

JOINT ARMY-NAVY STANDARDIZATION PROGRAM

Before entering the conflict, the Army and Navy each had its own systems of tube nomenclature, but they were quite unsuited to the desirable qualities of interchangeability, common stockpiles, joint inspection, and general efficiency.

Early in 1942, work was begun to prepare a joint Army-Navy specification for tubes which would be based upon the use of RMA and commercial type numbers. By the latter part of 1943, the Joint Army-Navy Specification JAN-1A for Radio Electron Tubes was in use, and mandatory for all Signal Corps and Navy tube contracts.

The JAN Committee, comprised of the Army Service Forces and Naval Office of Procurement and Material, has authorized the JAN-1 Tube Subcommittee to handle the tube specification. The Service organizations represented on this Subcommittee are:

1. The Navy - Bureau of Ships.
2. The Signal Corps Aircraft Signal Agency.
3. The Signal Corps Ground Signal Agency.
4. The Signal Corps Standards Agency.

The official duties of the JAN-1 Tube Subcommittee as supplied by the JAN Committee are as follows:

1. To prepare and establish standard tube specifications.
2. To review, revise and correct these specifications, as required by technical improvements, changes in Service requirements, etc.
3. To coordinate tube specification matters with the Services and industry.
4. To supervise the distribution of the specifications to all concerned.

In addition to these duties, which apply directly to the JAN-1A Specification, the members of the Subcommittee have additional duties as follows:

1. The consideration of proposed tests to determine if the resulting tubes are equivalent to those which meet tests required by the JAN-1A Specification.
2. The issuance of tube type approvals under the JAN-1A Specification.
3. The compiling and revising of the Army-Navy Preferred Lists of Vacuum Tubes.
4. The recommending of security classifications for vacuum tubes.
5. Coordination with Canadian Armed Services in their use of the JAN-1A Specification.

ARMY-NAVY STANDARDIZATION PROGRAM

6. Coordination with the RMA on tube numbering and tests methods.

Some of these duties will be described in detail, in order to indicate their scope and method of handling.

It may seem reasonable that the Services which use the tubes should write the specifications to insure that the tubes will meet Service needs. This is not wholly satisfactory however, for the tube manufacturers must also have an opportunity to comment in order to insure that the specification can be met, through its being in accordance with good production and engineering design and practice -- even though this may not allow the Services to make as "tight" a specification as they might prefer. In other words, it is sometimes necessary to sacrifice the ultimate in desired performance in order that the tube can be produced with reasonable efficiency and by more than one manufacturer. After complete coordination with all concerned, the resulting specification is written to insure the best possible operation of the tube in the equipments using it, with the minimum of requirements which would cause excessive production difficulties.

Because improved design and production techniques and changed equipment requirements may involve specification changes, the Subcommittee's duties include that of reviewing and correcting specifications as necessary. Coordination with the tube manufacturers affected is secured, as in the case of a new specification.

SPECIFICATION AVAILABLE

The JAN-1A Specification is available to any contractor or Government organization which requires it. Requests for copies may be sent either to the Signal Corps Standards Agency or the Bureau of Ships.

It is well to point out that the JAN-1A Specification is still incomplete in that all tube characteristics are not necessarily controlled by the required tests. Therefore, any tube application which requires the control of less frequently used tube characteristics should be checked against the specification to insure that it provides tests to control those characteristics. For example, the triode and suppressor cut-off characteristics of pentodes are not usually controlled by the specification, but if a particular equipment requires that these characteristics be controlled, the matter should be brought before the JAN-1 Tube Subcommittee, together with data to enable the formulation of a suitable test. The Subcommittee will then do all possible to arrange for specification revisions to accomplish the desired result.

At this point attention is called to the fact that special tube selection is extremely undesirable. Directives from the headquarters of both the Bureau of Ships and the Signal Corps state that special selection of tubes will not be permitted, but that equipments must meet performance requirements with any and all tubes which pass the JAN tests for the types involved. When a tube requires replacement in the field, any tube of the correct type which is in stock must work satisfactorily.

ARMY-NAVY STANDARDIZATION PROGRAM

Fortunately the majority of radio engineers recognize the evils of special tube selection and are doing all possible to eliminate it by proper equipment and circuit design, but continued attention to this is necessary. The preceding remarks to the effect that care should be taken to insure that the JAN-1A Specification controls all important tube characteristics are, therefore, particularly applicable to the prevention of special tube selection.

The JAN-1A Specification provides for type approval of each tube type produced by each tube manufacturer, since this provides a check on his ability to produce those tubes satisfactorily, and allows the Services to check the accuracy and capabilities of his test equipment as well as the suitability of the tube for use by the Armed Services. Thus when the contracting officer places a contract with a manufacturer holding type approval for the required types, he knows that the contractor can actually make and test those types satisfactorily. Complete information regarding the obtaining of tube type approval is contained in Form TAI-1 which may be secured from either the Bureau of Ships or the Signal Corps Standards Agency.

WAIVERS HANDLED BY COMMITTEE

An important function of the JAN-1 Tube Subcommittee is the handling of requests for waivers to the JAN-1A Specification. A tube manufacturer may find that he cannot make a required test due to lack of equipment; an equipment contractor may encounter a long delay in securing a particular type, if all JAN tests are complied with, but can secure quick delivery of that type if it is tested to broader limits which still permit it to give proper operation in the particular equipment concerned. Such situations often arise. If they are referred to the Bureau of Ships, the Signal Corps Standards Agency, or the Signal Corps laboratory concerned, the JAN-1 Tube Subcommittee will consider them and decide whether the tube will meet the requirements of the JAN-1A Specification. Decisions required to keep up production may be secured within a few hours by telephone and telegraph concurrence of the JAN-1 Tube Subcommittee members.

Over a year ago, the Army and Navy jointly issued a Preferred List of Vacuum Tubes. The present revision, dated 15 February 1944 includes both confidential and unclassified listings. The object of these Preferred Lists, which must be aimed for in all developments, is to reduce the number of types used by the Services. With fewer types required, there are important savings to the Services in space and manpower for handling stock. Also, tube manufacturers can, by concentrating on the production of these types, achieve greater production efficiency, higher quality, and lower shrinkage. The JAN-1 Tube Subcommittee members revise these Preferred Lists from time to time on the basis of each type's wideness of application, ease of production and available production capacity. If a development requires tube characteristics which can be shown to be lacking in any of the preferred types, a waiver of the Preferred Lists may be requested from either

ARMY-NAVY STANDARDIZATION PROGRAM

the Bureau of Ships or Signal Corps Standards Agency. Thus, the fact that the use of the Army-Navy Preferred List of Vacuum Tubes is mandatory does not serve as an obstacle to new developments in tubes and equipments.

SECURITY CLASSIFICATIONS

The JAN-1 Tube Subcommittee members are, by virtue of their close contact with personnel concerned with tube work for the government, fully cognizant of the tube features which should be withheld for reasons of security, so are called upon to recommend types for classification, or for removal from their security classification, after there is no longer need for restricting information concerning them.

Although the RMA continues to assign type numbers for new tubes, the JAN-1 Tube Subcommittee members work in cooperation with RMA regarding arrangements and plans for handling this work.

CANADIANS USE JAN-1A SPECIFICATION

The most recent addition to the work of the Subcommittee is that concerned with the use of the JAN-1A Specification by Canada. The Canadian Services now require the use of this specification in their contracts using tubes and will administer the specification through a joint industry-government committee. They will coordinate their actions with the JAN-1 Tube Subcommittee in order to assure a yet broader standardization of tubes.

Thus has been achieved a single specification for use with all tubes procured by the U. S. Signal Corps, the U. S. Navy, and the Canadian Armed Services. After the transition stage, during which existing tube stocks will be used up, all tubes purchased and stocked by the organizations just named will be fully interchangeable.

By pooling their requirements in the JAN-1A Specification, the Army and Navy have been able to improve the quality of many of their tubes.

Through the use of preferred types, the tube manufacturer is aided by the opportunity to specialize on a few types.

Lastly, the Services are working more closely with tube manufacturers than ever before, and there is greater mutual understanding of each other's problems.

In closing, it is interesting to quote from a report on lessons in signal operation from Burma. "American tubes are superior because they are (1) sturdier and (2) standardized and interchangeable."

RESTRICTED

ARMY-NAVY RADIO ELECTRON TUBE SECURITY CLASSIFICATION

10 March 1944

NOTE: This list supersedes the ARMY-NAVY RADIO ELECTRON TUBE SECURITY CLASSIFICATION list of 15 February 1944.

To Those Concerned with the Use and Dissemination of Information Concerning Classified Electron Tubes:

1. The following list sets forth certain electron tubes used by the Radio Division, Bureau of Ships, Navy Department, and the Signal Corps, Army Service Forces, together with the security classification of same. The purpose of this list is to insure uniformity in the security classification of electron tubes and electron tube information used by the aforementioned Services.

2. THE OMISSION OF A TUBE FROM THIS LIST DOES NOT NECESSARILY INDICATE THAT THE TUBE IS UNCLASSIFIED.

3. Technical data and information concerning electron tubes under development, or already developed but not in production, which would be of great advantage to a foreign nation by virtue of:

- a. Disclosure of wavelengths or operational frequency, or
- b. Disclosure of novel design and constructional features, or
- c. Disclosure as to application.

MUST BE CLASSIFIED AS SECRET.

4. Technical data and information for electron tubes not included in paragraph 3 above shall be classified CONFIDENTIAL when:

- a. The data or information directly or indirectly reveals pulse modulation ratings, or
- b. The data or information directly or indirectly reveals specific operations frequencies within or above the ultra high frequency spectrum. Photographs or drawings of frequency determining elements of tubes are included in this category.

5. Tubes for which technical data have been published and generally distributed prior to this data will not be classified in the future unless reasons of National Security necessitate such classification; in which event the recipients of this list will be notified.

6. The type number of a classified tube may be listed in an unclassified document when such listing does not disclose either wavelengths, basic principles, or technical details of the tube.

7. The publication of characteristics of unclassified tubes which may disclose application information pertaining to classified equipment is not permitted except by authority of the Services.

The following tubes are classified as "CONFIDENTIAL".

| | | | | | | |
|-------------------|----------------|----------------|---------------|----------------|------------|--------------|
| J-1 Series | 2E27(QF-206) | 4J21 THRU 4J30 | QF-197 | WL-443 Series | 706 Series | 730A |
| K-0 Series | 2E28(HY-145ZT) | 5J21 THRU 5J30 | QF-200 Series | GL-484 | 707A, B | SA780 |
| 1P23(729A) | 2E29(SA-781A) | 7C22 | QF-202 | GL-485 | 714 Series | SA781 Series |
| 1B24 | 2J21 THRU 2J34 | HK7 | QF-206 | GL-486 | 718 Series | SA782 Series |
| 1E26 | 2J36 THRU 2J62 | K-7 Series | QF-213 | GL-488 | 720 Series | 933 |
| 1B27 | 2JB51 | REL-7 | QF-214 | ZG-489 | 721A | 936 |
| 1P24(936, ZJ-564) | 2K22 THRU 2K29 | 8B | QF-215 | ZJ-564 | 723A | NU-976 |
| 1P25 | 2KB72 | REL-21 | 417 | ZG-530 | 723A/B | 128OCT5 |
| D-2 Series | 3BX | CV58 | 417A | GL-531(ZG-531) | 724A | 138OM |
| GY-2 | 4AP10 | CV92 | 419A | WL-538 | 725A | 1636 |
| 2E24(QF-197) | 4C27(CV92) | HY-145YT | 421AA | GL-541(ZG-541) | 726A, B, C | 8026 |
| 2C27(QF-200C) | 4C28 | HY-145ZT | WL-441 Series | ZP579 | 728 Series | |
| 2C28(SA-780) | | VT-158 | WL-442 | 700 Series | 729A | |
| 2D29(SA-782B) | | | | | | |

UNCLASSIFIED TUBES PREVIOUSLY CONSIDERED CLASSIFIED

| | | | | | | |
|------------|-------|-------|------------|----------|---------|---------|
| C1B | 3E29 | 5LP7 | TS-70 | 313CC | 530A | 829A |
| 1B22 | 3FP1 | 5NP1 | 72R | 316A | ZG-532 | 829B |
| 1B25 | 3FP7 | REL-5 | 73R | 326A | WL-532A | 832 |
| 1N21, A, B | 3HP7 | 6C21 | VR78 | 327A, B | GL-532A | 953B |
| 1N22 | GA-4 | 7BP7 | VT-90(Br.) | 371A, B | 559 | 1000HF |
| 1N23, B | CSB | 8C21 | 98R | 393A | HY615 | 1630 |
| 1N24 | CA-5 | 9EP1 | VT-98(Br.) | 410 | 701A | 1810-P1 |
| 1N26 | GA-5A | 9EP7 | 100R | 434A | 702A | 1860 |
| 1N27 | 5BP1 | 9FP1 | 100TH | 446A, B | 703A | 1960 |
| 1N28 | 5BP4 | 9GP7 | 100TS | 447A | 705A | 1961 |
| 1N29 | 5CP1 | 9HP7 | X102B | ZP-449 | 708A | WX3074 |
| 2C26 | 5CP4 | 9MP7 | HY114B | 450TH | 709A | 7193 |
| 2C44 | 5CP7 | 12DP7 | VT-114 | 451 | 710A | 7193 |
| 2E22 | 5D21 | 12FP7 | VT-127, A | CL-455 | 713A | 8011 |
| 3B24 | 5EP1 | 12GP7 | VCR139A | 455/9LP7 | 715A, B | 8012 |
| 3BP1 | 5EP7 | 12HP7 | QF-196 | 464A | 716A | 8013A |
| 3CP1 | 5FP7 | 15E | HK-227 | CL-471A | 717A | 8014A |
| 3CP1-S1 | 5GP1 | 15R | 227A | CL-515 | 719A | 8016 |
| 3DP1 | 5JP1 | H-45 | RX233 | CL-822 | 722A | 8020 |
| 3DP1-S1 | 5JP7 | EF50 | 274B | 527 | 727A | 8021 |
| 3DP1-S2 | 5LP1 | 53A | 304TH | WL-530 | 732A | 8023 |

Chief of the Bureau of Ships,
Navy Department.

Office of the Chief Signal Officer,
Headquarters, Army Service Forces,
War Department.

RESTRICTED

24-76274ABCD-3W

**ARMY-NAVY PREFERRED LIST OF RADIO ELECTRON TUBES
15 February 1944**

*NOTE:- THIS PREFERRED LIST SUPERSEDES THE ARMY-NAVY
PREFERRED LIST OF VACUUM TUBES, DATED MARCH 1, 1943*

TO THOSE CONCERNED WITH THE DESIGN AND MANUFACTURE OF ARMY OR NAVY EQUIPMENT
UTILIZING RADIO ELECTRON TUBES:

1. The following Army-Navy Preferred List of Radio Electron Tubes sets up a group of unclassified general purpose tubes selected jointly by the Signal Corps and the Bureau of Ships. The purpose of this list is to effect an eventual reduction in the variety of tubes used in Service Equipment.
 2. IT IS MANDATORY THAT ALL UNCLASSIFIED TUBES TO BE USED IN ALL FUTURE DESIGNS OF NEW EQUIPMENTS UNDER THE JURISDICTION OF THE SIGNAL CORPS LABORATORIES OR THE RADIO DIVISION OF THE BUREAU OF SHIPS BE CHOSEN FROM THIS LIST. EXCEPTIONS TO THIS RULE ARE HEREINAFTER NOTED.
 3. The term "new equipments", as mentioned in Paragraph 2 above, is taken to include:
 - a. Equipments basically new in electrical design, with no similar prototypes.
 - b. Equipments having a similar prototype but completely redesigned as to electrical characteristics.
 - c. New test equipment for operational field use.
 4. The term "new equipments", as mentioned in Paragraph 2 above, does not include:
 - a. Equipments either basically new or redesigned, that are likely to be manufactured in very small quantity, such as laboratory measuring instruments.
 - b. Equipments that are solely mechanical redesigns of existing prototypes.
 - c. Equipments that are reorders without change of existing models.
 - d. Equipments in the design stage before the effective date of adoption of this Preferred List.
- Note: The foregoing statements in Paragraphs 3 and 4 above are explanatory in nature and are not intended to be all-inclusive.*
5. In the event that it is believed that a tube other than one of those included in this Preferred List should be used in the design of new equipments for either the Signal Corps or Navy, specific approval of the Service concerned must be obtained. Such approval, when Signal Corps equipment is concerned, is to be requested from the Signal Corps Laboratory concerned with such equipment; the said laboratory will then make known its recommendations in the matter to the Signal Corps Standards Agency where the final decision will be made and returned to the laboratory for transmittal to the party requesting the exception. When Navy equipment is concerned, the request for exception shall be addressed to the Radio Division, Bureau of Ships, Code 930-A, Navy Department.
 6. The publication of this list is in no way intended to hamper or restrict development work in the field of radio electron tube or radio electron tube applications.
 7. This list is to take effect immediately.

Chief of the Bureau of Ships,
Navy Department.

Office of the Chief Signal Officer,
Headquarters, Army Service Forces,
War Department.

**ARMY-NAVY PREFERRED LIST OF RADIO ELECTRON TUBES
15 FEBRUARY 1944.**

| RECEIVING | | | | | | | | | | | |
|------------------|-----------------------------|---|---|-------------------------|------------------------|---|-------------|---|------------|-----------------|---|
| FILAMENT VOLTAGE | DIODES | DIODE TRIODES | TRIODES | TWIN TRIODES | PENTODES | | CONVERTERS | POWER OUTPUT | INDICATORS | RECTIFIERS | MISCELLANEOUS |
| | | | | | REMOTE | SHARP | | | | | |
| 1.4 | 1A3 | 1LH4 | 1LE3 | 3A5 3B7/1291 | 1T4 | 1L4 1L5 1S5 | 1LC6 1R5 | 3A4 3D6/1299 3S4 | | | CRYSTALS 1N21B 1N23 1N27 |
| 5.0 | | | | | | | | | | 5U6 5Y3GT | |
| 6.3 | 6AL5 6H6* 559 9006 | 6AQ6 6SQ7* 6C4 6J4 6J5* 7E5/1201 9002 | 2C22 2C26 6SL7GT 6J4 6SN7GT | 6J6 6SL7GT 6SN7GT | 6SG7* 6SK7* 9003 | 6AC7* 6AG5 6AG7* 6AK5 6SH7* 6SJ7* 7M7 9001 | 6SA7* | 6GG6 6L6GA 6W7GT/G 6V6GT/G 6Y6G | 6E5 | 6X5GT/G 1005 | PHOTOTUBES 9I8 927 |
| 12.6 | 12H6* | 12SQ7* 12SR7* | 12J5GT | 12SL7GT 12SN7GT | 12SG7* 12SK7* | 12SH7* 12SJ7* | 12SA7* | 12A6* | 1629 | | VOLTAGE REGULATORS 0B3/VR-90 0C3/VR-105 0D3/VR-150 |
| 25 and above | | | | | | | | 25L6GT/G 28D7 | 991 | 25Z6GT/G | |

| TRANSMITTING | | | | | RECYTIFIERS | | | | | MISCELLANEOUS | | |
|--------------|----------|---------------|----------|------|-------------|----------|--------------|---------------|---------------|---------------|--|--|
| TRIODES | TETRODES | TWIN TETRODES | PENTODES | | VACUUM | GAS | GRID CONTROL | CLIPPER TUBES | GAS SWITCHING | CATHODE RAY | | |
| 2C26 | 801A | 5021 | 3E29 | 2E22 | 2X2 | 4B25 | 3C23 | 73 | 1B32/532A | 2AP1 | | |
| 2C44 | 809 | 715B | 815 | 803 | 3B24 | 83 | 3C31/C18 | 719A | 471A | 3BP1 | | |
| 6C21 | 811 | 80Z | 829B | 837 | 5R4GY | 866A/866 | C5B | | 532 | 3DP1 | | |
| 15E | 826 | 813 | 832A | | 371B | 872A/872 | 88K | | | 3FP7 | | |
| VT127A | 833A | 814 | | | 705A | | 2050 | | | 5CP1 | | |
| 3Z7B | 838 | 1625 | | | 836 | | | | | 5CF7 | | |
| 434A | 1626 | | | | 1616 | | | | | 5FP7 | | |
| 446A | 8005 | | | | 8016 | | | | | 5P1 | | |
| 527 | 8014A | | | | 8020 | | | | | 7BP7 | | |
| 530 | 8025 | | | | | | | | | 12P7 | | |
| | | | | | | | | | | 12P7 | | |

*Where direct interchangeability is assured "GT" and "L" counterparts of the preferred metal tubes may be used.
Miniature tubes (shown in Italics) shall be used only when essential to Service requirements.