

MIL-S-20708/57A(Wep)  
1 April 1960  
SUPERSEDING  
MIL-S-20708/57(NOrd)  
10 September 1959

## MILITARY SPECIFICATION

### SYNCHRO, TRANSMITTER, TYPE 30TXB6a

This specification has been approved by the  
Bureau of Naval Weapons, Department of the Navy.

#### 1. SCOPE

1.1 This specification covers the detail requirements for  
transmitter synchro type 30TXB6a, 115 volt, 60 cycle.

#### 2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of  
invitation for bids form a part of this specification.

#### SPECIFICATIONS

##### MILITARY

- MIL-I-16557 - Ink, Marking, Quick-drying (For Non-porous  
Surfaces).
- MIL-S-20708 - Synchros, 60 and 400 cycles, General  
Specifications for.

#### STANDARDS

##### MILITARY

- MIL-STD-8 - Dimensioning and Tolerancing.
- MS25036 - Lug, Terminal

#### DRAWINGS

##### BUREAU OF NAVAL WEAPONS

- 813820 - Washer, Drive.
- 854949 - Nut.
- 1074382 - Washer.
- LD 255268 - Stock Material for Precision Instrument  
Components.

(Copies of specifications, standards, and drawings required  
by contractors in connection with specific procurement functions  
should be obtained from the procuring agency or as directed by  
the contracting officer.)

FSC 5990

3. REQUIREMENTS

3.1 Qualification. - Except as specified in par. 3.1.1, synchros covered by this specification shall be a product which has been tested and qualified in accordance with Specification MIL-S-20708.

3.1.1 Preproduction sample. - Pending issuance of a Qualified Products List (Q.P.L.), a sample (see 4.1.1.1) of the synchros to be furnished under this specification shall be subjected to the preproduction tests as specified in Specification MIL-S-20708.

3.2 Requirements. - All requirements shall be in accordance with Specification MIL-S-20708 except as otherwise specified herein.

3.2.1 Salt spray requirement. - Not applicable.

3.2.2 Design and construction. - The synchro shall be of the design, construction, and physical dimensions specified in Figure 1, and shall be complete, including all hardware shown and identified thereon.

3.2.3 Performing requirements. - The values applicable to the synchro shall be as specified in Table I.

Table I. - Synchro, Transmitter, Type 30TXB6a

Requirement	Unit	Value
Frequency	Cycles	60
Primary voltage (nominal)	Volts	115
Primary current (maximum)	Milliamps	462
Primary power (maximum)	Watts	6.6
Transformation ratio $\pm 2\%$		0.783
Electrical error (maximum)	Minutes	12
Friction torque (maximum) ROTOR	Ounce-inches	0.5
Friction torque (maximum) ROTATABLE STATOR	Ounce-inches	0.8
Torque gradient (minimum)	Oz. in./deg.	0.40
Null voltage total (maximum)	Millivolts	125
Fundamental component of null voltage (maximum)	Millivolts	50
Phase shift (maximum)	Degree	6.5 (lead)
Primary impedance (Zp)	Ohms	1/
Secondary impedance (Zd)	Ohms	1/
Secondary impedance (Zq)	Ohms	1/

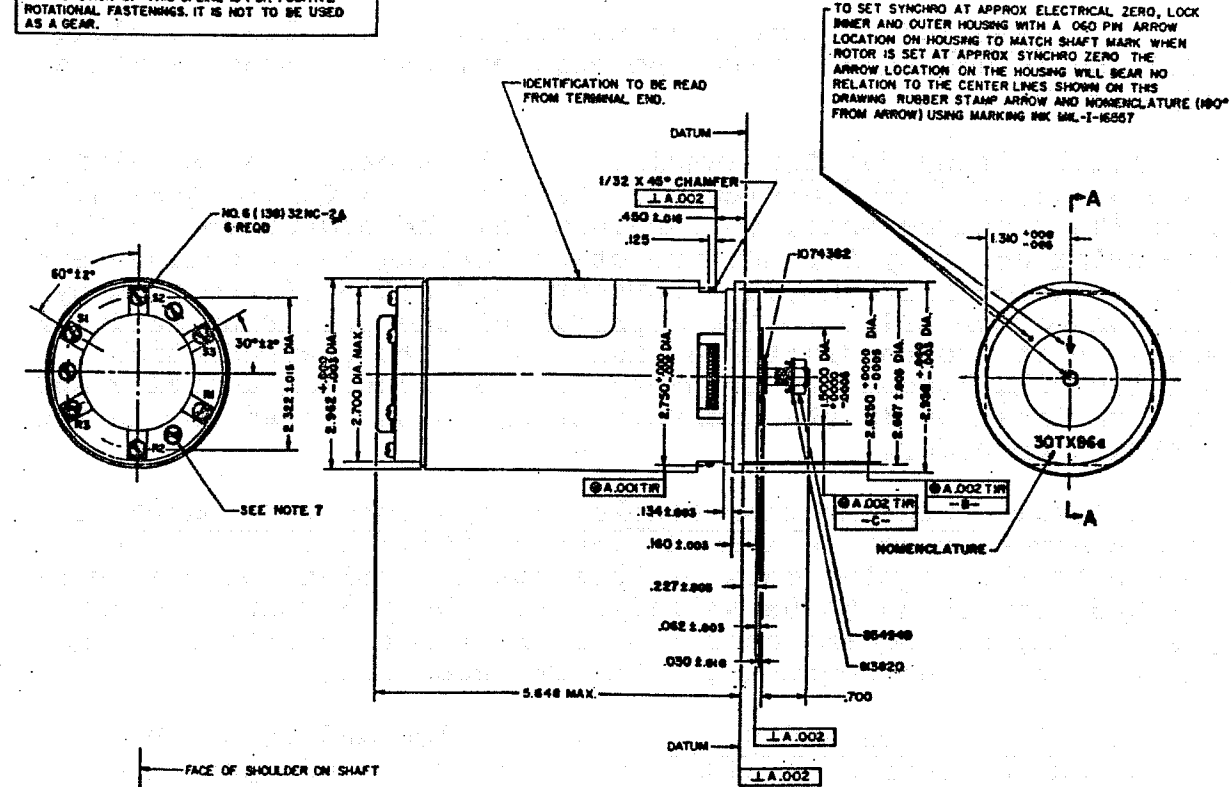
1/ As specified by the Bureau of Naval Weapons (see 6.1).

SPLINE DATA	
TEETH	22
PITCH	96
PITCH DIAMETER	229 $\begin{smallmatrix} +.0000 \\ -.0020 \end{smallmatrix}$
OUTSIDE DIAMETER	2405 $\begin{smallmatrix} +.0000 \\ -.0005 \end{smallmatrix}$
PRESSURE ANGLE	20°
ROOT DIAMETER MAX.	205
TOOTH FORM	FULL DEPTH INVOLUTE

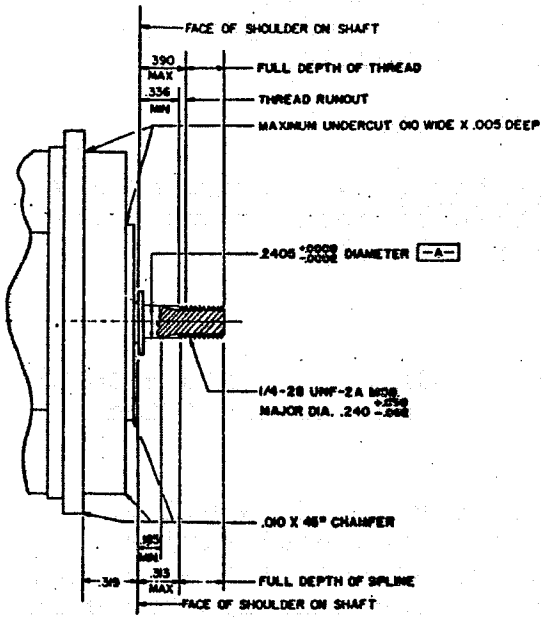
NOTE: INVOLUTE SPLINE BASED ON .250 NOMINAL SHAFT DIAMETER WITH REDUCED ADDENDUM. THE END FUNCTION OF THIS SPLINE IS FOR POSITIVE ROTATIONAL FASTENINGS. IT IS NOT TO BE USED AS A GEAR.

GEAR DATA	
TEETH	196
PITCH	72
PRESSURE ANGLE	20°
PITCH DIAMETER	2.725 $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$
OUTSIDE DIAMETER	2.750 $\begin{smallmatrix} +.000 \\ -.002 \end{smallmatrix}$
ROOT DIAMETER MAX.	2.690

NOTE: PITCH DIAMETER TO BE CONCENTRIC TO OUTSIDE DIAMETER WITHIN .0005 TIR.



TO SET SYNCHRO AT APPROX ELECTRICAL ZERO, LOCK INNER AND OUTER HOUSING WITH A .060 PH ARROW LOCATION ON HOUSING TO MATCH SHAFT MARK WHEN ROTOR IS SET AT APPROX SYNCHRO ZERO THE ARROW LOCATION ON THE HOUSING WILL BEAR NO RELATION TO THE CENTER LINES SHOWN ON THIS DRAWING RUBBER STAMP ARROW AND NOMENCLATURE (90° FROM ARROW) USING MARKING INK MIL-I-16557



- NOTES:
- INTERPRET CONCENTRICITY AND PERPENDICULARITY IN ACCORDANCE WITH MIL-STD 8.
  - RUNOUT OF  $\text{---A---}$  DIAMETER (SMOOTH PORTION) SHALL NOT EXCEED .0008 TIR.
  - EACH SPECIFIED CONCENTRICITY OF DIAMETERS  $\text{---B---}$  OR  $\text{---C---}$  TO DATUM  $\text{---A---}$  SHALL APPLY AFTER ROTATING THE INNER AND OUTER HOUSINGS INDEPENDENTLY TO BRING THE MAXIMUM READING OF BOTH INTO COINCIDENCE AND THEN LOCKING THE HOUSINGS TOGETHER.
  - CONCENTRICITY AND PERPENDICULARITY SHALL BE MEASURED WITH THE UNIT IN A VERTICAL POSITION.
  - END PLAY MEASURED AS TOTAL MOVEMENT DURING REVERSAL OF 1 POUND AXIAL LOAD SHALL BE .0008 INCHES MIN TO .006 INCHES MAX.
  - RADIAL PLAY MEASURED AS CLOSE TO THE BEARINGS AS POSSIBLE SHALL NOT EXCEED .0008 INCHES MAX. TIR DURING REVERSAL OF 1 POUND LOAD APPLIED NOT MORE THAN 1/8 INCH FROM END OF SHAFT.
  - THE DESIGN OF THIS UNIT SHALL PROVIDE FOR THE TERMINAL BLOCK TO REMAIN FIXED WHEN TERMINAL SCREWS AND TERMINAL LUGS ARE REMOVED.
  - THE END CAP DESIGN SHALL BE SUCH THAT THE TERMINAL LUG MS 25034-1 (WIRE SIZE 22-20-18 OR MS 25034-6 (WIRE SIZE 16-14) MAY BE INSTALLED WITH THE BARREL INBOARD OR OUTBOARD.

PARTIAL SECTION A-A

FIGURE 1-SYNCHRO TRANSMITTER, TYPE 30TX86a

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN INCHES  
TOLERANCES ON FRACTIONS  $\pm \frac{1}{32}$   
DECIMALS  $\pm .005$  ANGLES  $\pm 1^\circ$

#### 4. QUALITY ASSURANCE PROVISIONS AND TEST REQUIREMENTS

##### 4.1 Sampling, inspection, and tests. -

4.1.1 Sampling. - Except as specified in 4.1.1.1, sampling shall be in accordance with the requirements of Specification MIL-S-20708.

4.1.1.1 Preproduction samples. - Unless otherwise specified (see 4.1.1.1.1) and pending the issuance of a Q.P.L. (see 3.1.1), four (4) synchros shall be furnished by the contractor to the procuring activity for preproduction testing in accordance with Specification MIL-S-20708. Further production of the item by the contractor prior to the approval of the procuring activity shall be at the contractor's risk. Accepted preproduction samples will become the property of the procuring activity and will be included in the quantity of synchros called for in the contract or order.

4.1.1.1.1 Preproduction sample for a subsequent contract. - If a contractor has delivered synchros previously in accordance with the requirements of this specification and his product has been found to be satisfactory, the preproduction sample for any subsequent contract or order may be waived at the discretion of the procuring activity (see 6.1).

4.1.2 Inspection and tests. - Inspection and tests shall be conducted in accordance with the requirements of Specification MIL-S-20708 except as otherwise specified herein.

4.1.2.1 Salt spray test. - Not applicable.

4.1.2.2 Preproduction rejection criteria. - Failure of any preproduction sample synchro in any test or requirement shall be cause for withholding approval (see 4.1.1.1).

#### 5. PREPARATION FOR DELIVERY

5.1 Preparation for delivery shall be in accordance with the requirements of Specification MIL-S-20708 and as specified herein.

5.2 Hardware. - All loose hardware (see 3.2.2) shall be packaged in a ventilated envelope made of material having a PH value of 6-8 that is compatible with the weight of the contents. The packaged hardware shall be placed in the unit synchro package.

6. NOTES

6.1 All notes specified in Specification MIL-S-20708 are applicable to this specification and in addition, under ordering data, should specify the following:

- a. If preproduction samples are not required (see 4.1.1.1.1).
- b. Impedance (see Table I).

6.2 Stock material. - Miscellaneous stock materials not shown on Figure 1 which may be required for use with synchros, should be selected from LD 255268.

Notice. - When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

