

METRIC

MIL-PRF-46750E(AT)

29 January 1998

SUPERSEDING

MIL-T-46750D(AT)

29 July 1992

PERFORMANCE SPECIFICATION

TRANSMISSION, CROSS DRIVE, HYDRODYNAMIC, MODEL XTG411

This specification is approved for use by the U.S. Army Tank-automotive and Armaments Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of hydraulic transmission, and major components thereof, for use in tracked military vehicles.

1.2 Classification. This specification covers two different models of XTG411 transmissions, the XTG411-2A and the XTG411-4. These two models differ in performance as defined in MIL-PRF-46750/1A for the XTG411-2A and MIL-PRF-46750/2A for the XTG411-4 (see 6.2).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirement documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

AMSC N/A

FSC 2520

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

- MIL-PRF-46750/1 - Transmission, Hydraulic, Model XTG411-2A.
- MIL-PRF-46750/2 - Transmission, Hydraulic, Model XTG411-4

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.3.1.

3.3 Design, materials, and manufacturing processes. Unless otherwise specified (see 6.2), the design, materials, and manufacturing process selection is the prerogative of the contractor as long as all transmissions fully meet the operating, interface, ownership and support, and operating environment requirements specified. Recycled, recovered, or environmentally preferable materials shall be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

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3.4 Operating requirements. Each transmission shall provide the following functional, operational, and performance capabilities. The individual item requirements shall be as specified herein and in accordance with the applicable performance specification sheet(s). Where the word “transmission” is used herein, it is intended to mean an assembly consisting of the main transmission assembly and the input transfer gear assembly.

3.4.1 Oil temperature and oil level. Unless otherwise specified, the cooler-in oil temperature shall be maintained between 82 and 121 degrees Celsius (°C) (180 and 250 degrees Fahrenheit (°F)) during dynamometer operation. Oil level in the transmission shall be maintained within the proper operating range during operation.

3.4.2 Functional operations. The transmission shall operate at 300-400 revolutions per minute (rpm) input speed in all shift and steer positions without any indications of mechanical malfunction.

3.4.2.1 First to second range shift. The transmission shall shift at 300-400 rpm input speed from first range to second range without any momentary stop or decreased speed.

3.4.2.2 Brake adjustment. The transmission brakes shall be adjusted so when the brake is applied with 133-138 Newton meter (N-m) (98-102 pound-feet (lb-ft)) torque, rotation on the left hand (LH) and right hand (RH) brake apply shafts is not less than 28 nor more than 32 degrees (°) travel.

3.4.3 Fourth range stall. Fourth range stall shall be in accordance with MIL-PRF-46750/1A or MIL-PRF-46750/2A, as applicable.

3.4.4 Third range steer. Third range steer shall be in accordance with Table I and MIL-PRF-46750/1A or MIL-PRF-46750/2A, as applicable.

TABLE I. Third range partial steer performance values.

Item Direction of steer limits	RH		LH	
	Minimum (min.)	Maximum (max.)	Min.	Max.
Input speed (rpm)	*1450	*1510	*1450	*1510
Output torque (N-m)	*217 (200 lb-ft)	*813 (600 lb-ft)	*271 (200 lb-ft)	*813 (600 lb-ft)
Steer lever travel for Output clutch pressure to drop to 0 (°)	0.5	6.5	0.5	6.5

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TABLE I. Third range partial steer performance values- Continued.

Item	RH		LF	
	Min.	Max.	Min.	Max.
Steer lever travel for steer clutch pressure to appear on gauge (°)	1.0	7.0	1.0	7.0
Steer lever travel (°)	*15	*15	*15	*15
Steer clutch pressure kilopascals (kPa)	186 (27 pounds per square inch (psi))	317 (46 psi)	186 (27 psi)	317 (46 psi)

*Predetermined Values

3.4.5 Lockup clutch operation.

3.4.5.1 Lockup clutch engagement - no load. The transmission shall automatically engage the lockup clutch at an output speed between 890 and 1090 rpm.

3.4.5.2 Lockup clutch load. Transmission performance shall be in accordance with values as specified in Table II.

TABLE II. Lockup clutch load valves.

Item	Min.	Max.
Cooler oil flow (liters per second (L/s))	0.76 (12 gallons per minute (gal/min))	----
Output speed (rpm)	1240	1340
Lockup clutch apply oil pressure (kPa)	862 (125 psi)	----

3.4.5.3 Lockup clutch disengagement - no load. The transmission shall automatically disengage the lockup clutch at an output speed between 560 and 680 rpm.

3.4.6 First range steer. First range steer shall be as specified in MIL-PRF-46750/1A or MIL-PRF-46750/2A, as applicable.

3.4.7 Reverse range (R₂) function. R₂ function shall be within the limits specified in MIL-PRF-46750/1A or MIL-PRF-46750/2A, as applicable.

3.4.8 Service brake capacity. The RH and LH brakes shall hold transmission output without movement.

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3.4.9 Fourth range friction loss. The input torque shall not exceed 183 N-m (135 lb-ft) friction loss.

3.4.10 Brake coolant pump flow. Brake coolant oil flow shall occur before engagement of the brake plates.

3.4.11 Shift inhibitor evaluation. The input speeds at which the shifts are permitted shall be within the speed values as specified in Table III .

TABLE III. Downshift inhibitor speed values.

Item	Min.	Max.
Input speed (rpm) - 4th to 3rd	930	1410
Input speed (rpm) - 1st to neutral	600	1180

3.4.12 Range upshift. Transmission shall upshift throughout range of operation.

3.4.13 Speedometer drive check. During transmission operation, the speedometer drive shaft shall rotate when the left-hand output is turning.

3.4.14 Oil warm-up. The cooler-in temperature shall be maintained between 116 and 127°C (240 and 260°F) during operation as specified in 3.4.15 through 3.4.17. During warm-up operation, oil temperature shall not exceed 149°C (300°F).

3.4.15 Range shifts. The transmission shall upshift and downshift throughout operating range.

3.4.16 Output and steer pressure evaluation. Output and steer pressure shall be within the limits as specified in table IV.

TABLE IV. All forward ranges performance values.

Item	First		Second		Third		Fourth	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Oil pressure in kPa (psi):								
Output clutch RH	0	0	1138 (165)	---	1138 (165)	---	758 (110)	---
Output clutch LH	0	0	1138 (165)	---	1138 (165)	---	758 (110)	---

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TABLE IV. All forward ranges performance values - Continued.

Item	First		Second		Third		Fourth	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Steer clutch RH	1138 (165)	0	0	0	0	0	0	0
Steer clutch LH	1138 (165)		0	0	0		0	0
Cooler-in oil temperature °C (°F)	116 (240)	127 (260)	116 (240)	127 (260)	116 (240)	127 (260)	116 (240)	127 (260)

3.4.17 Brake and steer clutch performance. Brake and steer clutches shall function when applied.

3.4.18 Valve movement. The steer valve shall move freely.

3.4.19 Leakage. After dynamometer operation, the transmission shall show no evidence of a leak, drip, weep and seep (see 6.7).

3.4.20 Component performance.

3.4.20.1 Main assembly. The main assembly shall conform to performance requirements as specified in 3.4.1 through 3.4.19.

3.4.20.2 Input transfer gear assembly. The input transfer gear assembly shall conform to performance requirements in 3.4.1 through 3.4.3, inclusive, 3.4.5.1 through 3.4.5.3, inclusive, 3.4.9 and 3.4.19.

3.5 Interface requirements. Each transmission shall conform to the following inputs and interfaces.

3.5.1 Interface and envelope dimensions. Transmission shall possess the requisite interface and envelope dimensions necessary for satisfactory performance on the engines of the following combat and tactical vehicles, the M107, M108, M109, M110, or the M578, as specified in the contract or order (see 6.2 and 6.6).

3.6 Ownership and support requirements. Each transmission shall possess the following life cycle ownership characteristics.

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3.6.1 Durability. After proper installation in specified vehicle (see 6.2), the transmission shall be operated for distances up to 8046 kilometers (5000 miles), under conditions commensurate with the vehicle for which transmission is being procured, and require neither repair and nor maintenance, other than filter changes, oil changes, oil additions, and brake adjustments.

3.6.2 Exterior surface treatment. All exposed surfaces of the transmission or components shall be cleaned, painted or treated for corrosion resistance commensurate with the particular material and using the best commercial practices. Unless otherwise specified (see 6.2), color of final top coat of painted surfaces shall be white.

3.6.3 Identification and marking. Unless otherwise specified (see 6.2), all parts requiring identification and marking shall be permanently and legibly marked and shall include as a minimum, the model number, the serial number, the National Stock Number (NSN) and the manufacturers name or identification (CAGE).

3.6.4 Safety. The transmission shall not produce any hazards to personnel or the environment.

3.7 Operating environment requirements. Each transmission shall function under the environmental conditions specified for the vehicle for which the transmission is being procured (see 6.1).

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3.1).
- b. Conformance inspections (CI) (see 4.3.2).

4.2 Verification methods. The types of verification methods included in this section are visual inspection, road tests, measurement, sample tests, full-scale demonstration tests, simulation, modeling, engineering evaluation, component properties analysis, similarity to previously-approved or previously-qualified designs, and by inspection of contractor records providing proof or certification that design, construction, processing, and materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, industry standards, test reports, and rating data.

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4.2.1 Verification alternatives. The manufacturer may propose alternative test methods, techniques, or equipment, including the application of statistical processes control, tool control, or cost-effective sampling procedures, to verify performance. See the contract for alternatives that replace verification required by this specification.

4.2.2 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be performed under the following controlled ambient conditions:

- a. Temperature: $23 \pm 10^{\circ}\text{C}$ ($73 \pm 18^{\circ}\text{F}$)
- b. Atmospheric pressure: 92 ± 11 kPa (28.5 (+2.0, - 4.5) inches of Hg)
- c. Relative humidity: 50 ± 30 percent (%).

4.3 Order of inspections. The inspection sequence may be in any order.

4.3.1 First article inspection. When specified (see 6.2 and 6.3), first article inspection shall include all the verifications listed in table V.

Table V. Verification Methods.

Title	Requirements	Verification	Title	Requirements	Verification
Operating requirements	3.4	4.3.3	Upshift	3.4.12	4.3.3.14
Oil, In-vehicle operation	3.4.1	4.3.3.1	Speedometer drive	3.4.13	4.3.3.15
		4.3.3.1.1	Oil warm-up	3.4.14	4.3.3.16
Functional operation	3.4.2	4.3.3.2	Range shifts	3.4.15	4.3.3.17
First-second range shift	3.4.2.1	4.3.3.2.1	Output, steer pressure	3.4.16	4.3.3.18
Brake adjustment	3.4.2.2	4.3.3.2.2	Brake and steer clutch	3.4.17	4.3.3.19
Fourth range stall	3.4.3	4.3.3.3	Valve movement	3.4.18	4.3.3.20
Third range steer	3.4.4	4.3.3.4	Leakage	3.4.19	4.3.3.21
Lockup clutch	3.4.5.1	4.3.3.5	Main assembly	3.4.20.1	4.3.3.22
engagement-no load			Input transfer assembly	3.4.20.2	4.3.3.23
Lockup clutch- load	3.4.5.2	4.3.3.6	Interface requirements	3.5	4.3.4
Lockup clutch	3.4.5.3	4.3.3.7	Interface dimensions	3.5.1	4.3.4
disengagement- no load			Ownership and support requirements	3.6	4.3.5
First range steer	3.4.6	4.3.3.8	Durability	3.6.1	4.3.5.1
Reverse range	3.4.7	4.3.3.9	Exterior surface	3.6.2	4.3.5.2
Service brake	3.4.8	4.3.3.10	Identification and marking	3.6.3	4.3.5.3
Friction loss	3.4.9	4.3.3.11	Safety	3.6.4	4.3.5.4
Coolant pump flow	3.4.10	4.3.3.12	Operating environment	3.7	4.3.6
Shift inhibitor	3.4.11	4.3.3.13			

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4.3.2 CI. CI shall include the tests and examinations from table V as defined in the contract (see 6.4).

4.3.3 Operating requirements verification.

4.3.3.1 Oil temperature and oil level. The transmission shall be filled with oil within the operating range and operated as required to bring oil to operating temperature. The transmission shall be checked to meet performance requirements and show no evidence of leakage. The vehicle shall then be stopped for 3 minutes and checked for oil level.

4.3.3.1.1 In vehicle operation. The transmission shall be installed into a government selected vehicle, filled with proper oil to operating range, and operated. After the vehicle has been stopped for 3 minutes, the transmission shall be checked for oil leakage.

4.3.3.2 Functional operation. The range selector level shall be placed in the third range position. With the output shafts stalled by the dynamometers, increase input speed to 980-1220 rpm and run at this speed for a minimum of one minute. Run at 300-400 rpm input speed, and functionally check all steer and shift positions for any indication of mechanical malfunction.

4.3.3.2.1 First to second range shift. Transmissions shall be operated between 300-400 rpm input speed and shifted from first to second gear and checked for performance requirements.

4.3.3.2.2 Brake adjustment. Adjusted brakes shall be checked for meeting torque and alignment requirements.

4.3.3.3 Fourth range stall. The range selector level shall be placed in the fourth range with the throttle valve full on and the out shafts stalled. Input torque shall be increased to between 1000-1006 N-m (738 and 742 ft-lb) and transmission checked for performance requirements.

4.3.3.4 Third range steer. With the range selector in third range, the throttle valve full “on”, with an input speed of 1490-1510 revolutions per minute (rpm) and 271-813 N-m (200-600 lb-ft) torque load on output shafts, monitor the cooler oil flow. Slowly move the steer lever from “no steer” position to RH steer until RH output clutch pressure drops to 0 and monitor the steer level travel; continue to move the steer lever until steer clutch pressure is noted and monitor the steer lever travel; continue to move the steer lever to 15° rotation; transmission performance shall be as specified in table I. Move the steer lever to full RH steer position and monitor the cooler oil flow. The cooler oil flow shall be at least 0.5 L/s (8 gallons per minute (gal/min)) less than recorded at “no steer” position. Increase input torque to 1000-1006 N-m

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(738-742 lb-ft). Transmission performance shall be in accordance with applicable specification sheet. Reduce input speed to 300 ± 25 rpm and shift to no steer. Repeat the above sequence for LH steer.

4.3.3.5 Lockup clutch engagement no load. Operate transmission with range selector in third gear, throttle valve full “on”, with no load on output shaft, and check for performance requirements.

4.3.3.6 Lockup clutch load. Operate transmission with range selector in third gear, throttle valve full “on”, with an input speed of 2045-2055 rpm, the load on the dynamometers shall be increased to produce 1356-1491 N-m (1000-1100 lb-ft) total transmission output torque, and checked for performance requirements.

4.3.3.7 Lockup clutch disengagement- no load. Operate transmission with the range selector in third gear, with no throttle valve pressure, the lockup clutch engaged, no load on output shafts, and check for performance requirements.

4.3.3.8 First range steer. With the range selector in first range, throttle valve full “on”, with an input speed of 1490-1510 rpm and a 678-813 N-m (500-600 lb-ft) load on the output shafts, monitor cooler oil flow. Move the steer lever to full RH steer position and increase the load on the LH output in accordance with MIL-PRF-46750/1A or MIL-PRF-46750/2A, as applicable. Check for performance requirements. Reduce input speed to 300 rpm \pm 25 rpm and return steer lever to “no steer” position. Repeat the above sequence to LH steer, interchanging RH and LH.

4.3.3.9 R₂ function. Transmission shall be operated with selector in R₂, the throttle valve full “on”, an input speed of 1640-1660 rpm, and an output speed of 275-335 rpm, check for performance requirements.

4.3.3.10 Service break capacity. With the selector lever in first range, throttle valve full “on”, and RH output shaft coupled to and stalled by the dynamometer, the input speed shall be increased until RH output shaft torque is as specified in MIL-PRF-46750/1A or MIL-PRF-46750/2A, as applicable. With 133 to 138 N-m (98 to 102 lb-ft) torque applied to RH brake shaft and dynamometer released, the RH brake shall meet performance requirements. The above procedure shall be repeated on the LH brake.

4.3.3.11 Fourth range friction loss. Operate transmission with the range selector in fourth range, the throttle valve full “on”, and the output shafts uncoupled and an input speed of 1995-2005 rpm, and check for performance requirements.

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4.3.3.12 Brake coolant pump flow. With the range selector in fourth range, throttle valve full “on”, the output shaft uncoupled from the dynamometers and an input speed of 1995-2005 rpm, and check for proper brake coolant oil flow when the respective brake apply lever is moved in the apply direction.

4.3.3.13 Shift inhibitor evaluation. With the range selector in fourth range, throttle valve full “on”, the output shafts uncoupled from the dynamometer, and an input speed of 1490-1510 rpm, reduce the input speed until a fourth to third range downshift is permitted by the down shift inhibitor. Repeat the operation starting in first range for a first range to neutral shift. The input speeds at which the shifts are permitted shall be within the specified speed values.

4.3.3.14 Range upshift. With the range selector in third range, no throttle valve displacement, the output shafts uncoupled from the absorption dynamometers and an input speed of 1490-1510 rpm with the lockup clutch engaged, shift into fourth range. Lockup pressure must drop momentarily as the shift is made and return to 862 kPa (125 psi) minimum when the shift is completed.

4.3.3.15 Speedometer drive check. Operate left-hand output as specified and check for rotation.

4.3.3.16 Oil warm-up. Monitor cooler-in temperature during range shifts (see 4.3.3.14 and 4.3.3.17).

4.3.3.17 Range shifts. With the range selector in desired range, no throttle valve pressure, with an input speed of 600-800 rpm and no load on output shaft, the transmission shall be shifted in first, second, third and fourth range and then back to third, second and first range. Shifts shall be intermittent to allow the clutches to engage.

4.3.3.18 Output and steer pressure evaluation. Operate transmission with the range selector in desired range, no throttle valve pressure, the output shafts uncoupled from the dynamometers and an input speed of 975-1025 rpm, and check for performance requirements.

4.3.3.19 Brake and steer clutch performance. Full steer clutch shall be applied in first, second, third, and fourth range. Proper action of the brake and steer clutches shall be checked in accordance with table VI. Both LH and RH steer shall function when applied.

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TABLE VI. Brake and steer clutch functional check.

Item range	Steer function
First	Drop steer clutch, apply brake
Second	Drop output clutch, apply brake
Third	Drop output clutch, apply steer clutch
Fourth	Drop output clutch, apply steer clutch

4.3.3.20 Valve movement. Remove cover assembly and check for functional requirements.

4.3.3.21 Leakage. Transmission shall be shifted through all ranges and steer operations made in the first and fourth ranges at an input speed of 1480-1520 rpm. A minimum temperature of 66 °C (150 °F) shall be maintained at the oil cooler “in” location. During and after operation, the transmission shall be checked for the leakage of lubricants.

4.3.3.22 Main assembly. Operate with a slave input transfer gear assembly and check for performance requirements.

4.3.3.23 Input transfer gear assembly. Operate with a qualified slave main assembly and check for performance requirements.

4.3.4 Interface verifications. Interface requirements shall be verified using one or more of the methods outlined in 4.2.

4.3.5 Ownership and support verifications. Ownership and support verifications, except as specified below, shall be verified using one or more of the methods outlined in 4.2.

4.3.5.1 Durability. Vehicle shall be operated as specified and checked for performance requirements.

4.3.5.2 Exterior surface treatment. Visually inspect transmission and components for improper application of paint or other finish coat or wrong color.

4.3.5.3 Identification and marking. Inspect transmission and components for improper or illegible marking.

4.3.5.4 Safety. Transmission shall be tested using one or more of the methods outlined in 4.2, or an applicable alternative (see 4.2.1), to insure that transmission does not produce safety hazards resulting from the use of asbestos, cadmium, or other radioactive material.

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4.3.6 Operating environment verifications. Operating environment requirements shall be verified using one or more of the methods outlined in 4.2.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. The transmission and component assemblies covered by this specification are military unique items intended for use in new production, as spares, or as replacements in military unique combat or tactical vehicles, M107, M108, M109, M110, and M578. Any of these vehicles could employ either the XTG411-4 or XTG411-2A model transmissions, however, the XTG411-4 model will provide increased braking capacity, better cooling characteristics and possibly, increased durability.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Transmission model (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1).
- d. If first article testing is required (see 3.2 and 4.3.1).
- e. If design, materials, or manufacturing is other than as specified (see 3.3).
- f. Specification of vehicle for which transmission is being procured (see 3.5.1 and 3.6.1).
- g. Color of final top coat of painted surfaces if other than white (see 3.6.2).
- h. Marking of parts and identification plates, if required (see 3.6.3).
- i. If inspection conditions should be other than as specified (see 4.2.2).
- j. Packaging requirements (see 5.1).

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6.3 First article. When requiring a first article inspection, contracting documents should provide specific guidance to offerors. This guidance should cover whether the first article is a first article sample, a first production item, or the number of test items. These documents should also include specific instructions regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Pre-solicitation documents should provide Government waiver rights for samples for first article inspection to bidders offering a previously acquired or tested product. Bidders offering such products who wish to rely on such production testing must furnish evidence with the bid that prior Government approval is appropriate for the pending contract.

6.4 Conformance inspection. Affordable conformance inspection with confidence varies depending upon a number of procurement risk factors. Some of these factors include: Contractor past performance, government schedules and budget, product material and design maturity, manufacturing capital equipment and processes applied, the controlled uniformity of those processes, labor skill and training, and the uniformity of measuring processes and techniques. During the solicitation, contracting documents should indicate those tests desired from table V and their designated frequency based on a risk assessment for the procurement.

6.5 Transmission orientation. The terms LH and RH are derived as follows:

- a. The “front” of the transmission is the side which lies next to and parallel to the input shaft.
- b. The input transfer housing extends out from the “left side” on the transmission.
- c. The “rear” of the transmission is the end opposite the front.
- d. The “right” side is the side on the viewer’s right as he faces the transmission from the rear.
- e. The “left” side is the side on the viewer’s left.
- f. These definitions are established relative to the transmission only and not relative to any vehicle installation definitions.

6.6 Government drawings. Historically, drawings 8351098, Transfer Gear Assembly, XTG411-2A Input; 8351099, Main Assembly, XTG411-2A Transmission; 8351938, Cover Assembly, Steer Valve; 11650298, Transfer Gear Assembly, XTG411-4 Input; and 11650299, Main Assembly, XTG411-4 Transmission, have been used to procure transmissions and it is advisable to reference drawings for relevant interface and envelope dimensions. Copies of these drawings are available from the U.S. Army Tank-automotive and Armaments Command, AMSTA-TR-E/BLUE, Warren, MI 48397-5000.

6.7 Definitions. The following definitions are established as guidelines governing leakage:

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- a. Weep - Any evidence of fluid beyond a seal or splitline.
- b. Seep - Any evidence of fluid beyond a seal or splitline that does not result in the formation of a droplet.
- c. Leak - Any evidence of fluid beyond a seal or splitline that results in the formation of a droplet.
- d. Drip - Any evidence of fluid beyond a seal or splitline where droplets form and fall.

6.8 Subject term (key word) listing.

Main assembly
Powerpack
Self-propelled gun
Tracked vehicle
Transfer gear assembly

6.9 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the change.

Custodian:
Army - AT

Preparing Activity:
Army - AT

(Project 2520-0012)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-46750E(AT)	2. DOCUMENT DATE (YYMMDD) 980129
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3. DOCUMENT TITLE

Transmission, Cross Drive, Hydrodynamic, Model XTG411

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME <i>(Last, First, Middle Initial)</i>	b. ORGANIZATION	
c. ADDRESS <i>(Include Zip Code)</i>	d. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (2) AUTOVON <i>(If applicable)</i>	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (810) 574-8745 (2) AUTOVON 786-8745	
c. ADDRESS <i>(Include Zip Code)</i> Commander U.S. Army Tank-automotive and Armaments Command ATTN: AMSTA-TR-E/BLUE Warren, MI 48397-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403 Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	