

**INTERTEK
TRANSPORTATION TECHNOLOGIES 사업부
EV 및 자동차 시험인증 관련**

Global Resources Supporting the Automotive Industry

2021. FEB.10TH

담당 허재영 理事

intertek

Total Quality. Assured.

Since 1885 ~

인터텍 설립자 토마스 에디슨과 세계최초 전기차



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01

**THE INTERTEK SERVICES
OVERVIEW / LOCATIONS**



**MORE THAN 100 COUNTRIES, WITH 1,000 LOCATIONS
& 44000 EMPLOYEES, DELIVERING TOTAL QUALITY SOLUTIONS**



OUR SECTORS

일반제품



무역품



자원물



OUR SERVICES

Assurance



Testing



Inspection



Certification



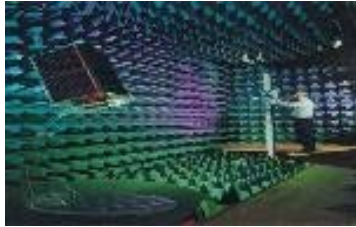
INTERTEK – TRANSPORTATION TECHNOLOGIES사업부는 자동차 관련 UL / E-Mark / ISO / CE 인증을 비롯한 FMVSS / MIL / ASTM / SAE / USCAR 등 유수의 GLOBAL OEM 스탠다드 기반의 전기, 전자파, 신뢰성, 퍼포먼스, 화학, 환경, VOC, 유해물질, 시험을 제공 하고 있습니다.
INTERTEK – TRANSPORTATION TECHNOLOGIES사업부는 전세계 11여개국에 20개의 시험소가 있으며, **여러 Global OEM사의 인증을 받은 시험소로서** 각국의 자동차 / 항공 / 밀리터리 관련 시험인증 전문인력들이 고객의 다양한 부품과 모듈, 완제품에 대해 **Testing & Certification Solution**을 제공하고 있습니다.

AT A GLANCE 인터텍 - 트랜스포테이션 테크놀로지 사업부 일람



VOC

- 다수 글로벌 OEM Approval 소유
- 각종 글로벌 스탠다드 시험 가능



EMC

- SAE, ISO, CISPR, FCC
- 다수 OEM standards Approval 소유



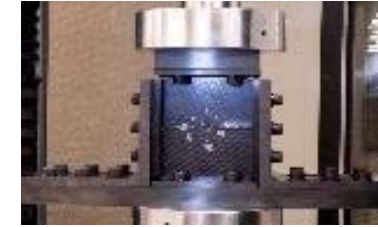
Electric Vehicle

- 배터리 시험
- 충전기 상호 적합성
- SAE J1772/J2953
- 충전기 나라별 인증



Full Vehicle

- Total quality
- Durability
- Driving route
- Proving Ground



Materials

- Polymer, Plastics, Metals, Composites
- ASTM/ASME Methods
- International Standards
- OEM Standards



Powertrain

- 100+ Engine dynamometer test beds
- 다양한 Engine Size 가능 Up to 3,000 HP
- CARB Approval



Industrial

- Machinery Directive
- CE Marking
- Factory Equipment
- Field Label



Failure Analysis

- FMEA
- Metallurgy OES, GCMS/HPLC
- DSC, DMA, TGA, TMA
- Microscopy SEM/EDS



Lubricant & Fuel

- API/ACEA/OEM oil
- Heavy / light Duty oil
- Engine, transmission, axle oils



Defense & Aerospace

- Environmental MIL-810
- EMC : MIL-461
- PPE/Ballistics Testing Transparent Armor (Glass) FAA/Aviation Lighting DO-160
- Batteries DO-311, 225, 227

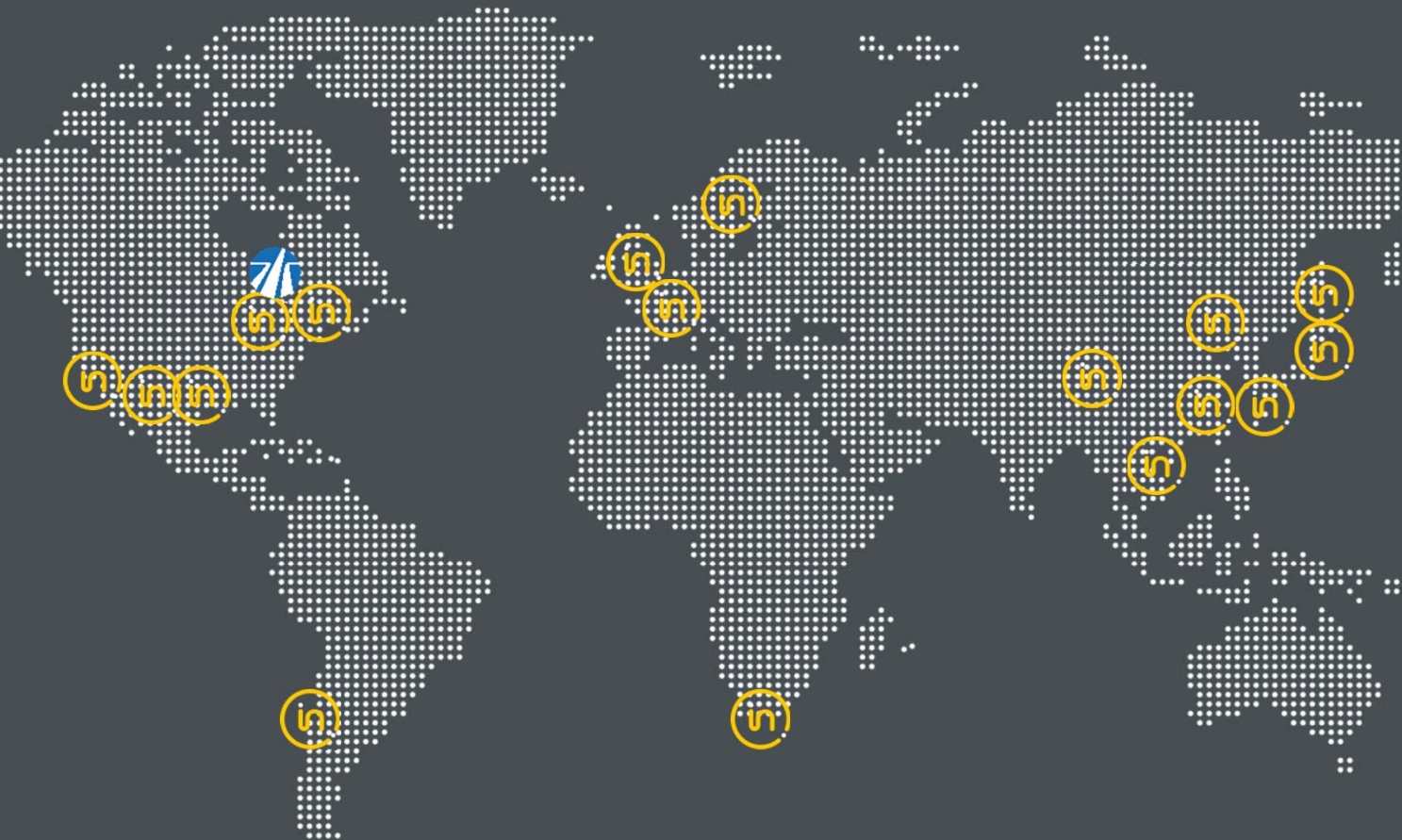
TRANSPORTATION TECHNOLOGIES 사업부 글로벌 네트워크



North America:
Detroit, MI
Grand Rapids, MI
San Antonio, TX
Pittsfield, MA
Phoenix, AZ
Irvine, CA

South America:
Valparaiso, Chile

1000+
TT
employees

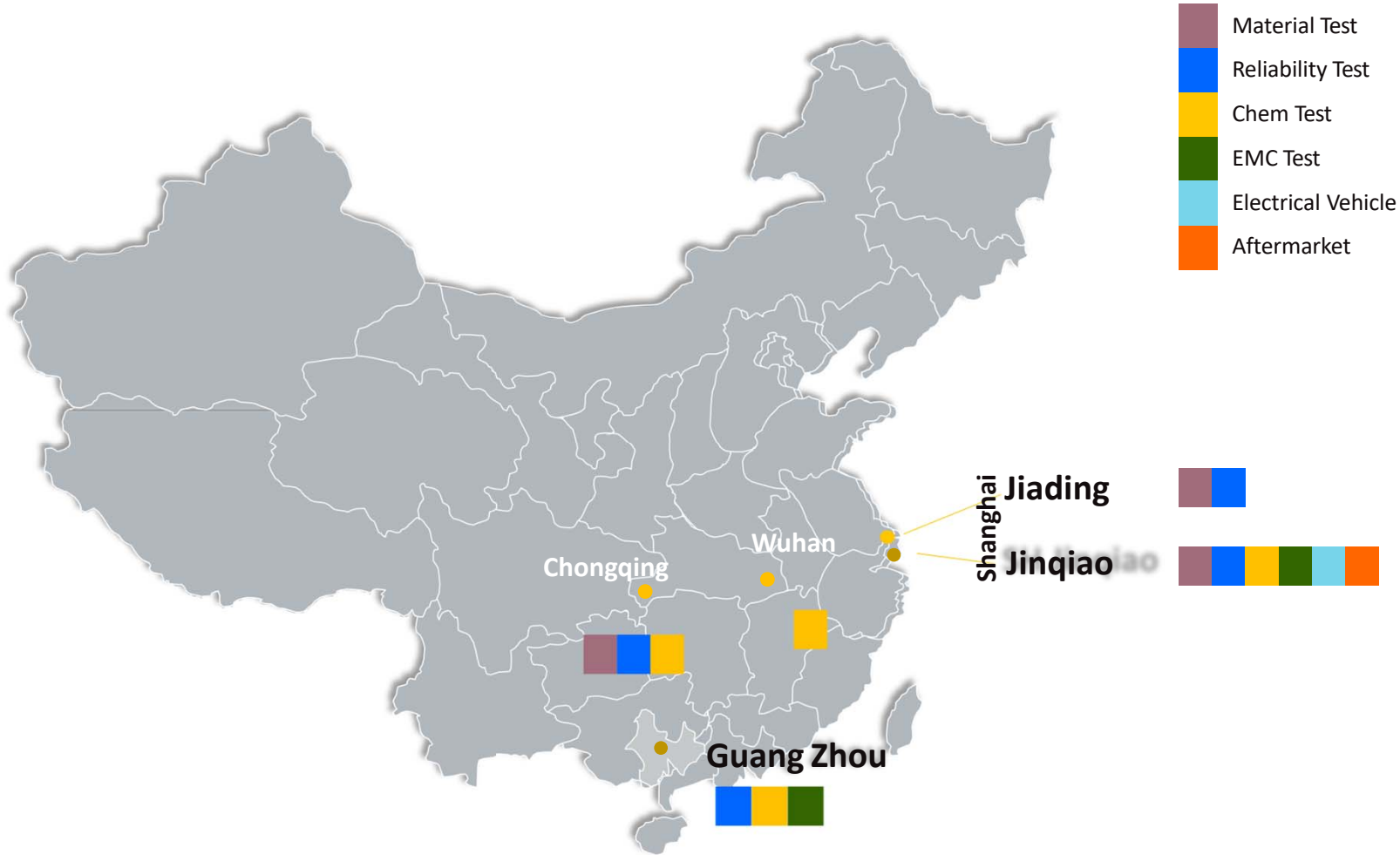


EMEA:
Milton Keynes, UK
Kaufbeuren, Germany
Griesheim, Germany
Kista, Sweden
Geleen, Netherlands
Johannesburg, S.A.

APAC:
Shanghai, China
Guangzhou, China
Chongqing, China
Wuhan, China
Bangkok, Thailand
Taipei, Taiwan
Seoul, South Korea
Matsuda, Japan

11
countries

BUSINESS LAYOUT IN CHINA



02

**EV / AUTONOMOUS SYSTEM
FACILITY CAPABILITY**



CONNECTED / AUTONOMOUS VEHICLES

Support for cutting edge technologies

- Design Validation
 - 신뢰성, 퍼포먼스, Materials & EMC Testing
- Telematics
 - PTCRB/GCF/CTIA/TCB/Verizon인증시험소
 - FCC, Cybersecurity & Software Testing
- Connected Car
 - DSRC(Dedicated Short Range Communication, 단거리전용통신), V2X, Bluetooth & Wi-Fi Testing
- 자율주행차
 - ADS Guidance, Functional Safety, Track & Road Testing
 - PG 및 드라이빙 루트 정보 제공



EV / CHARGER / BATTERY PACK

From battery packs to charge stations

- 배터리 시험 (Global OEM 스탠다드)
- E – Mark (UNECE R100)
- EV – EVSE간 상호적합성 시험
- SAE J1772 / J2953
- CHAdeMO 인증
- CB Scheme (EVSE)
- UL / ETL Safety 인증 (NRTL)



BATTERY TESTING & CERTIFICATION

Test Types:

- ETL Safety Mark
- Battery Autopsy / Failure Analysis
- Cycle life
- Abuse / Acupuncture / Immersion
- Fire exposure
- Overcharge / Short circuit
- Drop / Sled
- E-Mobility Devices
- Thermal / Altitude
- BMS simulation monitoring

Standards:

- UN 38.3
- CB Scheme
- IEC 62133
- UL 1642/UL 2054
- UL 1973/IEC 62619
- UL 2271/2580
- UL 1974 (2nd Life Batteries)



MOTORS & ENGINES

UK / Texas - Electrification Capability

- Today – existing rigs:
 1. 280kW eMachine Dyno Rig (18krpm) (C28)
 2. 320kW eMachine Dyno Rig (20krpm) (C29)
 3. 50kW BISG motor dyno Rig (C30)
 4. Precision eMotor rotor loss rig (to 15krpm) (C31)
 5. 2WD 250kW Transient EV Axle (EDU) rig (C20) **New**
 6. 2WD 250kW Transient EV Axle (EDU) rig (C25)
 7. eMotor Back-to-Back durability rig (25krpm) (C21) **New**
 8. HV Systems Functional Test Bench
 9. 3-E Transient Transmission rig (C22)
 10. 3-E Steady-state Transmission rig (C26)
 11. 1-E Transient Hybrid Powertrain rig (C24)



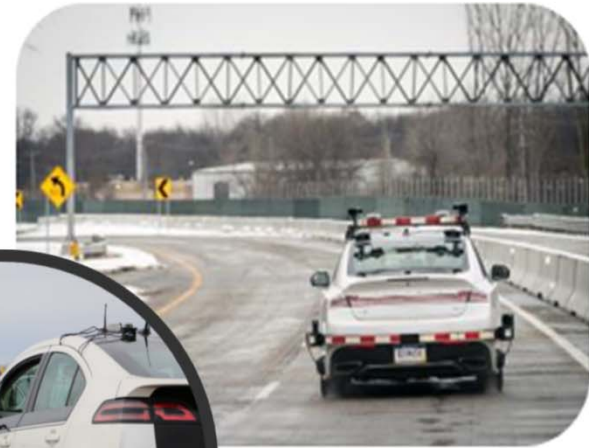
FULL VEHICLE TESTING



Proving Ground at Michigan

On road testing all over the World

- 실도로 주행시험
(미국, 중국, 유럽, 중동, 남미 등)
- Mileage - Fleet test
- Total Quality Test
- 내구시험
- 자율주행시험
- Oil, Lubrication & Fuel Testing
 - 트럭 누적 시험경력 거리 4억 KM이상
 - 승용 누적 시험경력 거리 6억 KM이상
 - 연간 핸들링 시험오일 가지 수
1000 + oil samples



03

**MODULE / PART
TEST**



AUTOMOTIVE MODULES / PARTS

Vehicle Areas:

- 부품 Level
- 모듈 Level
- 전차 Level
- Interior
- Exterior
- 전장(電裝)
- Materials
- Lighting
- Engine / Powertrain
- Fuel System
- Oils
- EV Battery
- eMotor

Industry Standards:

- SAE
- ASTM
- ISO
- UL
- IEC
- FMVSS
- UN ECE
- 각 OEM사별 Standards



PERFORMANCE & DURABILITY TESTING

Turn-Key 테스트 一站式方案

- 열충격 Thermal Shock 热冲击
- 환경 항온 항습 环境试验
- 피로 Fatigue / 내구Durability 疲劳 耐久性
- Multi-vibration / Shock 复合振动 冲击
- 부식 Corrosion / Salt Spray 腐蚀 盐水
- 인장 Tensile / 압착 抗拉强度
- 마모 Friction / 마멸 摩擦力
- IP / Drip / Splash / Jet 溅水 滴落
- Weathering
- Noise, Vibration, Harshness (NVH)
- Sun Radiation
- Condensation / Dewing

- Creep Rupture / Adhesion 蠕变断裂 附着
- Reliability Test 可靠性试验
- Performance Test 特性试验
- BSR(Buzz Squeak & Rattle) : 振动噪音

Assembly		Component				Timing		Latest
Test	Stage	Qty	Type	Cost	Start	Comp	Typ	
Regime Test	PV	1		chrome supplier				
		1						
		1						
Regime Test	PV	3		\$ -				
		3						
		3		need more info to quote				
Regime Test	PV	3						
		3		need more info to quote				
		3						
Regime Test	PV	3						
		3		need more info to quote				
		3						
Regime Test	PV	3		\$ -				
		3						
		3		\$ -				

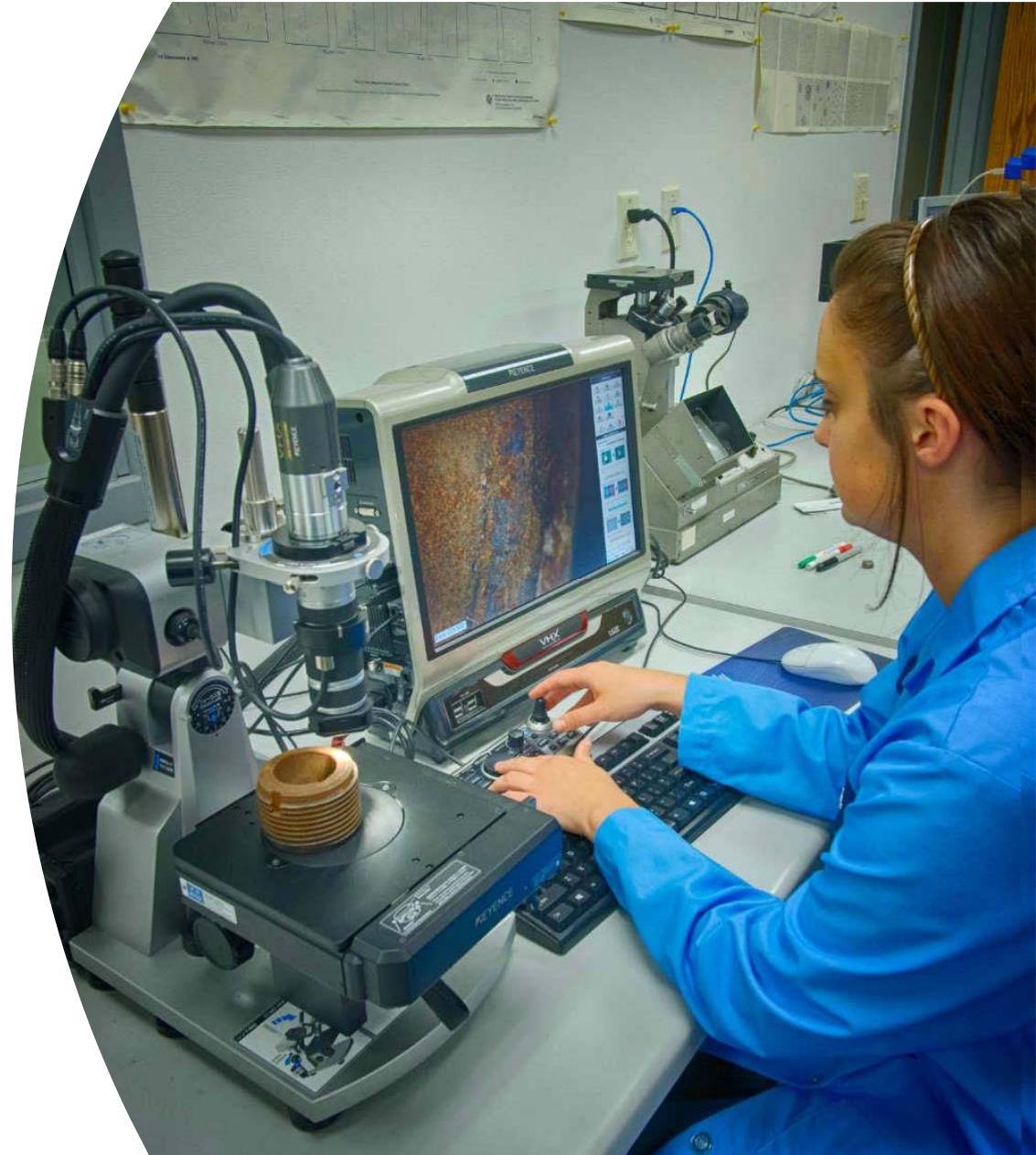
TEST STAGE:
 PD=PD/1/OKTT
 Sign-Off
 DV = Design
 Validation
 PV = Product
 Validation

SAMPLE SAMPL
 S A = Photo Log (qu
 (Photo log, an
 S = Photo Log, I.E
 (Photo)
 C = Program
 D = Production
 E = Paper

화학시험 · 분석

What broke, why it broke and how to fix it.

- Metallurgy OES
- Plastics FTIR / DSC
- Chemistry GCMS / HPLC
- Microscopy SEM / EDS
- Electronics PCB analysis
- Dosage
- DTA(Differential Thermal Analysis),
DSC(Differential Scanning Calorimetry),
DMA(Dynamic Mechanical Analysis),
TMA(Thermo Mechanical Analysis),
TGA(Thermo Gravimetric Analysis),
DETA(Dielectric Spectroscopy)



VOC / ODOR / REACH TESTING

휘발성유기화합물 시험 등

- Foams
- Rubbers
- Textiles
- Plastics
- Building Materials
- Composite
- Polymer
- Odour
- Fogging
- Air Quality (Clean Air Program / Green Leaf)
- ROHS / REACH
- **Approved OEM Service Provider**



EMC TESTING

Global OEM Recognition

- Radiated Immunity (RI & Reverberation)
- Bulk Current Injection (BCI)
- Conducted Transient Immunity (CI)
- Electrostatic Discharge Test (ESD)
- Radiated Emission (RE)
- Conducted Emission (CE)
- Conducted Transient Emission (CTE)



CHRYSLER



And More

HYUNDAI
MOTOR GROUP

Recognition of EMC Compliance

Hyundai Motor Group recognize EMC test results for the Electric & Electronics parts from INTERTEK AUTOMOTIVE TESTING SERVICE Co., Ltd. restrict to the test items of the specification which are specified as below.

Information of EMC Test Laboratory

Name of company INTERTEK AUTOMOTIVE TESTING SERVICE Co.,Ltd.
Technical manager Fangyong Ji
Address Building T52-8, No. 1201 Guiqiao Road, Pudong, Shanghai, China

EMC specification

Title of spec Electromagnetic Compatibility Specification
Spec No ES96200-00

EMC test items

Radiated Immunity	Bulk Current Injection Test (BCI) Absorber-Lined Shielded Enclosure Test (ALSE) GSM / OBT Test
Radiated Emission	Radiated Emission Test Conducted Emission on Power / Signal Line Test
Magnetic Field	Magnetic Field Immunity Test Magnetic Field Emission Test
Transient	Transient Immunity on Power / Signal Line Test Voltage Transient Emission Test
ESD	Electrostatic Discharge Test

January 24, 2018

P. Dongil
Dong-il Park

Senior Vice President
Electronics Technology Center

Electronics Technology Center, Hyundai Motor Group

EMC ACCREDITATIONS



序号	认可单位	认可能力范围	有效日期	证书编号					
1	A2LA	上海实验室	2020-12-31	0078.07、0078.08	36	VW	上海实验室, 可靠性测试	N/A	SVW0610
2	A2LA	广州实验室	2019-08-31	0078.10	37	VW	上海实验室, 可靠性测试	N/A	SVW0611
3	A2LA	重庆实验室	2019-11-30	0078.11	38	VW	上海实验室, 可靠性测试	N/A	SVW0612
4	CMA	上海实验室	2021-12-07	150920340414	39	VW	上海实验室, 可靠性测试	N/A	SVW0613
5	CMA	广州实验室	2021-12-10	2015192035Z	40	VW	上海实验室, 可靠性测试	N/A	SVW0653
6	CNAS	上海实验室	2024-06-27	CNAS L0139	41	VW	上海实验室, 可靠性测试	N/A	SVW0654
7	CNAS	武汉实验室	2024-06-27	CNAS L0139	42	VW	上海实验室, 可靠性测试	N/A	SVW0655
8	CNAS	重庆实验室	2023-03-07	CNAS L9793	43	VW	上海实验室, 可靠性测试	N/A	SVW0656
9	CNAS	广州实验室	2023-07-09	CNAS L0220	44	VW	上海实验室, 可靠性测试	N/A	SVW0657
10	AQSIQ	上海天祥	2022-05-23	国质检检许分字[025]号	45	VW	上海实验室, 可靠性测试	N/A	SVW0658
11	CNCA	上海天祥	2023-07-27	CNCA-RF-2002-07	46	VW	上海实验室, EMC	N/A	SVW0614
12	BYD	广州实验室, 全项认可	2020-07-25	BYD-RK11-2018	47	VW	上海实验室, EMC	N/A	SVW0615
13	Chrysler	上海实验室, EMC	N/A	批准文件	48	VW	上海实验室, EMC	N/A	SVW0616
14	dongfeng Honda	武汉实验室, 除VOC以外	N/A	无证书文件	49	VW	上海实验室, EMC	N/A	SVW0617
15	FCA	除气味测试以外	N/A	无证书文件	50	VW	上海实验室, EMC	N/A	SVW0618
16	Ford	上海实验室, VIEQ	2020-01-16	CN-19-003	51	VW	上海实验室, EMC	N/A	SVW0619
17	Ford	重庆实验室, VIEQ	2020-01-16	CN-19-009	52	Volvo	上海实验室, 可靠性测试	2019-05-11	批准文件328294
18	Ford	上海/重庆实验室, EMC	N/A	认可清单	53	Volvo	上海实验室, EMC	2020-08-16	VCCSHEMC1805
19	Geely	上海实验室, 全项认可	2019-12-31	GASL18010	54	Volvo	上海实验室, 内外饰材料	2020-04-01	认可清单
20	Geely	广州实验室, EMC	N/A	无证书文件	55	爱驰汽车	上海实验室, 材料测试	2019-11-30	AW-MT-L0003-1.0
21	HYUNDAI	上海实验室, EMC	N/A	资质证书	56	北汽福田	全项认可	N/A	批准文件
22	KIA	上海实验室	2022-01-01	证书待更新	57	长安汽车	上海/重庆实验室, 气味/VOC	N/A	(2017)191号文件
23	Mazda	广州实验室, EMC	N/A	无证书文件	58	东风汽车	武汉实验室, VOC/醛酮/袋式法	2019-05-09	CLSY-ZS-2016002F
24	NIO	上海/广州实验室, 气味测试除外	2019-06-04	NLA-000008-1	59	东风汽车	武汉实验室, 雾化	2019-11-30	CLSY-ZS-2016009F
25	PSA	广州实验室, EMC	N/A	批准文件	60	广汽三菱	上海实验室, VOC/ELV/EMC等	N/A	推荐名单
26	RENAULT	武汉实验室, 气味/VOC/醛酮	顺延至2019-10-30	批准文件	61	捷豹路虎	上海实验室, 全项认可	2019-12-31	资质证书
27	SAIC	上海实验室, EMC	2018-2020年度	1803SHINT081503	62	神龙汽车	武汉实验室	2019-06-10	MXP-ZS-2016 004
28	SAIC	上海实验室, 散发/VOC	N/A	证书待更新	63	一汽奔腾	上海实验室, EMC	2021-12-03	资质证书
29	SAIC	上海实验室, 电连接器实验	2022-02-15	SMCA20190201	64	蓝石汽车	上海实验室, 全项认可	2020-04-26	18-021
30	SGM	上海实验室, EMC	N/A	认可清单	65	众泰汽车	上海实验室, 全项认可	2020-12-31	ME-ZS-002-2019
31	SGM	上海实验室, GP-10	2020-05-01	GP-10(L1004)	66	Yanfeng	上海实验室, 全项认可	2019-10-18	YF-18-09
32	SGMW	广州实验室, 电子电器/EMC	N/A	推荐目录	67	BOSCH	上海实验室, EMC	N/A	批准文件
33	SVW	上海实验室, 材料测试	2020-01-01	DL18003	68	Continental	上海实验室, 性能测试/EMC	N/A	资质证书
34	VW (德国)	上海实验室	2021-01-31	资质证书	69	SALEEN	上海实验室, 全项认可	2019-10-30	JSAT-RK-2018-05
35	VW	上海实验室, 可靠性测试	N/A	SVW0609	70	Olfasense	上海实验室, PV3942	N/A	ISO 12219-3、including Odour

LIGHTING

Standards

- FMVSS / CMVSS / SAE Test
- ECE Regulation
E-Mark
- Airflow ASTM E283
- ICAO
國際民間航空機構
Specifications
- FAA-E / Advisory
Circulars 150/5345
Specifications
- OEM Specifications
- AMECA

Testing

- Photometry 光度
- Chromaticity 色度
- Lens warpage
- Spectroradiometer Testing
(color testing)
- Goniophotometer Testing
(light intensity testing)
- Reliability / Performance /
Environmental test
- Electrical test



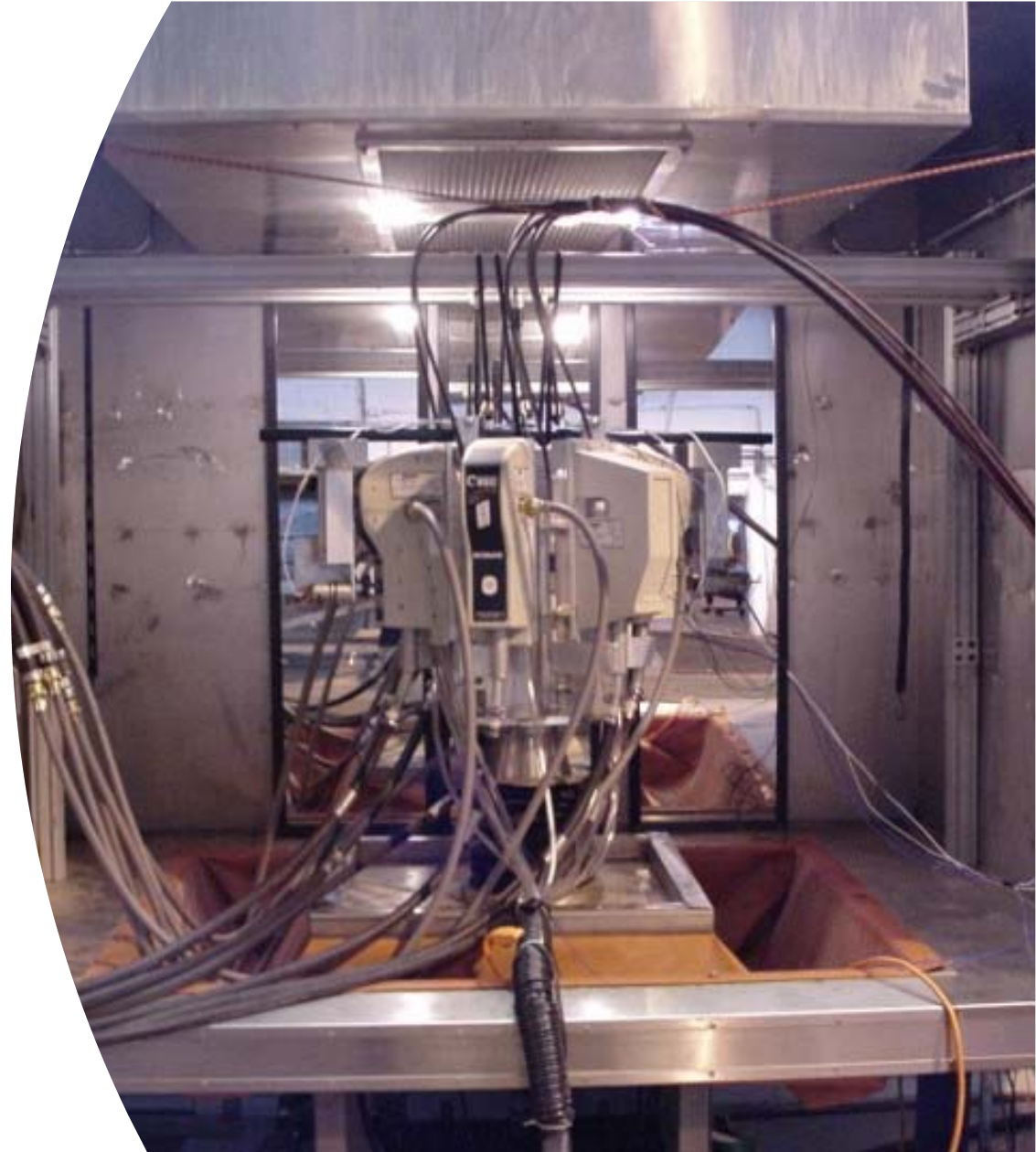
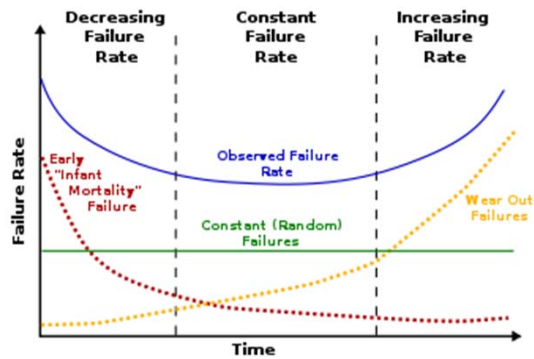
가속시험 · 분석

Products:

- Electronics
- Textiles
- Components
- First Article

Test Types:

- HALT
- HASS
- AST
- MEOST
- Key Life Test
- FMVT®
- Risk Assessment
- Fixture제작, 디자인



POWERTRAIN TESTING

Engine size from string trimmer to 3,000 HP

- NG, CNG, Gasoline, Diesel
- 100+ Engine Dynamometer Test Beds
- Chilled Fluids / Thermal Shock
- Electric / Hybrid Powertrain
- Altitude Simulation to 14,000 feet
- CARB Approved
- Testing at both UK & Texas, USA



FUEL & LUBRICANTS

Oils, lubricants and additives

- Fuel Deposit Testing
- Engine, transmission, Gear Lub Testing
- Gear & Axle Efficiency Testing
- Fuel & Lubricant Qualification
- Heavy / Light Duty Motor Oil
- 각종 첨가제
- API 인증
- Plastic fuel tank 시험
- 연료시스템
- SHED Permeation



04

**OTHER SERVICE
OFFERINGS**



AEROSPACE / DEFENSE

Aerospace:

- FAA / Aviation Lighting
- RTCA DO-160
- Aviation Batteries
RTCA DO-311, 225,
227

Defense:

- Environmental
MIL-STD-810
- EMC MIL-461
- Transparent Armor
(Glass)



INDUSTRIAL 장비 기계 설비 인증

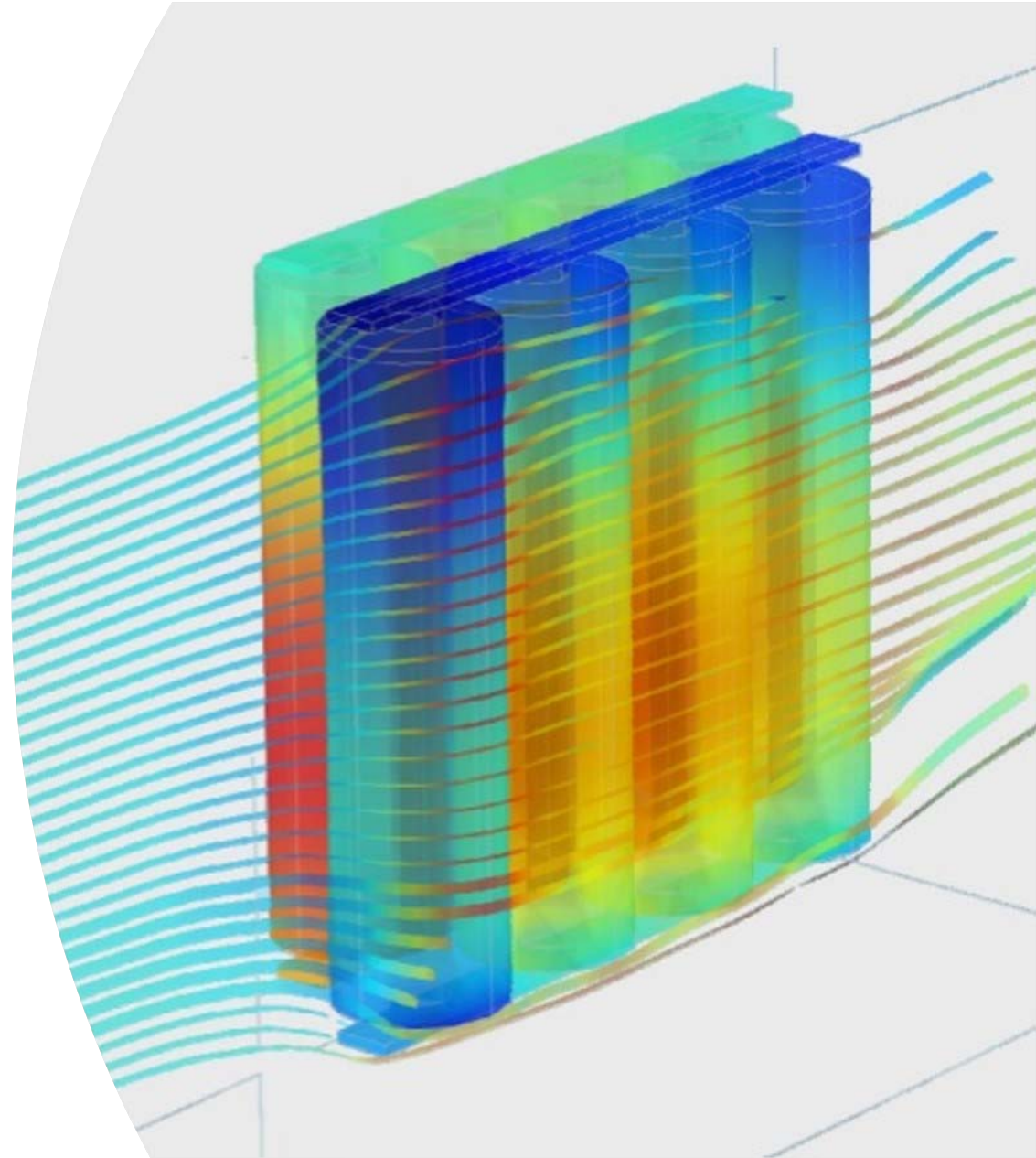
Field labelling in your factory

- Machinery Directive
- CE Marking
- ETL Safety Mark
- ETL Field Label
- UL 508 and IEC 61010
- IEC / UL / CSA 60950-1
- Assembly Cells
- Weld Cells
- Factory Equipment
- Equipment Builds
- Facilities



BATTERY ADVISORY SERVICES

- Systemic failure analysis investigation approach
- Battery dissection capabilities
- Technical manufacturing audit
- COMSOL certified modeling and simulation services



GLOBAL MARKET ACCESS SERVICES

- Providing country-specific regulatory compliance research:
 - Regulatory environment and classification of product
 - Applicable standards
 - Conformity assessment procedure
- Manages compulsory and voluntary national certifications and registrations worldwide
- Vehicle Homologation Services
- EV charging cord set / ICCPD global certification program

CONFIGURATION: HCS-40-C13-L25-45

Standard UL 2594
Certified to CAN/CSA
Standard 280.13

BRANCH CIRCUIT PROTECTOR

INPUT: 208-240 VAC, 50/60Hz, 120V TO GND
32AMPS CONTINUOUS

OUTPUT: 208-240 VAC, 50/60Hz, 120V TO GND
32AMPS CONTINUOUS

SHORT CIRCUIT RATING:

5000RMS SYMMETRICAL AMPS at 240VAC

SAE J1772 COMPLIANT / TYPE 4 ENCLOSURE

AMBIENT TEMPERATURE RATING: -30°C to +50°C

LA STATION DE RECHARGE POUR UTILISATION
AVEC DES VÉHICULES ÉLECTRIQUES

NUMÉRO DE MODEL: HCS-40

NUMÉRO DE PIÈCE: 0909-00-003

NUMÉRO DE SÉRIE: HC1C161044633

CONFIGURATION: HCS-40-C13-L25-45



Intertek
4003190

Conforme aux normes
UL 2594
Certifié à la norme
CAN/CSA 280.13

40A PROTECTOR DE CIRCUITS DE DÉRIVATION

ENTRÉE: 208-240 VAC, 50/60Hz, 120V À LA TERRE
32AMPS CONTINU

SORTIE: 208-240 VAC, 50/60Hz, 120V À LA TERRE
32AMPS CONTINU

CLASSIFICATION DE COURT-CIRCUIT:

5000RMS SYMÉTRIQUE AMPS À 240VAC

J1772 CONFORME / COFFRET TYPE 4

05

WRAP UP

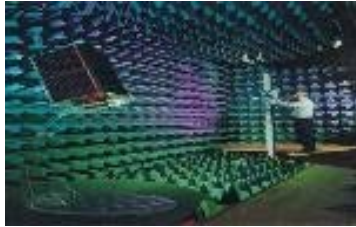


AGAIN 인터텍 - 트랜스포테이션 테크놀로지 사업부 일람



VOC

- 다수 글로벌 OEM Approval 소유
- 각종 글로벌 스탠다드 시험 가능



EMC

- SAE, ISO, CISPR, FCC
- 다수 OEM standards Approval 소유



Electric Vehicle

- 배터리 시험
- 충전기 상호 적합성
- SAE J1772/J2953
- 충전기 나라별 인증



Full Vehicle

- Total quality
- Durability
- Driving route
- Proving Ground



Materials

- Polymer, Plastics, Metals, Composites
- ASTM/ASME Methods
- International Standards
- OEM Standards



Powertrain

- 100+ Engine dynamometer test beds
- 다양한 Engine Size 가능 Up to 3,000 HP
- CARB Approval



Industrial

- Machinery Directive
- CE Marking
- Factory Equipment
- Field Label



Failure Analysis

- FMEA
- Metallurgy OES, GCMS/HPLC
- DSC, DMA, TGA, TMA
- Microscopy SEM/EDS



Lubricant & Fuel

- API/ACEA/OEM oil
- Heavy / light Duty oil
- Engine, transmission, axle oils



Defense & Aerospace

- Environmental MIL-810
- EMC : MIL-461
- PPE/Ballistics Testing Transparent Armor (Glass) FAA/Aviation Lighting DO-160
- Batteries DO-311, 225, 227

The Intertek Advantage



Total Quality. Assured.

- Global OEM 규격 시험 전문
- Global network
- Global Resources – Local Service
- Major automotive market 에 위치
- One – Stop / Turn-key Service

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