

**BİRİKİM PİLLERİ AR-GE MERKEZİ**

HEADSHIP OF BIRIKIM R&amp;D CENTER (BARGEM)

Ar-Ge Test Takımı  
R&D Test Team

20.03.2025

**BİRİKİM PİLLERİ AR-GE MERKEZİ  
TEST KABİLİYETLERİ LİSTESİ**BIRIKIM PİLLERİ R&D CENTER  
TEST CAPABILITIES LIST

| #                                                      | Deney Kategorisi       | Deney Adı                                         | Deney Metodu | Deney Yapılan Ürün | İç / Dış Lab            |
|--------------------------------------------------------|------------------------|---------------------------------------------------|--------------|--------------------|-------------------------|
|                                                        | Test Category          | Test Name                                         | Test Method  | Product Under test | Internal / External Lab |
| BMS Testleri / BMS Tests                               |                        |                                                   |              |                    |                         |
| 1                                                      | Fonksiyonel/Güvenlik   | Düşük Gerilim Koruma Testi                        | Genel        | BMS                | İç                      |
|                                                        | Functional/Safety      | UVP Under Voltage Protection Test                 | General      |                    | Internal                |
| 2                                                      | Fonksiyonel/Güvenlik   | Yüksek Gerilim Koruma Testi                       | Genel        | BMS                | İç                      |
|                                                        | Functional/Safety      | OVP Over Voltage Protection Test                  | General      |                    | Internal                |
| 3                                                      | Fonksiyonel/Güvenlik   | Aşırı Yük Koruma Testi                            | Genel        | BMS                | İç                      |
|                                                        | Functional/Safety      | OLP Over Load Protection Test                     | General      |                    | Internal                |
| 4                                                      | Fonksiyonel/Güvenlik   | Aşırı Akım Koruma Testi                           | Genel        | BMS                | İç                      |
|                                                        | Functional/Safety      | OCP Over Current Protection Test                  | General      |                    | Internal                |
| 5                                                      | Fonksiyonel/Güvenlik   | Kısa Devre Koruma Testi                           | Genel        | BMS                | İç                      |
|                                                        | Functional/Safety      | SCP Short Circuit Protection Test                 | General      |                    | Internal                |
| 6                                                      | Fonksiyonel/Güvenlik   | Yüksek Sıcaklık Koruma Testi                      | Genel        | BMS                | İç                      |
|                                                        | Functional/Safety      | OTP Over Temperature Protection Test              | General      |                    | Internal                |
| 7                                                      | Fonksiyonel/Güvenlik   | Düşük Sıcaklık Koruma Testi                       | Genel        | BMS                | İç                      |
|                                                        | Functional/Safety      | UTP Under Temperature Protection Test             | General      |                    | Internal                |
| 8                                                      | Fonksiyonel/Güvenlik   | Hücre Dengeleme Testi                             | Genel        | BMS                | İç                      |
|                                                        | Functional/Safety      | Cell Balancing Test                               | General      |                    | Internal                |
| 9                                                      | Fonksiyonel/Güvenlik   | Ters Polarite Koruma Testi                        | Genel        | BMS                | İç                      |
|                                                        | Functional/Safety      | Reverse Polarity Protection Test                  | General      |                    | Internal                |
| Batarya Elektriksel Testler / Battery Electrical Tests |                        |                                                   |              |                    |                         |
| 10                                                     | Elektriksel/Performans | Şarj & Deşarj Testi                               | IEC 61960-3  | Hücre / Batarya    | İç                      |
|                                                        | Electrical/Performance | Charge & Discharge Test                           |              | Cell / Battery     | Internal                |
| 11                                                     | Elektriksel/Performans | Farklı Sıcaklıklarda Şarj & Deşarj Testi          | IEC 61960-3  | Hücre / Batarya    | İç                      |
|                                                        | Electrical/Performance | Charge & Discharge Test at Different Temperatures |              | Cell / Battery     | Internal                |

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| #                                                    | Deney Kategorisi        | Deney Adı                               | Deney Metodu                                 | Deney Yapılan Ürün    | İç / Dış Lab            |
|------------------------------------------------------|-------------------------|-----------------------------------------|----------------------------------------------|-----------------------|-------------------------|
|                                                      | Test Category           | Test Name                               | Test Method                                  | Product Under test    | Internal / External Lab |
| 12                                                   | Elektriksel/Performans  | Kapasite Testi                          | Genel                                        | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Performance  | Capacity Test                           | General                                      | Cell / Battery        | Internal                |
| 13                                                   | Elektriksel/Performans  | Kapasite Kaybı Testi                    | IEC 61960-3                                  | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Performance  | Capacity Loss Test                      |                                              | Cell / Battery        | Internal                |
| 14                                                   | Elektriksel/Performans  | Farklı Sıcaklıklarda Kapasite Testi     | IEC 61960-3                                  | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Performance  | Capacity at Different Temperatures Test |                                              | Cell / Battery        | Internal                |
| 15                                                   | Elektriksel/Performans  | Çevrim Ömrü Testi                       | Genel                                        | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Performance  | Life Cycle Test                         | General                                      | Cell / Battery        | Internal                |
| 16                                                   | Elektriksel/Performans  | C-Oran Testi                            | Genel                                        | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Performance  | C-Rate Test                             | General                                      | Cell / Battery        | Internal                |
| 17                                                   | Elektriksel/Performans  | ACIR İç Direnç Testi                    | IEC 61960-3                                  | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Performance  | ACIR Internal Resistance Test           |                                              | Cell / Battery        | Internal                |
| 18                                                   | Elektriksel/Performans  | DCIR İç Direnç Testi                    | IEC 61960-3                                  | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Performance  | DCIR Internal Resistance Test           |                                              | Cell / Battery        | Internal                |
| 19                                                   | Elektriksel/Performans  | Sürekli ve Anlık Akım Testleri          | Genel                                        | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Performance  | Continuous and Inrush Current Tests     | General                                      | Cell / Battery        | Internal                |
| 20                                                   | Elektriksel/Performans  | CF (Tepe Faktörü) Testi                 | Genel                                        | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Performance  | CF (Crest Factor) Test                  | General                                      | Cell / Battery        | Internal                |
| 21                                                   | Elektriksel/Güvenlik    | Zorla Deşarj Testi                      | IEC 62133-2<br>UN38.3<br>UL1642              | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Safety       | Forced Discharge Test                   |                                              | Cell / Battery        | Internal                |
| 22                                                   | Elektriksel/Güvenlik    | Harici Kısa Devre Testi                 | IEC 62133-2<br>IEC 62619<br>UN38.3<br>UL1642 | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Safety       | External Short Circuit Test             |                                              | Cell / Battery        | Internal                |
| 23                                                   | Elektriksel/Güvenlik    | Aşırı Şarj Testi                        | IEC 62133-2<br>IEC 62619<br>UN38.3<br>UL1642 | Hücre / Batarya       | İç                      |
|                                                      | Electrical/Safety       | Over Charging Test                      |                                              | Cell / Battery        | Internal                |
| Çevre Koşul Testleri / Environmental Condition Tests |                         |                                         |                                              |                       |                         |
| 24                                                   | Çevre Koşulu            | Düşük Sıcaklık Testi                    | MIL-STD-810<br>E/F/G<br>DO-160E              | Hücre / Batarya / BMS | İç                      |
|                                                      | Environmental Condition | Low Temperature Test                    |                                              | Cell / Battery / BMS  | Internal                |
| 25                                                   | Çevre Koşulu            | Yüksek Sıcaklık Testi                   | MIL-STD-810<br>E/F/G/H<br>DO-160E            | Hücre / Batarya / BMS | İç                      |
|                                                      | Environmental Condition | High Temperature Test                   |                                              | Cell / Battery / BMS  | Internal                |
| 26                                                   | Çevre Koşulu            | Düşük Sıcaklık Depolama Testi           | MIL-STD-810<br>E/F/G<br>DO-160E              | Hücre / Batarya / BMS | İç                      |
|                                                      | Environmental Condition | Low Temperature Storage Test            |                                              | Cell / Battery / BMS  | Internal                |

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20.03.2025

| #                                  | Deney Kategorisi        | Deney Adı                        | Deney Metodu                                                      | Deney Yapılan Ürün    | İç / Dış Lab            |
|------------------------------------|-------------------------|----------------------------------|-------------------------------------------------------------------|-----------------------|-------------------------|
|                                    | Test Category           | Test Name                        | Test Method                                                       | Product Under test    | Internal / External Lab |
| 27                                 | Çevre Koşulu            | Yüksek Sıcaklık Depolama Testi   | MIL-STD-810<br>E/F/G/H<br>DO-160E                                 | Hücre / Batarya       | İç                      |
|                                    | Environmental Condition | High Temperature Storage Test    |                                                                   | Cell / Battery        | Internal                |
| 28                                 | Çevre Koşulu            | Termal Şok Testi                 | MIL-STD-810<br>E/F/G<br>DO-160E                                   | Hücre / Batarya       | İç                      |
|                                    | Environmental Condition | Thermal Shock Test               |                                                                   | Cell / Battery        | Internal                |
| 29                                 | Çevre Koşulu            | Nem Testi                        | MIL-STD-810<br>E/F/G<br>DO-160E                                   | Hücre / Batarya       | İç                      |
|                                    | Environmental Condition | Humidity Test                    |                                                                   | Cell / Battery        | Internal                |
| 30                                 | Çevre Koşulu            | Sızdırmazlık/Daldırma Testi (IP) | MIL-STD-810<br>E/F/G<br>DO-160E                                   | Hücre / Batarya       | İç                      |
|                                    | Environmental Condition | Immersion Test                   |                                                                   | Cell / Battery        | Internal                |
| 31                                 | Çevre Koşulu            | Toz Testi                        | MIL-STD-810<br>E/F/G<br>DO-160E                                   | Hücre / Batarya       | İç                      |
|                                    | Environmental Condition | Dust Test                        |                                                                   | Cell / Battery        | Internal                |
| 32                                 | Çevre Koşulu            | Kum Testi                        | MIL-STD-810<br>E/F/G,<br>DO-160E                                  | Batarya               | Dış                     |
|                                    | Environmental Condition | Sand Test                        |                                                                   | Battery               | External                |
| 33                                 | Çevre Koşulu            | Tuz Spreyi Testi                 | MIL-STD-810<br>E/F/G,<br>DO-160E                                  | Batarya               | Dış                     |
|                                    | Environmental Condition | Salt Spray Test                  |                                                                   | Battery               | External                |
| Mekanik Testler / Mechanical Tests |                         |                                  |                                                                   |                       |                         |
| 34                                 | Mekanik                 | Titreşim Testi                   | MIL-STD-810,<br>F/G/H, DO-160E,<br>IEC 62133-2,<br>UN38.3, UL1642 | Hücre / Batarya       | Dış                     |
|                                    | Mechanical              | Vibration Test                   |                                                                   | Cell / Battery        | External                |
| 35                                 | Mekanik                 | Serbest Düşme Testi              | MIL-STD-810, IEC<br>62133-2, IEC 62619,<br>IATA PI 96X            | Hücre / Batarya       | Dış                     |
|                                    | Mechanical              | Transit Drop Test                |                                                                   | Cell / Battery        | External                |
| 36                                 | Mekanik                 | Mekanik Şok Testi                | MIL-STD-810,<br>E/F/G, IEC 62133-2,<br>UN38.3, UL1642             | Hücre / Batarya       | Dış                     |
|                                    | Mechanical              | Mechanical Shock Test            |                                                                   | Cell / Battery        | External                |
| 37                                 | Mekanik                 | Darbe Testi                      | IEC 62133-2,<br>IEC 62619, UN38.3,<br>UL1642                      | Hücre / Batarya       | Dış                     |
|                                    | Mechanical              | Impact Test                      |                                                                   | Cell / Battery        | External                |
| 38                                 | Mekanik                 | Ezme Testi                       | IEC 62133-2<br>UN38.3<br>UL1642                                   | Hücre / Batarya       | Dış                     |
|                                    | Mechanical              | Crush Test                       |                                                                   | Cell / Battery        | External                |
| 39                                 | Mekanik                 | Patlatma Testi                   | UL1642                                                            | Hücre / Batarya       | Dış                     |
|                                    | Mechanical              | Explosion Test                   |                                                                   | Cell / Battery        | External                |
| EMC Testleri / EMC Tests           |                         |                                  |                                                                   |                       |                         |
| 40                                 | EMC/EMI                 | Işınım Yollu Bağışıklık          | MIL-STD-461<br>IEC 61000-4-3                                      | Batarya / Şarj Cihazı | Dış                     |
|                                    |                         | Radiated Immunity                |                                                                   | Battery / Charger     | External                |
| 41                                 | EMC/EMI                 | İletim Yollu Bağışıklık          | MIL-STD-461 IEC<br>61000-4-6                                      | Şarj Cihazı           | Dış                     |
|                                    |                         | Conducted Immunity               |                                                                   | Charger               | External                |

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| #                             | Deney Kategorisi                                 | Deney Adı                                                           | Deney Metodu                      | Deney Yapılan Ürün                  | İç / Dış Lab            |
|-------------------------------|--------------------------------------------------|---------------------------------------------------------------------|-----------------------------------|-------------------------------------|-------------------------|
|                               | Test Category                                    | Test Name                                                           | Test Method                       | Product Under test                  | Internal / External Lab |
| 42                            | EMC/EMI                                          | Elektrostatik Deşarj (ESD)                                          | MIL-STD-461<br>IEC 61000-4-2      | Batarya / Şarj Cihazı               | Dış                     |
|                               |                                                  | Electrostatic Discharge (ESD)                                       |                                   | Battery / Charger                   | External                |
| 43                            | EMC/EMI                                          | Elektriksel Hızlı Rejime / Ani Darbeye Karşı Bağışıklık (EFT/Burst) | MIL-STD-461 IEC<br>61000-4-4      | Şarj Cihazı                         | Dış                     |
|                               |                                                  | Electrical Fast Transient/Burst Immunity (EFT/Burst)                |                                   | Charger                             | External                |
| 44                            | EMC/EMI                                          | Ani Yükselmelere Karşı Bağışıklık                                   | MIL-STD-461<br>IEC 61000-4-5      | Şarj Cihazı                         | Dış                     |
|                               |                                                  | Surge Immunity                                                      |                                   | Charger                             | External                |
| 45                            | EMC/EMI                                          | Gerilim Çukurları, Kısa Kesintiler ve Gerilim Değişimi Testleri     | MIL-STD-461 IEC<br>61000-4-11     | Şarj Cihazı                         | Dış                     |
|                               |                                                  | Voltage Dips, Short Interruptions and Voltage Variations Immunity   |                                   | Charger                             | External                |
| 46                            | EMC/EMI                                          | Işınım Yollu Emisyon                                                | MIL-STD-461<br>EN55032<br>CISPR32 | Batarya / Şarj Cihazı               | Dış                     |
|                               |                                                  | Conducted Emission                                                  |                                   | Battery / Charger                   | External                |
| 47                            | EMC/EMI                                          | İletim Yollu Emisyon                                                | MIL-STD-461<br>EN55022, CISPR22   | Batarya / Şarj Cihazı               | Dış                     |
|                               |                                                  | Conducted Emission                                                  |                                   | Battery / Charger                   | External                |
| 48                            | EMC/EMI                                          | Harmonik Akım Emisyon                                               | MIL-STD-461<br>IEC 61000-3-2      | Şarj Cihazı                         | Dış                     |
|                               |                                                  | Harmonic Current Emission                                           |                                   | Charger                             | External                |
| Özel Testler / Specific Tests |                                                  |                                                                     |                                   |                                     |                         |
| 49                            | Elektriksel                                      | Yük Analizi                                                         | Genel                             | Yük                                 | İç                      |
|                               | Electrical                                       | Load Analysis                                                       | General                           | Load                                | Internal                |
| 50                            | Elektriksel / Güvenlik / Çevresel / Mekanik      | Özelleştirilmiş Performans                                          | Genel                             | Hücre / Batarya / BMS / Şarj Cihazı | İç                      |
|                               | Electrical / Safety / Environmental / Mechanical | Specific Performance                                                | General                           | Cell / Battery / BMS / Charger      | Internal                |
| 51                            | Elektriksel / Güvenlik / Çevresel / Mekanik      | Stres Testleri                                                      | Genel                             | Hücre / Batarya / BMS / Şarj Cihazı | İç                      |
|                               | Electrical / Safety / Environmental / Mechanical | Stress Tests                                                        | General                           | Cell / Battery / BMS / Charger      | Internal                |

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**BİRİKİM PİLLERİ AR-GE MERKEZİ  
STANDART OPSİYONLARI LİSTESİ**BIRIKIM PİLLERİ R&D CENTER  
LIST OF STANDARD OPTIONS

| #  | Standart Kodu  | Standart Tanımı                                                                                                                                                                                                                              |
|----|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Standard Code  | Standard Description                                                                                                                                                                                                                         |
| 1  | MIL-STD-810    | Military Standard: Environmental Engineering Considerations and Laboratory Tests                                                                                                                                                             |
| 2  | MIL-STD-461    | Military Standard: Electromagnetic Interference Characteristics Requirements For Equipment                                                                                                                                                   |
| 3  | IEC/EN 62133-2 | Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Safety Requirements for Portable Sealed Secondary Cells, and for Batteries Made From Them, for Use in Portable Applications – Part 2: Lithium Systems     |
| 4  | IEC/EN 62619   | Secondary Cells And Batteries Containing Alkaline or Other Non-Acid Electrolytes – Safety Requirements for Secondary Lithium Cells and Batteries, for Use in Industrial Applications                                                         |
| 5  | IEC/EN 62620   | Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Secondary Lithium Cells and Batteries for Use in Industrial Applications                                                                                  |
| 6  | IEC/EN 61960-3 | Secondary Cells and Batteries Containing Alkaline Or Other Non-Acid Electrolytes – Secondary Lithium Cells and Batteries for Portable Applications – Part 3: Prismatic and Cylindrical Lithium Secondary Cells, and Batteries Made From Them |
| 7  | IEC/EN 62281   | Safety of Primary and Secondary Lithium Cells and Batteries During Transport                                                                                                                                                                 |
| 8  | IEC/EN 63056   | Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Safety Requirements for Secondary Lithium Cells and Batteries for Use in Electrical Energy Storage Systems                                                |
| 9  | IEC/EN 62485-5 | Safety Requirements for Secondary Batteries and Battery Installations – Part 5: Safe Operation of Stationary Lithium Ion Batteries                                                                                                           |
| 10 | IEC/EN 50604-1 | Secondary Lithium Batteries for Light EV (Electric Vehicle) Applications – Part 1: General Safety Requirements and Test Methods                                                                                                              |
| 11 | UN38.3         | Transport Of Lithium Metal, Lithium Ion and Sodium Ion Batteries                                                                                                                                                                             |
| 12 | UL2054         | Household and Commercial Batteries                                                                                                                                                                                                           |
| 13 | UL2271         | Batteries For Use In Light Electric Vehicle (LEV) Applications                                                                                                                                                                               |
| 14 | UL2580         | Batteries For Use In Electric Vehicles                                                                                                                                                                                                       |
| 15 | UL1642         | Standard For Safety Lithium Batteries                                                                                                                                                                                                        |
| 16 | UL1973         | Batteries for Use In Stationary and Motive Auxiliary Power Applications                                                                                                                                                                      |
| 17 | MSDS           | Material Safety Data Sheet                                                                                                                                                                                                                   |