

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Add new source, correct figure 1 notes. Editorial changes throughout.	2 June 2006	Thomas M. Hess

MIL-S-19500/322 has been inactivated.
This drawing may be used as a substitute.

Prepared in accordance with ASME-14.100

Selected item drawing

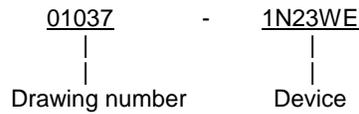
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REV STATUS OF PAGES	REV	A	A	A	A	A	A	A	A	A	A	A	A							
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PMIC N/A	PREPARED BY Roger Kissel		DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH http://www.dsc.dla.mil/programs/milspec/docsearch.asp																
Original date of drawing 1 June 2001	CHECKED BY Jason Hochstetler		TITLE SEMICONDUCTOR DEVICE, DIODE, SILICON, MIXER, 1N23WE, 1N23WEM, AND 1N23WEMR 1N23WG, 1N23WGM, AND 1N23WGMR																
	APPROVED BY Thomas M. Hess																		
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1. SCOPE

1.1 Scope. This drawing covers the performance requirements for a silicon point contact semiconductor diode for use as single units, matched forward pairs, and matched forward and reverse pairs as a mixer in X-band equipment. This drawing may be used as a substitute for MIL-S-19500/322 which has been inactivated (see 6.3).

1.2 Part or Identifying Number (PIN). An example of the complete PIN shall be as follows:



1.2.1 Device types. The device type shall identify the polarity and voltage of the devices as follows:

<u>Device type</u>	<u>Figure number</u>	<u>Device type</u>	<u>Figure number</u>
01037-1N23WE	1	01037-1N23WG	1
01037-1N23WEM	1	01037-1N23WGM	1
01037-1N23WEMR	1	01037-1N23WGMR	1

1.2 Ratings.

	1N23WE	1N23WG	1/G	L	N	SWR ratio	T _{STG} and T _{OP}
	dB	dB	<u>Ohms</u>	<u>dB</u>	<u>ratio</u>		
Min			335	6.0	1.4	1.3	-65°C to
Max	7.5	6.5	465				+150°C

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited 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 requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-19500 - Semiconductor Devices, General Specification for.

DEPARTMENT OF DEFENSE STANDARD

MIL-STD-750 - Test Methods for Semiconductor Devices.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch> or <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation or contract.

DESC Drawing D65019 - Test Holder for Microwave Diodes, Type 1N23.

(Application for copies should be addressed to Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O.Box 3990, Columbus, OH 43218-3990.

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2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASTM-B16/B16 - Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines.

(Application for copies should be addressed to ASTM International, P.O. Box C700, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, 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 General. The individual item requirements shall be in accordance with MIL-PRF-19500, and as specified herein.

3.2 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in MIL-PRF-19500. and as follows:

1/G Reciprocal of conductance (IF impedance).
SWR Standing wave ratio.

3.3 Interface and physical dimensions. The semiconductor diode shall be of symmetrical construction and shall consist of a cylindrical body having pins on both ends. The body outline with removable base adapter shall conform to figure 1. Organic package sealants may be used at the option of the manufacturer.

3.3.1 Base adapter. The base adapter shall be of the design, construction, and physical dimensions shown on figure 2.

3.3.2 Plating. The diode and base adapter shall be plated as specified on figures 1 and 2.

3.4 Performance characteristics. Performance characteristics shall be in accordance with tables I and II.

3.5 Marking. The marking shall be placed on each device in accordance with MIL-PRF-19500, except that the manufacturer's identification and country of origin may be omitted.

3.5.1 Matched diodes. The "M" suffix for matched diodes shall be omitted in the type designation on each device. Diodes meeting the matching requirements of this drawing will be packaged with a statement to that effect (see 4.4.2 and 4.4.3).

3.6 Manufacturer eligibility. To be eligible to supply devices to this drawing, the manufacturer shall perform conformance inspection in accordance with procuring activity's requested conformance inspection testing requirements in accordance with 4.3 herein. Devices specified herein shall meet traceability and lot formation requirements of MIL-PRF-19500, except as modified by the procuring activity.

3.7 Submission of certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as a source of supply in 6.4. The certificate of compliance submitted to DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990 prior to listing as a source of supply in 6.4, shall state that the manufacturer's product meets the applicable requirements of MIL-PRF-19500 and the requirements herein.

3.8 Certificate of conformance. A certificate of conformance shall be provided with each lot of devices delivered in accordance with this drawing.

3.9 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should 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.

3.10 Workmanship. The semiconductor shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

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4. VERIFICATION

4.1 Sampling and inspection. Unless otherwise specified, sampling and inspection procedures shall be performed in accordance with MIL-PRF-19500.

4.1.1 Structurally similar device types. Types 1N23WE and 1N23WG are structurally similar devices. Any type may be sampled for groups B inspection to accept all for quality conformance inspection.

4.2 Test conditions. Unless otherwise specified herein, the test conditions, when applicable, shall be as follows:

$P = 1.0 \text{ mW} \pm 5 \text{ percent.}$

$N_{if} \geq 1.5 \text{ dB.}$

$R_L = 100 \pm 1\Omega.$

$f = 9,375 \pm 5 \text{ MHz.}$

$Z_m = 400 \pm 10\Omega.$

Holder - DESC Drawing D65019 or equivalent.

4.2.1 Holder. The diode holder, DESC Drawing D65019 or equivalent, shall be used for all electrical test measurements.

4.3 Conformance inspection. Conformance inspection shall consist of the inspections and tests specified in groups A and B herein.

4.3.1 Group A inspection. Group A inspection shall consist of the inspections and tests specified in table I.

4.3.2 Group B inspection. Group B inspection shall consist of the inspections and tests specified in table II.

4.4 Methods of inspection and test. Methods of inspection and test shall be as specified in the appropriate tables and as follows:

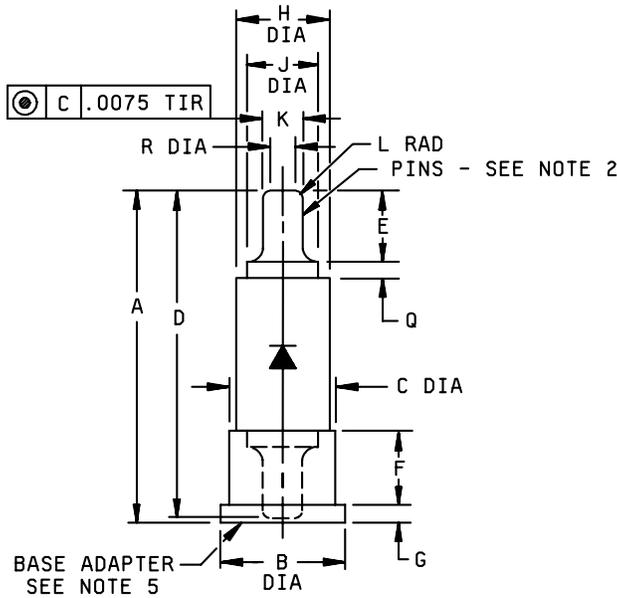
4.4.1 High-temperature operation. The semiconductor diode shall be placed in the mixer holder. The ambient temperature of the diode, with test conditions specified for the overall noise figure, shall be raised to +150°C and maintained at this temperature until equilibrium is reached. The F_{OM} shall then be determined and shall be less than the specified limit. The temperature shall then be returned to $25 \pm 3^\circ\text{C}$ at which time F_{OM} shall be less than the specified maximum limit.

4.4.2 Matched pair "M" suffix (forward polarity). The matched pair (M suffix) shall consist of two diodes, tested to the requirements of subgroup 3, table I, having the anode connected to the adapter.

4.4.3 Matched pair "MR" suffix (forward and reverse polarity). The matched forward and reverse pair (MR suffix) shall consist of two diodes, tested to the requirements of subgroup 3, table I: one diode having the anode connected to the adapter (forward polarity) and the second diode having the cathode connected to the adapter (reverse polarity).

4.4.4 Time limit for end-points. End-point tests for qualification and quality conformance inspection shall be completed within 96 hours after completion of the last test in the subgroup.

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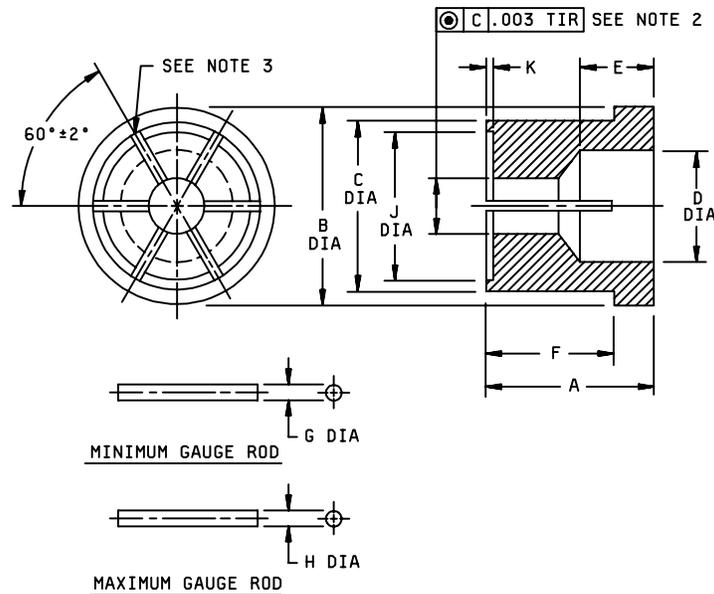
Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
A	.800	.840	20.32	21.34	
B	.292	.296	7.42	7.52	
C	.246	.250	6.25	6.35	
D	.766	.792	19.46	20.12	
E	.180	.190	4.57	4.83	6
F	.195	.199	4.95	5.05	
G	.047	.057	1.19	1.45	
H	.222	.240	5.64	6.10	
J	.195	.215	4.90	5.46	6
K	.092	.094	2.34	2.39	2, 6, 7
L	.030	.046	.76	1.17	6
Q	.020	.030	.51	.76	6
R		.030		.76	6

NOTES:

1. Dimensions are in Inches. Millimeters are given for general information only.
2. The ends of both pins shall be smooth with no burrs or sharp edges. Within the diameter R, a recess is allowed on both ends of the pins.
3. Metal parts shall be plated 10 msi minimum.
4. The polarity shall be indicated by an arrow, with the arrow pointing in the direction of easier current flow.
5. Removable base adapter shall establish the forward or reverse polarity.
6. Applies to both pins.
7. Eccentricity between both pins and the base dimension 'C' should not exceed .0075 inch (0.191 mm).
8. Metal parts shall be gold plated 10 msi minimum.

FIGURE 1. Semiconductor device, diode types 1N23WE, 1N23WEM, 1N23WEMR, 1N23WG, 1N23WGM, and 1N23WGMR.

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Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.242	.256	6.15	6.50
B	.292	.296	7.42	7.52
C	.246	.250	6.25	6.35
D		.187		4.75
E		.100		2.54
F	.195	.199	4.95	5.05
G	.0915	.0920	2.32	2.34
H	.0940	.0945	2.39	2.40
J	.216	.221	5.49	5.61
K	.031	.036	.79	.91

NOTES:

1. Dimensions are in Inches. Millimeters are given for general information only.
2. This diameter should be .100 (2.54 mm) max diameter before closing jaws. This diameter shall then be sufficiently closed and the adapter so tempered that it will fit on the minimum gage rod and maximum gage rod, in each case with a snug fit (for hand assembly).
3. Each slot shall be .013 (0.330 mm) min, .017 (0.132 mm) max wide by .185 (4.70 mm) deep before closing. The six slots are equally spaced.
4. The material for the adapter shall be brass in accordance with ASTM-B16/B16, or equivalent.
5. Metal parts shall be gold plated 10 msi minimum.
6. All burrs and sharp edges shall be removed.

FIGURE 2. Removable base adapter, included as a part of types 1N23WE, 1N23WEM, 1N23WEMR, 1N23WG, 1N23WGM, and 1N23WGMR.

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TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u> Visual and mechanical examination	2071					
<u>Subgroup 2</u> Voltage standing wave ratio (see 4.2)	4136	I = 1.0 mAdc	VSWR		1.3	ratio
Intermediate frequency conductance (see 4.2)	4116	f = 60 - 2000 Hz	1/G	335	465	ohms
Overall noise figure (see 4.4.1)	4126	Test condition A	F _{om}			
1N23WE, WEM, WEMR 1N23WG, WGM, WGMR					7.5 6.5	dB dB
<u>Subgroup 3</u> Matched pair requirements (see 4.4.2 and 4.4.3)						
Conversion loss unbalance	4101		ΔL		0.3	dB
Intermediate frequency conductance unbalance	4116		Δ1/G		25	ohms

1/ For sample size, see MIL-PRF-19500.

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TABLE II. Group B inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Physical dimensions	2066	See figures 1 and 2				
<u>Subgroup 2</u>						
Thermal shock (temperature cycling)	1051	Test condition F; T _(high) = +150°C +5°C, -0°C				
Terminal strength:						
Tension	2036	Test condition A; 1 lb; t = 30 sec				
Torque	2036	Test condition D ₁ ; t = 30 sec				
Moisture resistance	1021	Omit initial conditioning				
End-points: Overall (average) noise figure (see 4.4.1) 1N23WE, WEM, WEMR 1N23WG, WGM, WGMR	4126	Test condition A	F _{om}	8.5 7.5		dB dB
<u>Subgroup 3</u>						
Shock	2016	500 G; t ≅ 1 ms, 5 blows in each orientation: X ₁ , Y ₁ , and Y ₂				
Vibration, variable frequency	2056	15 G; 50 to 2,000 cps				
End-points: (same as for table II, group A, subgroup 2)						
<u>Subgroup 4</u>						
High temperature operation (see 4.5.1)		T _A = 150°C				
Overall (average) noise figure 1N23WE, WEM, WEMR 1N23WG, WGM, WGMR		Test condition A	F _{om}	10.5 9.5		dB dB
Overall (average) noise figure 1N23WE, WEM, WEMR 1N23WG, WGM, WGMR		Test condition A, T _A = 25° C	F _{om}	8.5 7.5		dB dB
<u>Subgroup 5</u>						
High temperature life (non-operating)	1031	T _A = 150°C				
End-points: (same as for table II, group A, subgroup 2)						

1/ For sample size, see MIL-PRF-19500.

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NOTE:

1. The holder used with a diode mounted in it and terminated with 100 ohms, and with an incident power of 1.0 mW to the holder, shall have a 2.0 maximum VSWR over a minimum band width of $1/(\text{pulse width used})$ on both sides of the RF burn-out test frequency used.

FIGURE 3. Multiple RF pulse burn-out circuit.

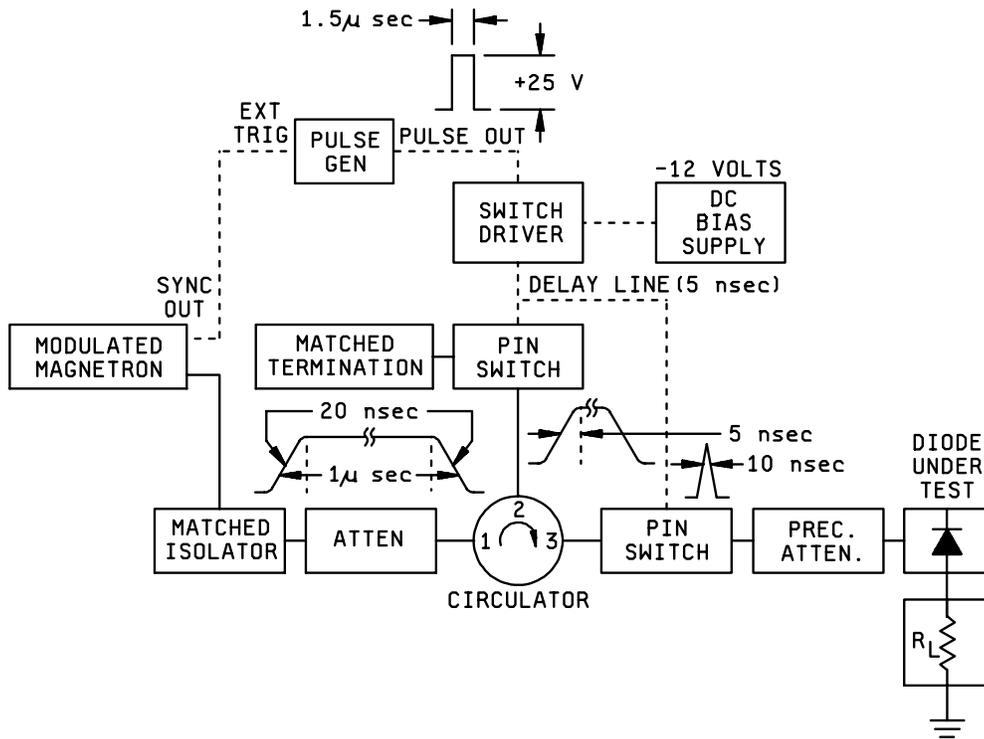


FIGURE 4. RF pulse burn-out system.

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When 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 that may be helpful, but is not mandatory.)

6.1 Intended use. Devices conforming to this drawing are intended for use when performance or military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of duplicate specifications, drawings, and stock number listings.

6.2 Acquisition requirements. The acquisition requirements should specify the following:

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of one copy of the conformance inspection data or certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Requirements for packaging and packing.

6.3 Replaceability. Devices covered by this drawing may be used as a substitute for MIL-S-19500/322 and listed commercial part numbers.

DSCC drawing PIN	Military part number	Commercial part number	Commercial part number
01037-1N23WE	JAN1N23WE	UXAN1N23WE	MXAN1N23WE
01037-1N23WEM	JAN1N23WEM	UXAN1N23WEM	MXAN1N23WEM
01037-1N23WEMR	JAN1N23WEMR	UXAN1N23WEMR	MXAN1N23WEMR
01037-1N23WG	JAN1N23WG	UXAN1N23WG	MXAN1N23WG
01037-1N23WGM	JAN1N23WGM	UXAN1N23WGM	MXAN1N23WGM
01037-1N23WGMR	JAN1N23WGMR	UXAN1N23WGMR	MXAN1N23WGMR

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* 6.4 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have agreed with this drawing and have submitted a certificate of compliance (see 3.8 herein) to Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990 or emailed to Semiconductor@dsc.dla.mil.

DSCC drawing PIN <u>1/</u>	Vendor similar designation or type number <u>2/</u>	Vendor CAGE	Vendor name and address
01037-1N23WE 01037-1N23WEM 01037-1N23WEMR 01037-1N23WG 01037-1N23WGM 01037-1N23WGMR	MXAN1N23WE MXAN1N23WEM MXAN1N23WEMR MXAN1N23WG MXAN1N23WGM MXAN1N23WGMR	0EFF4	Micrometrics, Inc. 136 Harvey Road Building B Londonderry NH 03053

DSCC drawing PIN <u>1/</u>	Vendor similar designation or type number <u>2/</u>	Vendor CAGE	Vendor name and address
01037-1N23WE 01037-1N23WEM 01037-1N23WEMR 01037-1N23WG 01037-1N23WGM 01037-1N23WGMR	UXAN1N23WE UXAN1N23WEM UXAN1N23WEMR UXAN1N23WG UXAN1N23WGM UXAN1N23WGMR	3BBY6	Semi-G 360 Route 101 Unit 12B Bedford NH 03110

1/ Parts must be purchased to this DSCC PIN to assure that all performance requirements and tests are met.

2/ CAUTION: Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

* 6.5 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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