

AEC-Q200

Stress Test Qualification for Passive Components

2026 First Asian AEC Reliability Workshop
Hsinchu, Taiwan

Christoph B. Raible TDK Electronics AG, Rafael Monreal Vela Murata Electronics Europe

October 14, 2026



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Agenda

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- **About (Scope, Members, Meetings)**
- **Modular Structure of AEC-Q200 Rev F**
- **Document Status**
- **Examples**
 - AEC-Q200-T005 – Inductors, Table 5A
 - AEC-Q200-008 – Assessment Mission Profiles
- **Outlook**



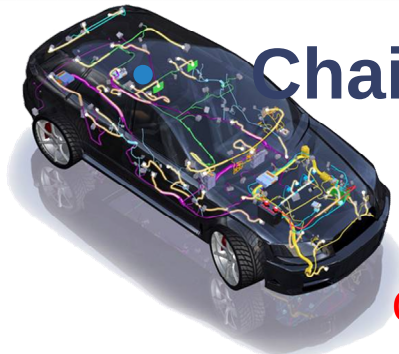
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About AEC-Q200

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- **Scope:** automotive qualification of passive components such as capacitors, inductors, resistors, thermistors, fuses, varistors, etc.
- **Members:** Aumovio - BorgWarner - Bose Corporation - Coilcraft Inc. - Diodes Inc. - Harman International - IST Group - John Deere - Littelfuse - Marelli - Maxwell - Murata - Resistor - Robert Bosch - Schurter - Tayo Yuden - TDK - Texas Instruments - TÜV - UCAP Power - Vishay - Würth Elektronik - Yageo Group - ZF Friedrichshafen
- **Meetings:** weekly on Tuesdays at 09:00 Central Time Zone

Chairs: Saad Lambaz and Rafael Monreal Vela



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Status of AEC-Q200 and Outlook

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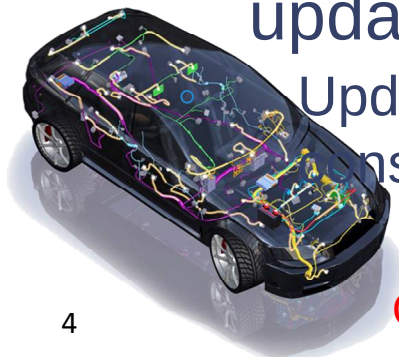
Context

- The automotive industry is in a challenging situation
- ZVEI DeQuMa is widely used within European Automotive Industry
- Deviations to the requirements of PCN communication from other regions add on to the efforts

AEC-Q200

- Revision F is currently in progress with relevant structural changes
- To remain contemporary and future-proof, take the opportunity to update AEC-Q200

Update AEC-Q200 Base Revision F and its associated Subordinate documents with consideration of ZVEI DeQuMa



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AEC-Q200 Modular Structure of AEC-Q200 rev F

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- **Why is it needed?**
 - Current document is large and difficult to maintain (100+ pages)
 - Updates to one component require full document revision cycle
 - Adding new technologies is slow and disruptive
 - Increasing need for flexibility and faster updates



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AEC-Q200 Modular Structure of AEC-Q200 rev F

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- **Solution:** transition AEC-Q200 to a modular document structure
 - Separate General Requirements (Base Document)
 - Split Technology-Specific Tables into standalone documents
 - Maintain alignment with existing AEC-Q200-001 to -007 test methods

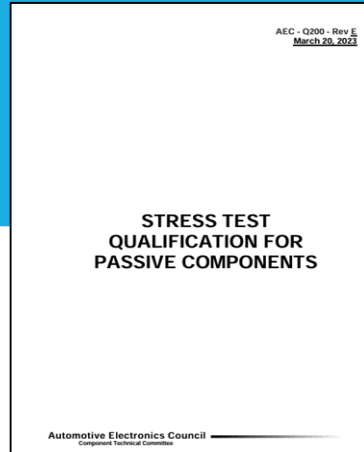


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Modular Structure of AEC-Q200 rev F

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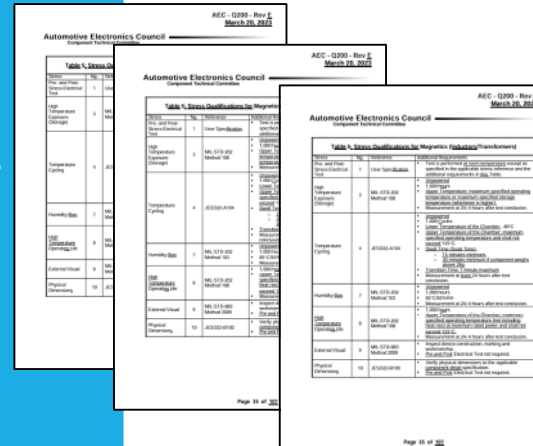
Base document Rev F



AEC-Q200-BASE → Sections 1-4

Additional Addenda or Annexes

AEC-Q200-001 → Flame Retardance Test
AEC-Q200-002 → Electrostatic Discharge Test
AEC-Q200-004 → Measurement Procedures for Res.
AEC-Q200-005 → Board Flex Test
AEC-Q200-006 → Terminal Strength (SMD) Test
AEC-Q200-007 → Voltage Surge Test
AEC-Q200-008 → Mission Profile Evaluation



AEC-Q200-T001 → Tantalum
AEC-Q200-T002 → Ceramic Capacitors
...
AEC-Q200-T014 → Polymeric Resettable Fuses
AEC-Q200-T015 → Fuses
AEC-Q200-T016 → Double Layer Capacitors
AEC-Q200-T017 → Reed Switches
AEC-Q200-T018 → Gas Discharge Tubes

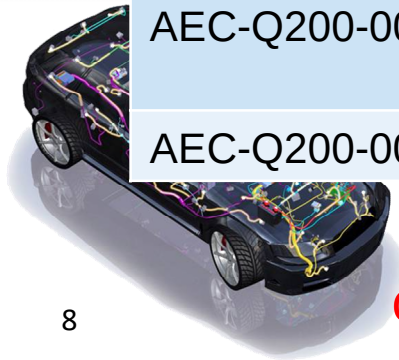
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Automotive Electronics Council
Component Technical Committee

Modular Structure of AEC-Q200 rev F

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Document	Topic	Status
AEC-Q200-001	Flame Retardance Test	Current Revision B, June 1, 2010 New Revision C to be published with AEC-Q200 Rev F
AEC-Q200-002	Electrostatic Discharge Test	Current Revision B, June 1, 2010 New Revision C to be published with AEC-Q200 Rev F
AEC-Q200-003	Beam Load Test	Current Revision B, June 1, 2010 Document will be obsoleted
AEC-Q200-004	Measurement Procedures for Resettable Fuses	Current Revision A, June 1, 2000 New Revision C to be published with AEC-Q200 Rev F
AEC-Q200-005	Board Flex Test	Current Revision A, June 1, 2010 New Revision B to be published in 2026
AEC-Q200-006	Terminal Strength Test	Current Revision A, June 1, 2010 New Revision B to be published in 2026
AEC-Q200-007	Voltage Surge Test	Current Revision A, June 1, 2010 New Revision C to be published with AEC-Q200 Rev F
AEC-Q200-008	Assessment of Mission Profiles for EVs	Under evaluation



Example for extending the xA tables in -Q200-T0xx

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For a given change listed below, the Supplier should justify why a suggested test does not apply for the given components under consideration. Collaboration with their customer base is highly recommended.

- | | | |
|--|-----------------------------------|-----------------------------|
| 3. High Temperature Exposure (Storage) | 13. Mechanical Shock | 22. Terminal Strength (SMD) |
| 4. Temperature Cycling | 14. Vibration | |
| 7. Biased Humidity | 15. Resistance to Soldering Heat | |
| 8. Operational Life | 17. Electrostatic Discharge (ESD) | |
| 9. External Visual | 18. Solderability | |
| 10. Physical Dimension | 19. Electrical Characterization | |
| 11. Terminal Strength (THT) | 20. Flammability | |
| 12. Resistance to Solvents | 21. Board Flex | |

Note: A letter or "●" indicates that performance of that stress test should be considered (not necessarily required) for the appropriate process change

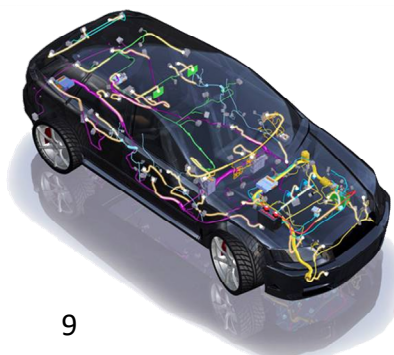
Test # From Table 5	3	4	7	8	9	10	11	12	13	14	15	17	18	19	20	21	22
MATERIAL																	
Bobbin material	●	●	●	●	●				●							●	
Core material		●		●	●				●					B	●		
Insulation material	●	●	●	●	●			●			●	a		B	●		
Lead material				●	●		●			●	●		●			●	●
Mold material	●	●	●	●	●			●	●					B	●		
Solder material		●			●		●	●	●				●			●	●
Wire/foil material			●	●	●								●	B		●	●

Test No		Test No		Test No	
3.	High Temperature Exposure (Storage)	13.	Mechanical Shock	22.	Terminal Strength (SMD)
4.	Temperature Cycling	14.	Vibration		
7.	Biased Humidity	15.	Resistance to Soldering Heat		
8.	Operational Life	17.	Electrostatic Discharge (ESD)		
9.	External Visual	18.	Solderability		
10.	Physical Dimension	19.	Electrical Characterization		
11.	Terminal Strength (THT)	20.	Flammability		
12.	Resistance to Solvents	21.	Board Flex		

Note:

- A letter or "●" indicates that performance of that stress test should be considered (not necessarily required) for the appropriate process change.

Test # From Table 5	Description/Explanation/Potential Risks	Identifier	3	4	7	8	9	10	11	12	13	14	15	17	18	19	20	21
MATERIAL																		
Bobbin material	Change in bobbin material or material system, including non-magnetic structural materials, where thermal or mechanical performance may be affected. Potential risk: impact on thermal or mechanical stability of bobbin?	T05-MA-01	●	●	●	●	●	●			●						●	
Core material	Change of core material, which is material with magnetic function.	T05-MA-02	●	●		●	●				●					B	●	
Insulation material	Change of insulation material, as insulation tapes. Potential risk: Components with Ur ≥ 100V final decision by User.	T05-MA-03	●	●	●	●	●			●			●	A		B	●	



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Excerpt of AEC-Q200-T05 5A as an example

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Test # From Table 5	Description/Explanation/Potential Risks	Identifier	3	4	7	8	9	10	11	12	13	14	15	17	18	19	20	21	22
MATERIAL																			
Bobbin material	Change in bobbin material or material system, including non-magnetic structural materials, where thermal or mechanical performance may be affected. Potential risk: impact on thermal or mechanical stability of bobbin?	T05-MA-01	●	●	●	●	●	●			●						●		
Core material	Change of core material, which is material with magnetic function.	T05-MA-02	●	●		●	●				●					B	●		
Insulation material	Change of insulation material, as insulation tapes. Potential risk: Components with $U_r \geq 100V$ final decision by User.	T05-MA-03	●	●	●	●	●			●			●	A		B	●		
Lead material	Change in lead or terminal material, including surface covering or base material.	T05-MA-04				●	●		●			●	●		●			●	●
Mold material	Change of mold compound or mold material system. Potential risk: Change of electrical function in case of change of mechanical stress distribution? Impact on MSL, AOI, board coating?	T05-MA-05	●	●	●	●	●			●	●					B	●		●
Solder material	Change of solder material at inner connection.	T05-MA-06		●			●		●		●	●	●		●			●	●
Wire/foil material	Wire for wound inductors. Foil for multilayer inductors, the inner electrode.	T05-MA-07	●		●	●	●					●		●		B		●	●
Adhesive	Change of Adhesive from material-to-material B or foil for multilayer inductors, inner electrode. Potential risk: Air gap in case of core-core Adhesive?	T05-MA-08		●	●		●					●	●		●	B			

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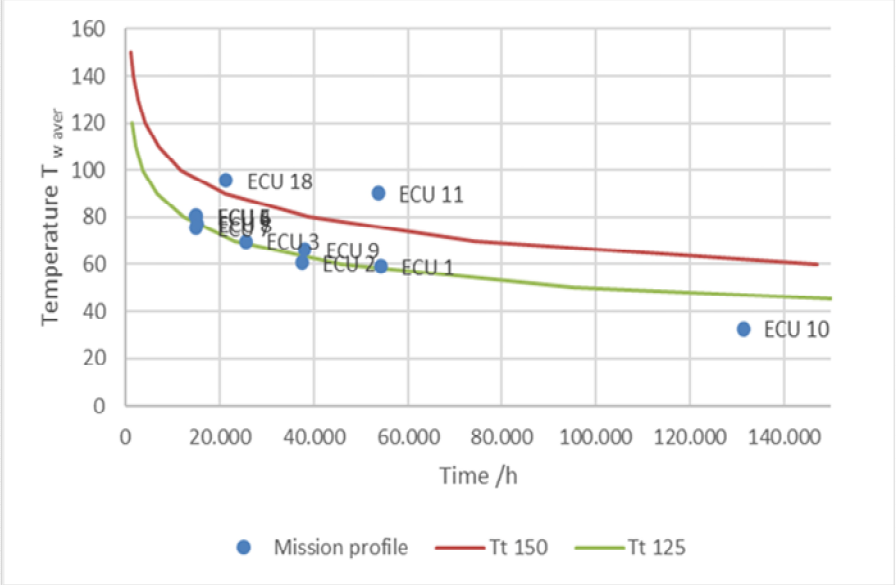
AEC-Q200-008: Assessing Customer defined Mission Profiles for Electric Vehicles – Evaluation of User defined MP

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Referring to http://www.aecouncil.com/files/Workshops/2026_US_AEC_Workshop/1_3_AEC-Q200-Proposal_for_Assessing_EV%20Mission%20Profiles-YAGEO-Cooper.pdf

With the result: For the majority of ECUs, the qualified robustness of the Components lies within or below the range of the isotherms at 150°C (SMD MLV, NTC) and 125°C (inductors) respectively.

ECU	Active Times															Sum active Time ECU [h]				
	Drive (KI 15 on)			Charging			Conditioning			bidi - Charging			Parking (inkl. ON Grid)							
	Time [h]	Ambient Temperature ECU		Time [h]	Ambient Temperature ECU		Time [h]	Ambient Temperature ECU		Time [h]	Ambient Temperature ECU		Time [h]	Ambient Temperature ECU						
		Tmin in °C	Tmax in °C		Tmin in °C	Tmax in °C		Tmin in °C	Tmax in °C		Tmin in °C	Tmax in °C		Tmin in °C	Tmax in °C					
ECU 1	8500	-40	70	13350	-40	60	3800	-40	60	28500	10	55	0			9542	-40	85	37387	✓
ECU 2	8500	-40	85	18980	-40	80	365	-40	85	0						1800	-40	75	25500	✓
ECU 3	8500	-40	75	12000	-40	75	3200	-40	75	0										✓
ECU 4	8000	-40	85				6200	-40	85							800	-40	85	15000	✓
ECU 5	8000	-40	85				6200	-40	85							800	-40	85	15000	✓
ECU 6	8000	-40	85				6200	-40	85							800	-40	85	15000	✓
ECU 7	8000	-40	80				6200	-40	80							800	-40	80	15000	✓
ECU 8	8000	-40	80				6800	-40	80							500	-40	80	15300	✓
ECU 9	8000	-40	70	30000	-40	65													38000	✓
ECU 10	8000	-40	80	12000	10	75	8000	-40	75	28500	10	75	74900	-40	75				131400	✗
ECU 11	8000	-40	90	13350	-40	90	3800	-40	90	28500	-40	90	0	0	0				53650	✓
ECU 12	8000			30000															38000	✓
ECU 13	8000			6200															14200	✓
ECU 14	8000			13333			2800												24133	✓
ECU 15	8000						6200									39500			53700	✓
ECU 16	8000						6200									8300			22500	✓
ECU 17	8000			24800			6200												39000	✓
ECU 18	8000	-40	130 (600s - 140°C)	13350	-40	75													21350	✓



AEC-Q200-008 – User defined Mission Profiles: Status under evaluation

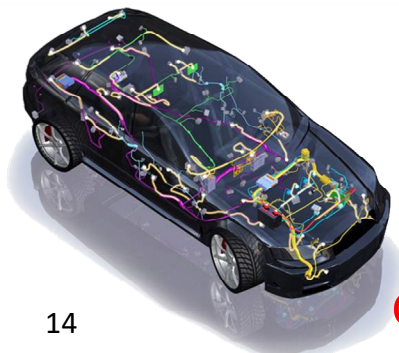
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Scope of the document:

- Summarizing available market requirements
- Use of potential aging models
- Evaluation of User defined Mission Profiles using specific examples
- Proposal for standardise response

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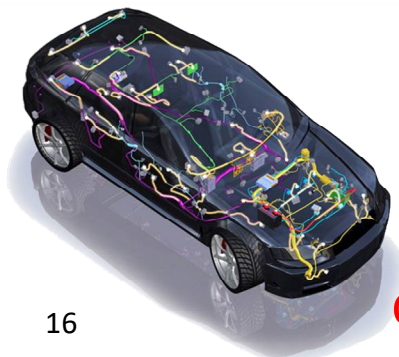


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Outlook - Collaboration with ZVEI body?

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- **Potential on an AEC / ZVEI Collaboration on xA tables in -Q200-T0xx / ZVEI DeQuMa**
- **ZVEI will use AEC content as provided and will not influence AEC decisions or processes**
- **Goal is to shorten the current lag between AEC revisions and DeQuMa updates**
- **AEC-Q200 as a pilot?**



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