33K-1-100-2 denotes components that are calibrated as part of a next higher assembly. The calibration interval and calibration TO of the next higher assembly apply unless otherwise noted. NHA items shall not generate a separate "due calibration" in addition to the end item. The next higher assembly end-item calibration sticker applies to all components designated NHA. NOTE: For scheduling systems that have not been updated to process NHA, load as NPC so only the next higher assembly is scheduled for calibration.

NIST
Any item listed NIST in the Cal Resp column will be calibrated by the National Institute of Standards and Technology (NIST). Coordination for calibration services will be made in advance with AFMETCAL, however Owners/Users will fund this support.

NPC
No periodic calibration

OO-ALC, WR-ALC, OC-ALC
Items to be calibrated by the designated Air Logistics Centers PMEL.

PART NUMBER PAREN.
Part number or type with paren will not be listed in TO 33K-1-100-2. The full part number or series part number will be listed only.

PMEL
The PMEL is responsible for calibration and maintenance. If NCR is listed in Cal Int column of Equipment Calibration Requirements List, TMDE does not require calibration and PMEL is responsible for performing maintenance.

PMEL 2A
Any item with a Calibration Responsibility of PMEL2A will be supported by a Type IIA PMEL.

PMEL (68 DEG)
Any item with a Calibration Responsibility of PMEL (68 DEG) will be supported by a PMEL with an authorized 68 degree dimensional calibration area.

PMEL (N64)
The PMEL is responsible for calibration. An item listed with PMEL/N64 in the Cal Resp column has been converted from N64 to PMEL calibration responsibility using a 33K calibration procedure with a TO directed limited calibration. If the user requires a full calibration they must supply justification for the full calibration in the form of a documented Air Force measurement requirement (i.e. a published maintenance TO, a system design specification, or a similar documented user requirement). Upon receipt of the request for full calibration, the PMEL will forward the request and supporting justification to AFMETCAL using the N64 process. If justification is sufficient, AFMETCAL will process the item as an 'N64' item. If justification is not sufficient, the request will be rejected and the PMEL will be instructed to either calibrate the item IAW the published calibration determination or to submit a request for commercial calibration.
PMEL/CONTRACT
The PMEL is responsible for calibration. Maintenance support will be obtained from a commercial source.

PMEL/USER
The PMEL is responsible for calibration to the extent designated in the Calibration Measurement Summary (CMS), system support plan, or other calibration instructions. All other support will be provided by the User. No adjustments that affect calibration will be made by the User.

RADIAC
Radiation Detection, Identification, and Computation

REM
Term used to direct users to view the AFCAV Remarks Field for specific information/instructions

SCW
See SICW (See Item Calibrated With)

SEE P/N
This term is used by AFMETCAL to direct the technician to use the referenced AFCAV entry. This is a conscious effort by AFMETCAL to keep MDC associated with the referenced listing.

SICL (See Individual Component Listing)
Designates an end-item of TMDE, such as consoles, testers, automatic test equipment or a part number, consisting of components, which are separately listed by individual part number, support responsibility, calibration interval, Calibration TO and a WUC related to the end-item WUC. The list of components may include both original and replacement components. Additional SICL item guidelines:

a. The PMEL has support responsibility for end-items designated PMEL/SICL. The User has support responsibility for end-items designated USER/SICL or SICL.

b. NCR components that are PMEL responsibility will be listed.

c. Maintenance responsibility for components not listed is the same as the end-item.

d. An end-item that requires periodic calibration will have an interval and calibration TO listed.

e. An end-item with no end-item calibration will have NEC listed as the calibration interval. (See NEC definition.)

f. Components calibrated as part of the end-item (i.e., a system calibration) will have NHA listed as the calibration interval. (See NHA definition.)

g. The SRD of the end-item should be used for each component.

h. The SICL component WUC shall be used to ensure MDC data reflects end-item usage.

i. The User has the responsibility to identify to the PMEL the end-item part number and bar code number for each component to assure proper annotation of WUC and calibration interval.

j. If the end-item is designated NEC, enter "NEC" in the DATE CALIBRATED block. Certification Labels are not required on NEC coded SICL end-items that do not physically exist.

k. Bar code labels will only be applied to SICL end-items and SICL components that are PMEL or AFPSL responsibility.

SICW (See Item Calibrated With)
Items that cannot be calibrated by themselves but require another item will have SICW entered in the Cal Resp column and SCW entered in the Cal Int column of the Equipment Calibration Requirement List. No Calibration Interval, Calibration Responsibility nor Calibration TO will be listed for these items. (Note: as an example, a display, meter, or transducer may be listed as the SICW item. All items are scheduled together. The calibration interval and calibration TO used for the SICW components are those listed for the prime part number). Attach a Certification Label to these items using the SPECIAL block to identify either The Bar Code Number or the part number and serial number of the end item it is calibrated with. The SPECIAL block of the end item Certification Label will list either the Bar Code Numbers or the part numbers and serial numbers of all items calibrated with the end item. If the end item is unknown, contact the User to properly identify the end item and all the items that are calibrated with it. The end item and all the items identified with it shall be calibrated at the same time.

SSA (Same Specifications As)
The abbreviation SSA is used in the nomenclature column of the equipment listing to identify the applicable specification when the TO contains more than one set of accuracy specifications.

TMDE
Test, Measurement and Diagnostic Equipment (TMDE). Devices used to maintain, evaluate measure, calibrate, test, inspect, diagnose or otherwise examine materials, supplies, equipment and systems to identify or isolate actual or potential malfunction, or decide if they meet operational specifications established in technical documents. Other documents may refer to this equipment as “measuring and test equipment.

TO IN PROCESS
A “T” in the Change Code indicates that a new TO is being prepared or an existing TO is being changed for the item in question. The TO will be prepared or changed as priority and workload permit. In the interim, the item can be supported using the calibration authority precedence prescribed in TO 00-20-14.

TRC
Items to be supported at a Technology Repair Center (TRC)-Command certification is not required. Equipment owners should contact the IM for shipping instructions, repair approval, and estimated turn-around time. Support should be obtained IAW procedures specified in TO 00-25-107.

USER
The using activity or owning organization is responsible for calibration and maintenance. In most cases, the User and owner are the same. In general, the User is the activity that physically uses the item. The owner is the organization that owns the item via a supply account. The User performs user calibrations or coordinates with the PMEL for assistance when resources are not available. The PMEL will assist to identify required equipment or approved sources of support. As a last resort, the PMEL may perform the calibration. The owner is responsible for any funding associated with these efforts.

USER/CONTRACT
The User is responsible for calibration. Maintenance support will be obtained from a commercial source.

USER/PMEL
The User is responsible for calibration. The PMEL will perform or assist in performing maintenance. The extent of PMEL maintenance is specified in the Calibration and Measurement Summary (CMS), support equipment plan or other maintenance instructions.

War Reserve Materiel (WRM)
Materiel required in addition to primary operating stocks and deployment (mobility) equipment necessary to attain objectives in the scenarios approved for sustainability planning in the Strategic Planning Guidance.

WEB-AFCAV (Air Force Calibration Authority Viewer)
Web version of AFCAV hosted on the Metrology web site (MetWeb)

WUC (Work Unit Code)
Consist of five characters designed to identify system, subsystem, and component relationships within end items. WUC provides a standard method of sorting maintenance data and summarizing different levels of detail that is not applicable to all types of equipment.