

MIL-H-82127A(MC)

6 November 1978

SUPERSEDING

MIL-H-82127(MC)

6 June 1966

MILITARY SPECIFICATION

HOSE ASSEMBLY, RUBBER (SYNTHETIC):

FUEL, DISCHARGE, COLLAPSIBLE

This specification is approved for use by U.S. Marine Corps, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers collapsible, synthetic rubber, discharge hose assemblies.

1.2 Classification. The collapsible discharge hose assemblies shall be of the following sizes, as specified in 1.2.1 and 6.2.1:

Sizes

2-inch

4-inch

6-inch

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commandant of the Marine Corps, Headquarters Marine Corps, Code LMA-1, Washington, D.C. 20380 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 4720

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1.2.1 Part number. The military specification part number for the hose assemblies shall be as follows (see Table I and 6.4).

Example:	M	82127	00	0000	00000
	Prefix	Basic	Hose	Quarter	Manufacturer's
	meaning	number	dash	year of	Federal Code
	military	of spec-	size	manufacture	Identification
		ification			

TABLE I. Size and dash code numbers.

Size nom.	Inside dimensions		
	2	4	6
Dash no.	08	11	32

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

- | | |
|----------|--|
| QQ-S-766 | - Steel Plates, Sheets, and Strip - Corrosion Resisting. |
| VV-F-800 | - Fuel Oil, Diesel. |
| WW-C-440 | - Clamps, Hose, (Low-Pressure). |

MILITARY

- | | |
|------------|--|
| MIL-P-775 | - Packaging of Hose, Hose Assemblies; Rubber, Plastic, Fabric, or Metal (Including Tubing); and Fittings, Nozzles and Strainers. |
| MIL-G-3056 | - Gasoline, Automotive, Combat. |
| MIL-G-5572 | - Gasoline, Aviation: Grades 80/87, 100/130, 115/45. |
| MIL-T-5624 | - Turbine fuel, Aviation, Grades JP-4 and JP-5. |

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STANDARDS

FEDERAL

FED-STD-601 - Rubber: Sampling and Testing.

MILITARY

MIL-STD-105 - Sampling Procedures and Tables
for Inspection by Attributes.

MIL-STD-129 - Marking for Shipment and
Storage.

MIL-STD-1188 - Commercial Packaging of Supplies
and Equipment.

MS27021 - Coupling Half, Quick Disconnect,
Cam-Locking Type, Male, Hose
Shank, Type II.

MS27025 - Coupling Half, Quick Disconnect,
Cam-Locking Type, Female, Hose
Shank, Type VI.

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS

ASTM D 380 - Rubber Hose Testing.

ASTM D 381 - Existent Gum in Fuels by Jet Evaporation.

ASTM D 412 - Rubber Properties in Tension.

ASTM D 413 - Rubber Property - Adhesion to Flexible Substrate.

ASTM D 471 - Rubber Property - Effect of Liquids.

ASTM D 518 - Rubber Deterioration - Surface Cracking.

ASTM D 1053 - Measuring Rubber Property - Stiffening at Low Temperature Using a Torsional Wire Apparatus.

ASTM D 1149 - Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimens).

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

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(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 First article. When specified (see 6.2.1), the contractor shall furnish sample unit(s) for first article inspection and approval (see 4.4 and 6.3).

3.2 Material. Material shall be as specified herein. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification (see 6.5).

3.3 Design and construction. The hose assemblies shall consist of collapsible, reinforced synthetic rubber hose with attached cam-locking type coupling halves.

3.3.1 Hose. The hose shall be constructed of a compounded inner tube, a cotton or synthetic fiber reinforcement, and a compounded cover.

3.3.2 Tube. The tube shall be fabricated from a synthetic compound utilizing a copolymer product of butadiene and acrylonitrile. The compound shall be resistant to aromatic hydrocarbon fuels, and shall not have any deleterious effects upon all types and grades of fuels conforming to MIL-G-3056 (automotive gasoline), MIL-G-5572 (aviation gasoline), MIL-T-5624 (jet fuels), and VV-F-800 (diesel fuel). The tube shall be smooth, free from pits, and of uniform thickness. The thickness of the tube shall be not less than 5/64 inch.

3.3.3 Cover. The cover shall be fabricated from a synthetic compound utilizing polymerized chloroprene. The cover shall be uniform in thickness and shall be not less than 5/64 inch.

3.3.4 Coupling halves. The appropriate size, class, and type of coupling halves, with specified gaskets, shall be furnished with each size of hose as shown in Table II.

3.3.5 Hose clamps. Each cam-locking type coupling half shall be banded to the hose with clamps conforming to WW-C-440, type H, except the clamp material shall be corrosion-resistant steel conforming to QQ-S-766, class 201, condition A. Quantity and size of clamps for each size hose shall be as shown in Table II. When installed and locked the clamps shall have no protruding ends.

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TABLE II. Coupling halves and clamps.

Hose dash no.	Hose size nom.	Couplings		Clamps	
				Size width	Qty. per cplg.
08	2	Female MS27025-11	Male MS27021-11	5/8	2
11	4	Female MS27025-17	Male MS27021-17	3/4	2
32	6	Female MS27025-21	Male MS27021-21	3/4	3

3.3.6 Reinforcement.

3.3.6.1 Size 2-inch hose. The reinforcement material for the size 2-inch hose (dash number 08) shall be one or more plies of braided or spiraled cotton, or synthetic fiber cord which shall be evenly and firmly fabricated and thoroughly impregnated with synthetic rubber compound which shall cause the plies to adhere firmly to each other and to the tube and cover. The reinforcement material shall be applied by braiding, looming, or spiral winding twist to provide a balanced design. The reinforcement shall be evenly and firmly fabricated, and shall be free from defects, dirt, knots, lumps, and irregularities of twist so that the completed hose shall comply with all the applicable requirements herein.

3.3.6.2 Sizes 4- and 6-inch hoses. The reinforcement material for the sizes 4- and 6-inch hoses (dash numbers 11 and 32, respectively) shall be a fabric of two or more even-numbered layers of parallel cotton or synthetic fiber cord embedded in synthetic rubber compound, wound or plied in contradirection, and arranged so that there is a rubber bond through the space between each cord which will provide a continuous rubber bond from the inner tube through the reinforcement to the outer cover. The reinforcement shall be evenly and firmly fabricated, and shall be free from defects, dirt, knots, lumps, and irregularities of twist so that the completed hose shall comply with all of the applicable requirements herein.

3.3.6.3 End reinforcement. Each length of hose shall be constructed with an end reinforcement at each end not less than 14 inches long. The end reinforcement shall consist of one or more plies of the fabric specified in 3.3.6.1.

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3.4 Physical and chemical properties.

3.4.1 Hydrostatic pressure. The hose with couplings attached shall not leak nor show any imperfections in either the hose or couplings (see 4.6.2.1).

3.4.1.1 Length change and twist. The length of hose shall not change more than plus or minus 3 percent and shall not twist either clockwise or counterclockwise more than one-half turn (180 degrees) in 25 feet (see 4.6.2.2).

3.4.1.2 Minimum burst. Each type of hose shall have a minimum burst pressure as specified in Table III (see 4.6.2.3).

TABLE III. Burst and working pressures.

Hose dash no.	Size I.D. (inches nom.)	Burst pressure lb_f/in^2 (min.)	Working pressure lb_f/in^2
08	2	400	100
11	4	600	150
32	6	600	150

3.4.2 Tensile strength. The tensile strength of the tube shall be not less than 1,250 pounds force per square inch (lb_f/in^2) and the tensile strength of the cover shall be not less than 1,000 lb_f/in^2 (see 4.6.2.4.1). The tensile strength of the tube and cover after immersion shall be not less than 40 percent or less than 600 lb_f/in^2 (whichever is greater) of the tensile strength obtained before immersion (see 4.6.2.4.2).

3.4.3 Ultimate elongation. The ultimate elongation of the tube and cover shall be not less than 200 percent or, when tested as specified in 4.6.2.4.2, shall be not less than 40 percent of the original elongation obtained before immersion.

3.4.4 Adhesion.

3.4.4.1 Original. The original adhesion between tube and plies, and between the cover and the plies, shall be not less than 10 pounds force (lb_f) (see 4.6.2.4.3).

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3.4.4.2 After fill test. The adhesion between the tube and plies, between the plies, and between the cover and the plies shall be not less than 6 lbf (see 4.6.2.4.4).

3.4.5 Volume increase. The volume increase of the tube specimen after immersion in test fluid shall not exceed 40 percent, and the volume increase of the cover specimen shall not exceed 70 percent (see 4.6.2.5).

3.4.6 Low temperature flexibility. The relative torsional modulus for the inner tube and the outer cover shall be not greater than 5 at minus 32° C (minus 25.6° F) (see 4.6.2.6).

3.4.7 Existent gum content. The remainder shall be not more than 20 milligrams per 100 milliliters of test fluid (see 4.6.2.7).

3.4.8 Ozone resistance. The hose cover material shall show no evidence of cracking, checking, or irregularities at the end of the exposure time when viewed under 7 power magnification (see 4.6.2.8).

3.5 Quantities, dimensions, and weights. The quantities and lengths of the hose shall be as specified (see 6.2.1) and shall be the actual hose length exclusive of the couplings. A tolerance in length of 2 percent will be permitted. This hose shall be furnished in the diameters and weights shown in Table IV.

TABLE IV. Diameters and weights.

Size (I.D.) inches (plus or minus 1/32 inch)		Outside diameter (inches at ends)	Pounds per foot (maximum)
Dash no.	Size nom.		
08	2	2-9/16, plus 1/8 or minus 1/16	1-1/4
11	4	4-3/4, plus 1/8 or minus 1/16	2-5/8
32	6	6-5/8, plus 1/8 or minus 1/16	4-11/16

3.6 Identification marking. Each length of hose shall be branded with the manufacturer's name or trademark, the quarter and year of manufacture, the type, the working pressure, and the words "Hose, Liquid Petroleum Fuels, Dispensing, Collapsible." The hoses shall be branded with the manufacturer's standard working pressures for the specific type and size hose supplied, and shall be rated at the working pressures

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indicated in Table III. The letters shall be molded, either recessed or in relief, and shall be not less than 1/4-inch high. Hoses shall be branded at 10-foot intervals or by continuous-impression branding, provided that the pattern will be repeated every 5 feet or less.

3.7 Workmanship. The hose assemblies shall conform to the quality requirements specified herein with no cuts, nicks, bruises, blisters, sharp edges, or lumps, and shall be clean and smooth. Each hose assembly shall be free from any other workmanship deficiencies that could impair the function or serviceability of the hose or endfitting in its intended use.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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

- a. Component and material inspection (see 4.3).
- b. First article inspection (see 4.4).
- c. Quality conformance inspection (see 4.5).
- d. Packaging inspection (see 4.7).

4.3 Component and material inspection. Components and materials used in the manufacturing, testing, and packaging of the hose assemblies shall be inspected in accordance with the applicable referenced documents. Nonconformance to the applicable referenced documents shall be cause for rejection.

4.4 First article inspection.

4.4.1 Examination. The first article hose assembly shall be examined as specified in 4.6.1. Presence of one or more defects shall be cause for rejection.

4.4.2 Tests. The first article hose assembly shall be tested as specified in 4.6.2.1 through 4.6.2.8, inclusive. Failure of any test shall be cause for rejection of the hose assembly.

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4.5 Quality conformance inspection.

4.5.1 Lot. Each lot shall consist of all units of hose assemblies of the same size manufactured under the same conditions and at the same time, and offered to the Government at one time.

4.5.2 Sampling. Sampling of hose and hose assemblies for examination and tests shall be in accordance with MIL-STD-105, Inspection Level S-2.

4.5.3 Examination. Samples selected in accordance with 4.5.2 shall be examined as specified in 4.6.1. Acceptable quality level (AQL) shall be 4.0 percent defective.

4.5.4 Tests.

4.5.4.1 Individual. Each hose assembly shall be tested as specified in 4.6.2.1. Failure of the test shall be cause for rejection.

4.5.4.2 Samples. Samples selected in accordance with 4.5.2 shall be tested as specified in 4.6.2.1 through 4.6.2.8, inclusive. AQL shall be 4.0 percent defective.

4.6 Inspection procedure.

4.6.1 Examination. The hose assembly shall be examined as specified herein for the following major defects:

101. Materials not as specified.
102. Diameters and weights not as specified.
103. Couplings not as specified.
104. Hose clamp not as specified.
105. Length of hose not as specified.
106. Design and construction not as specified.
107. Identification marking missing, illegible, or not as specified.
108. Workmanship not as specified.

4.6.2 Tests.

4.6.2.1 Hydrostatic. Each length of hose, with fittings such as couplings and adapters attached, shall be subjected to a hydrostatic pressure test in accordance with ASTM D 380 and as specified in Table V. Nonconformance to 3.4.1 shall constitute failure of the test.

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TABLE V. Hose sizes and hydrostatic test pressures.

Dash no.	Size nom.	Hydrostatic test lbf/in ²
08	2	200
11	4	250
32	6	250

4.6.2.2 Length change and twist. A measurement of the original length of each length of hose shall be made, with the hose laid out in a straight horizontal position, after a pressure of 10 lbf/in² is applied and maintained. With a crayon or soft pencil, make a mark on the top surface of the hose at each end adjacent to the coupling. These marks are used as a means of measuring the amount of twist during the test. The pressure shall then be increased to 100 lbf/in² and held for not less than 30 seconds. With the pressure still maintained, the final length measurement and the final twist measurement shall be taken. The percent change in length shall be calculated as plus for increase and minus for decrease in length. Nonconformance to 3.4.1.1 shall constitute failure of the test.

4.6.2.3 Minimum burst. A sample of not less than 3 feet nor more than 6 feet shall be cut from the one length selected from each 100 lengths for burst and physical tests. The hose shall be subjected to a hydrostatic test pressure in accordance with ASTM D 380 and as specified in Table III. The pressure shall be supplied at a uniform rate sufficient to develop the test pressure in 10 seconds, plus or minus 2 seconds. Nonconformance to 3.4.1.2 shall constitute failure of the test. The remaining section of hose from which the test sample has been taken shall be accepted as a full length, provided the sample meets all the requirements of the specification.

4.6.2.4 Tensile strength, elongation, and adhesion.

4.6.2.4.1 Tensile and elongation specimens. Tensile and elongation specimens shall be tested in accordance with ASTM D 412 method A. The immersion fuel test shall be performed in accordance with FED-STD-601 method 6001, utilizing test fluid consisting of 60 percent of medium No. 4 (low swelling), 25 percent of medium No. 8 (toluene), and 15 percent of medium No. 9 (xylene). Die "C" shall be used for cutting test specimens. The tube specimens shall be buffed to not less than 0.050-inch thickness. Nonconformance to 3.4.2 and 3.4.3 shall constitute failure of this test.

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4.6.2.4.2 Tensile strength and ultimate elongation after immersion. Tensile strength and ultimate elongation after immersion shall be determined in accordance with ASTM D 471. The immersion test fluid medium shall be as specified in 4.6.2.4.1. Nonconformance to 3.4.2 and 3.4.3 shall constitute failure of this test.

4.6.2.4.3 Original adhesion test. A dry specimen of hose material shall be tested in accordance with ASTM D 413 machine method. Nonconformance to 3.4.4.1 shall constitute failure of this test.

4.6.2.4.4 Adhesion after filling. A 12-inch length of the hose shall be stoppered and filled with the test fluid specified in 4.6.2.4.1. The section of hose with the test fluid shall be maintained at a temperature of plus 23° C, plus or minus 3° C (plus 73° F, plus or minus 5° F) for not less than 48 hours. Ring specimens shall be cut from the 12-inch length of hose and tested in accordance with ASTM D 413 machine method within 15 minutes after the removal of the test fluid. Nonconformance to 3.4.4.2 shall constitute failure of this test.

4.6.2.5 Volume increase. Volume increase test shall be determined in accordance with ASTM D 471 with the test fluid specified in 4.6.2.4.1. Nonconformance to 3.4.5 shall constitute failure of this test.

4.6.2.6 Low temperature flexibility. The test for low temperature flexibility shall be made in accordance with ASTM D 1053. The low temperature test shall be determined after the samples have been conditioned 7 days at minus 32° C (minus 25.6° F). Nonconformance with 3.4.6 shall constitute failure of this test.

4.6.2.7 Existent gum. A test sample of hose, not less than 14 inches long, shall be selected and the bottom plugged with a clean corrosion-resisting steel cylinder 2 inches long secured in place with a clamp. The sample shall be filled to within 2 inches of the top with test fluid specified in 4.6.2.4.1. The top end of the hose shall be plugged in a manner similar to the bottom. The sample shall then be stored in a vertical position for 7 days at an ambient temperature of plus 38° C, plus or minus 1° C (100° F, plus or minus 2° F). At the end of each 24 hours, the fuel in the sample shall be agitated for 5 minutes by moving the hose back and forth from a vertical to a horizontal position at a rate of 2 cycles per minute. At the end of the 7-day storage period, the fuel shall again be agitated in the sample for 5 minutes and immediately removed from the hose. The removed fuel shall be tested for existent gum in accordance with the air-jet solvent wash method of ASTM D 381. A blank shall be run on the test fluid at the same time and by the same method. The existent gum of the blank fluid shall be subtracted from the existent gum obtained from the test fluid removed from the hose. Nonconformance to 3.4.7 shall constitute failure of the test.

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4.6.2.8 Ozone resistance. Specimens of the cover, prepared as described in ASTM D 518 procedure A, shall be mounted in a 20-percent elongated position and tested in accordance with ASTM D 1149. After conditioning for 24 hours in an ozone-free atmosphere, the mounted specimens shall be exposed for 72 hours at 40° C, plus or minus 1° C (104° F plus or minus 1° F), to an atmosphere containing 50 parts, plus or minus 10 parts, per hundred million (pphm) of ozone. Upon completion of the test, the specimens shall be examined. Nonconformance to 3.4.8 shall constitute failure of this test.

4.7 Packaging inspection. The preservation, packing, and marking shall be examined to determine compliance with Section 5.

5. PACKAGING

5.1 Preservation. Preservatives shall not be used for hose covered by this specification. Preservation shall be level A or commercial, as specified (see 6.2.1).

5.1.1 Level A. Each hose assembly shall be preserved in accordance with the level A requirements of MIL-P-775.

5.1.2 Commercial. Hose assemblies shall be preserved in accordance with MIL-STD-1188.

5.2 Packing. Packing shall be level A, B, or commercial, as specified (see 6.2.1).

5.2.1 Level A. Hose assemblies shall be packed in accordance with the level A requirements of MIL-P-775.

5.2.2 Level B. Hose assemblies shall be packed in accordance with the level B requirements of MIL-P-775.

5.2.3 Commercial. Hose assemblies shall be packed in accordance with MIL-STD-1188.

5.3 Marking. In addition to any special marking required by the contract, unit packages, intermediate packages, and shipping containers shall be marked in accordance with the requirements of MIL-STD-129.

6. NOTES

6.1 Intended use. The hose assemblies covered by this specification are intended for transferring automotive and aviation gasoline, JP4 or JP5 jet fuel, or diesel fuels for the U.S. Marine Corps amphibious assault and tactical airfield fuel systems.

6.2 Ordering data. Procurement requirements should specify the following:

6.2.1 Procurement requirements.

- a. Title, number, and date of this specification.
- b. Size required (see 1.2).
- c. When first article is required for inspection and approval (see 3.1, 4.4, and 6.3).
- d. Quantity and length of hose assembly (see 3.5).
- e. Level of packaging and packing required (see 5.1 and 5.2).

6.2.2 Data requirements. When this specification is used in a procurement which incorporates Contract Data Requirements List (DD Form 1423) and invokes the provisions of 7-104.9(n) of the Armed Services Procurement Regulations, the data requirements identified below will be developed as specified by an approved Data Item Description (DID) (DD Form 1664) and delivered in accordance with the approved DD Form 1423 incorporated into the contract. When the provisions of ASPR-7-104.9(n) are not invoked, the data specified below will be delivered by the contractor in accordance with the contract requirements. Deliverable data required by this specification is cited in the following paragraphs:

<u>Paragraph</u>	<u>Data Requirement</u>	<u>Applicable DID</u>
4.4	First Article Inspection Procedures.	DI-T-4901
4.4	First Article Inspection Report.	DI-T-4902
4.5	Production/Acceptance Inspection Procedures.	DI-T-4903
4.6	Inspection System Program Plan.	DI-R-4803
4.6	End Item Final Inspection Record.	DI-R-4809

(Copies of data item descriptions required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

6.3 First article. When a first article is required it shall be tested and approved under the appropriate provisions of 7-104.55 of the Armed Services Procurement Regulation. The first article should be the first-produced item. The first article should consist of one hose assembly. The contracting officer should include specific instructions in all procurement instruments, regarding arrangements for examination, test, and approval of the first article.

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6.4 Definitive military specification part number. The military specification part number is a definitive part number which corresponds to the dash number and size of hose assemblies covered by this specification. The military specification prefix, number, dash size (internal dimensions), quarter year, and manufacturer's code identification of the hose are combined to form a definitive military specification part number.

Example:

Prefix - meaning military	M	82127	00	0000	00000
specification item	_____	_____	_____	_____	_____
Military specification number	_____	_____	_____	_____	_____
Hose dash number (see Table I)	_____	_____	_____	_____	_____
Quarter year, manufacture	_____	_____	_____	_____	_____
Manufacturer's code identification	_____	_____	_____	_____	_____

6.5 Recycled material. It is encouraged that recycled or reclaimed material be used, when practical, as long as it meets the requirements of this specification (see 3.2).

6.6 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Preparing activity:
Navy-MC

Project 4720-N542

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