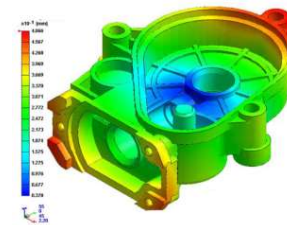


MSC

Material Science Company

for all Your Needs about Material & Engineering Solution



2023

Material Science Company

MSC



- MSC는 국가적 원천 기술인 부품 소재 산업인 첨단 소재 관련 **엔지니어링 플라스틱**을 연구, 개발 및 생산하여 자동차, 전기전자, 소비재 산업분야에 공급을 하는 회사입니다.
- 엔지니어링플라스틱 관련, 범용 엔지니어링플라스틱을 포함하여 특수목적소재인 **내열 재료, 고강도 재료, 열 전기 전도성재료, Carbon Fiber 재료**에 이르기까지 검증된 재료를 생산 공급할 수 있는 기술력을 확보하고 있습니다.



MSC

회사소개

■ (주) MSC 연혁 I

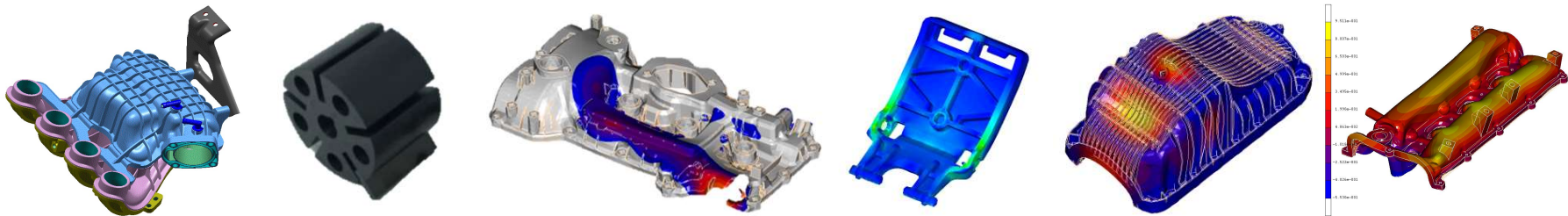
- 2009. 04 : 주식회사 엠에스시 창립
- 2010. 04 : HMC Nu Engine (2.0 2.4 Liter gasoline) Cylinder Head Cover 개발참여 (Mahle)
- 2010. 07 : 진천공장 MSC 브랜드 생산시작 (AIM 용 소재 Poweron CTS P0633 HSL BK 생산)
- 2011. 03 : Thermostat Housing (Theta-I VVL Engine) 플라스틱화 기술컨설팅 계약
- 2011. 06 : HMC U2 Engine 용 U2 Cylinder Head Cover 플라스틱화 기술컨설팅 계약
- 2011. 08 : HMC L Engine / H Engine / Gamma Dual CVVT CHC 기술컨설팅 계약
- 2011. 12 : MSC 세종특별 자치시 본사공장 완공 및 가동, 기업부설 연구소 설립
- 2012. 03 : 쌍용자동차 X100 CHC 및 AIM 용 재료로 MSC 재료 승인
- 2012. 04 : 쌍용자동차 G20DT, G32DT, D20DTF Engine 용 CHC 및 AIM 소재로 MSC 재료 승인
- 2012. 06 : 미쯔비시 (SAME) Cylinder Head Cover 용 재료로 MSC 재료 공급
- 2012. 07 : Nissan 자동차 Radiator End Bracket 로 MSC 재료로 선정
- 2013. 01 : HMC/KIA EQ900 Tau V8 Engine 용 Cylinder Head Cover 소재공급사로 MSC 선정
- 2013. 05 : BMW/Benz 용 Fuel Filler Housing 재료 공급 시작 (중국 수출)
- 2014. 01 : 러시아 GAZ사 U27S엔진용 Cylinder Head Cover, AIM, Oil Pan 플라스틱화 기술 컨설팅 계약
- 2014. 05 : GAZ 자동차용 CHC, AIM, Oil Pan 재료공급사로 MSC 선정 (한국 최초 Oil Pan 양산 및 재료 공급)
- 2014. 06 : Vane Pump 용 Vane 한국 최초 MSC J10M6 (EP) 으로 성공 및 공급 시작
- 2014. 08 : HMC/KIA 자동차 Powertrain용 재료 Spec PA66 GF 그레이드 승인획득

■ (주) MSC 연혁 II

- 2014. 11 : HMC/KIA 자동차 Kappa Engine (1.0 , 1.2 Liter) Cylinder Head Cover 용 소재공급사로 MSC 선정
- 2014. 11 : HMC/KIA 자동차 Valve Body Cover (GenII) 용 소재공급사로 MSC 선정
- 2014. 12 : HMC/KIA 자동차 신유 Engine (1.6 Diesel) Cylinder Head Cover 용 소재공급사로 MSC 선정
- 2014. 12 : LG 전기전자용 난연절연 Sheet 로, MSC Zero1® 승인 획득 (UL 획득)
- 2014. 12 : 현대자동차 그룹 계열사인 현대머티리얼과 엔지니어링플라스틱 관련 업무협약 MOU 체결

- 2015. 04 : 현대자동차그룹 계열사인 현대머티리얼과 업무제휴 계약 체결
- 2015. 05 : 충청북도 보은사업단지 이전 관련 보은군과 투자협정 체결 (MOU)
- 2015. 06 : HMC/KIA Nu MPI,GDI,TGDI, CVVL Engine CHC 용 소재로 MSC 재료 선정

- 2016. 01 : Water Jacket Spacer 용 소재공급사로 MSC 선정
- 2016. 05 : HKMC Mission Oil Pan 재료로 MSC 재료 선정
- 2016. 05 : 보은군과 104억 투자협정 체결 및 보은생산 및 연구사이트 최대 12개 라인 , 45,000 톤 규모의 생산설비 착공
- 2016. 06 : Door Latch 용 슈퍼엔지니어링 소재 (PPA) 공급사로 MSC 선정
- 2016. 08 : MSC 보은 공장 완공 및 양산개시

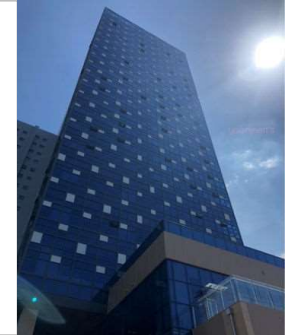


■ MSC 본사 및 영업장



MSC 영업본부

- * 경기도 화성시 동탄(영천동)
- * 엔지니어링폴리머 영업팀
- * 스페셜티 영업팀
- * 글로벌 영업팀
- * 기술지원팀 (CAE, CAD)



MSC 본사

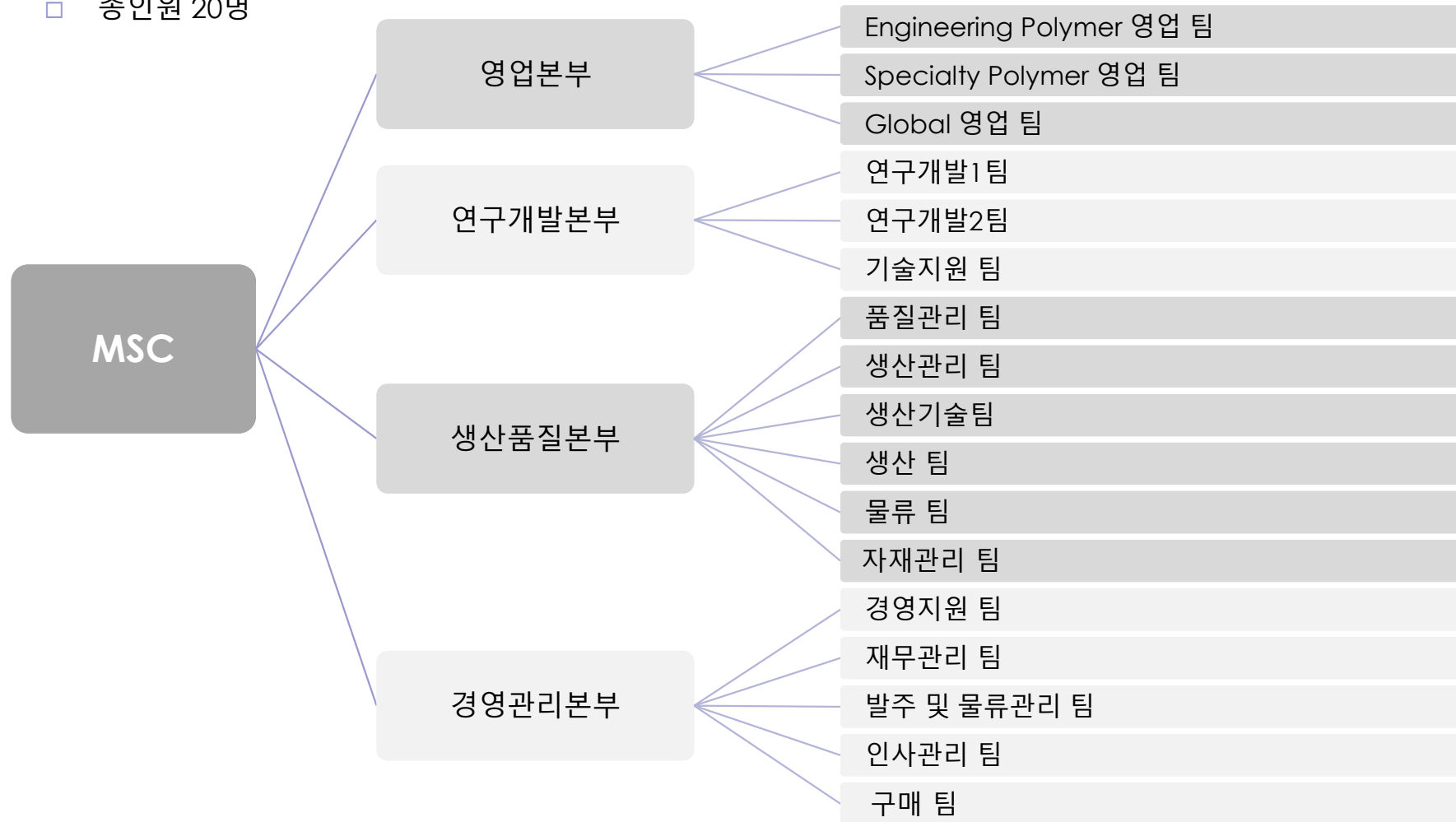
- * 충청북도 보은산업단지
- * 연구개발본부 / 생산품질본부
- * 총면적 6000평
- * Maximum Capacity : 45,000 Ton/Year
- * Maximum Compounding Line ; 16



중국 상하이 영업사무소

■ MSC 조직도

- 4개 사업본부 17개 팀
- 총인원 20명

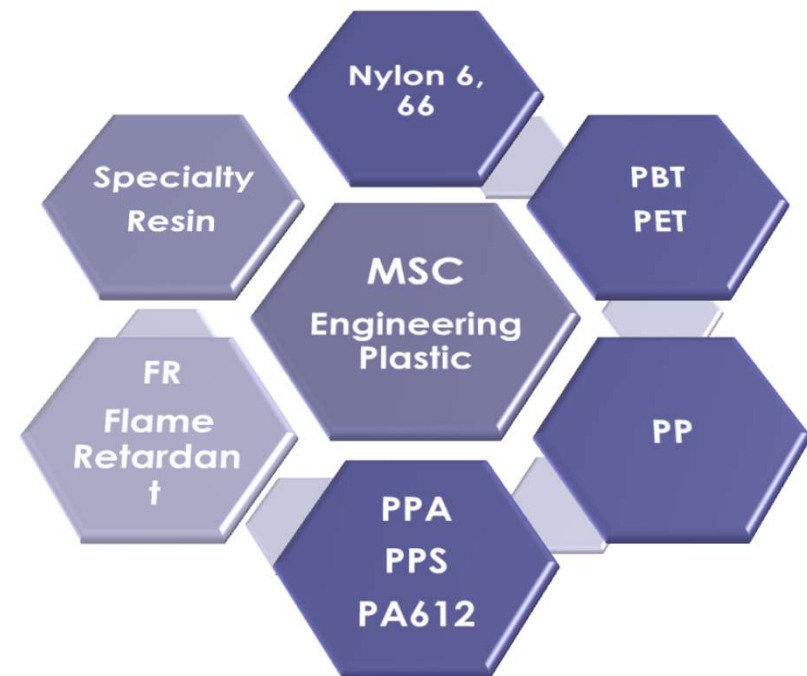
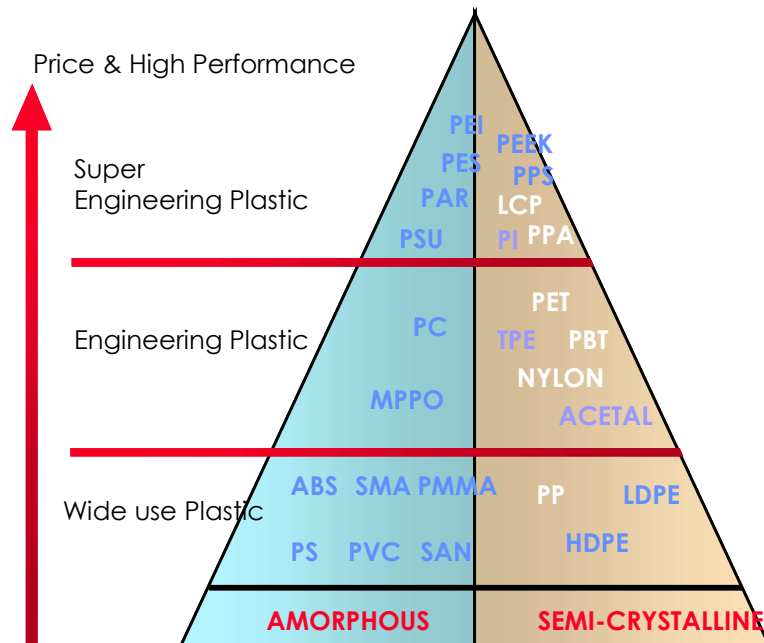


MSC

사업영역

MSC 는 범용 및 특수목적 엔지니어링플라스틱을 연구 개발하여 판매하는 회사 입니다.

(1) 범용 엔지니어링플라스틱



MSC 에서 생산 및 공급하는
범용 엔지니어링플라스틱

MSC 는 범용 및 특수목적 엔지니어링플라스틱을 연구 개발하여 판매하는 회사 입니다.

(2) 특수목적 엔지니어링플라스틱

카본화이버 함유 재료

Carbon Fiber Reinforced Material

열전도성 재료

Thermally Conductive Material

전기전도성 재료

Electrically Conductive Material

고온용 재료

High Temperature Solution

초고강성 재료

Super Strength Material

고윤활, 내마모 재료

Tribology Material

저소음, 저진동 재료

High Damping Material

특수목적 재료

Special Purpose Material

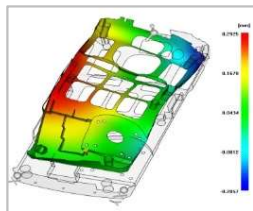
MSC

기술지원 및 연구개발

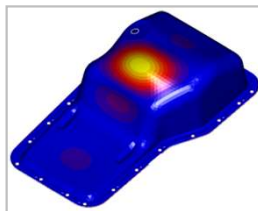
■ 플라스틱화에 따른 설계 기술지원



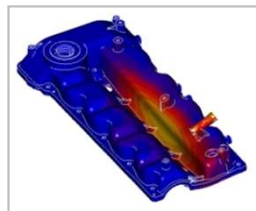
플라스틱화를 위한 MSC 의 기술지원



Moldflow해석



NVH 해석



열변형해석

Design Support

Concept and 3D CAD Support (컨셉설계 / 3D CAD)

CAE Support

Moldability Analysis (성형성 검토)

Warpage Analysis (변형 해석)

Structural Analysis (구조강도해석)

NVH Analysis (진동해석)

Noise Analysis (소음해석)

Impact Analysis (충격해석)

Thermal Analysis (열변형 / 열응력해석)

FEA Model (해석용 모델)

Rubber/Gasket Analysis (고무/가스켓 분석)

Processing Support

Injection Molding Support (시사출지원)

Assembling (Welding) Support

Testing Support

Material Mechanical Property (재료분석 / 물성측정)

■ 재료개발 및 선행연구, 신소재 개발

Material Property Measurement

Material Analysis



For Product Quality and Customer Service



□ Material Property 분석 장비

	No	Equipment	Maker	Standard	Calibration Cycle	Q'ty
		Conditioning Room		23±3°C, 50±5% RH	12 Month	1
1	MSC-RD-2	Precision Scale	Ohaus	0.001 g ~ 210 g	12 Month	1
2	MSC-RD-4	Specimen Mold	Jaell Mold	ASTM / ISO		2
3	MSC-RD-5	Electodensimeter	Mirage	0.001g ~ 300g	12 Month	1
4	MSC-RD-8	UTM	Tinius Olsen	Capacity 25KN	12 Month	1
5	MSC-RD-9	HDT	Tinius Olsen	ASTM D648, D1525, ISO 75, 306	12 Month	1
6	MSC-RD-10	Impact Tester (IZOD / Charpy)	Tinius Olsen	2.82J to 25J	12 Month	1
7	MSC-RD-11	V-Notching Machine	Tinius Olsen	ISO 179,180 ASTM D256, 6110	12 Month	1
8	MSC-RD-12	Depth Gauge	Tinius Olsen	0.01 mm	12 Month	1
9	MSC-RD-13	Specimen Cutting Machine	Manix	Dia. 100 ~ 150 mm, Rpm Control	12 Month	1
10	MSC-RD-14	Electrical Precision Scale	CAS	0.01g ~ 200g	12 Month	1
11	MSC-RD-16	Surface Resistivity	SIMCO (Japan)	10 ⁹ ~ 10 ¹³ Ω	12 Month	1
12	MSC-RD-20	Rockwell Hardness Tester				0

□ Material Analysis

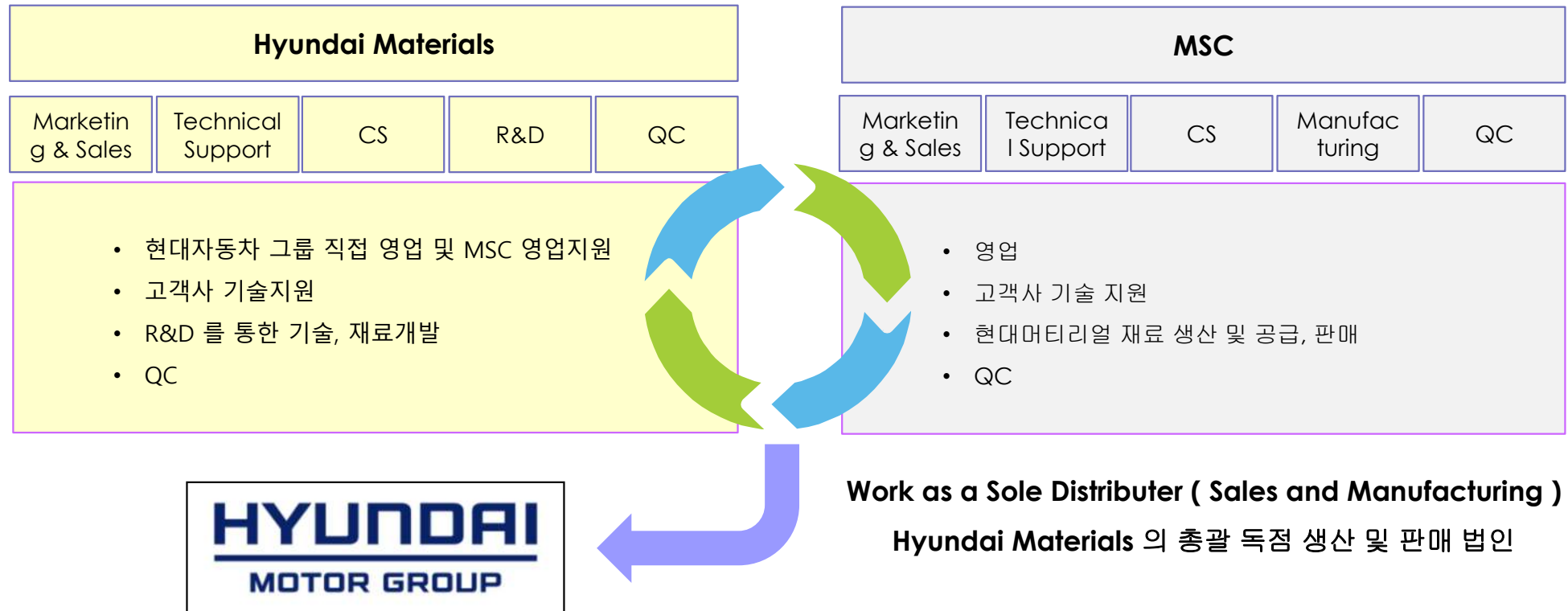
	No	Equipment	Maker	Standard	Calibration Cycle	Q'ty
		Conditioning Room		23±3°C, 50±5% RH	12 Month	1
1	MSC-RD-1	Melt Index Measurement	Tinius Olsen	ASTM D1238 and D3364, ISO 1133	12 Month	1
2	MSC-RD-3	Moisture Analyzer	Precisa	0.01 %, 0.001 g	12 Month	2
3	MSC-RD-6	High/Low Temperature Chamber (with Humidity Control)	HanBaek	Temperature Rage ; -40C ~ 150C Humidity Range : 35% ~ 95%	12 Month	1
4	MSC-RD-7	Furnace	Jisico	300 ~900 C	12 Month	1
5	MSC-RD-15	FTIR		'2015 Scheduled to Install		0
6	MSC-RD-17	Room Temp./Hum. Controller	LG	23C 50% RH	12 Month	1
7	MSC-RD-18	Precision Microscope	Itten	500 Magnitude	12 Month	1
8	MSC-RD-19	DSC	Perkin Elmer PYRIS-1		12 Month	1

□ CAD/CAE (Computer Aided Design / Computer Aided Engineering)

	No	Equipment	Maker	Standard	Calibration Cycle	Q'ty
1	MSC-CAD-1	Pro-Engineer	PTC	2D/3D Computer Aided Design Software		1
2	MSC-CAE-1	MOLDFLOW	Autodesk	2D/3D Injection Molding Analysis Software		1
3	MSC-CAE-2	MSC In-House NVH Software	MSC	Noise Analysis Software		1
4	MSC-CAE-3	MSC-In House Warpage Program	MSC	Warpage Analysis for GF Reinforced Part		1
5	MSC-CAE-4	MSC In-House Vibration Program	MSC	Vibration Analysis Program		1

Business Collaboration **with** **Hyundai Materials**

현대머티리얼 – MSC 업무제휴



HYUNDAI MATERIALS은 현대기아자동차그룹의 계열사로서, 국내 엔지니어링플라스틱 제품에 대한 분석 (CAE, Molding 등) 능력과 자동차 부품관련 플라스틱 부품 개발 및 적용 경험 그리고 엔지니어링 플라스틱 소재관련 기술력을 보유한 MSC社에 대한 MOU 및 업무제휴를 체결하였으며, 이를 통한 EP 소재 경쟁력 강화에 중점을 두어, 현대기아자동차그룹의 글로벌 경쟁력 재고에 힘을 실어줄 예정이다.

현대머티리얼 이 주도하는 현대기아자동차그룹의 엔지니어링플라스틱 사업을 위해, MSC社는 현대머티리얼의 엔지니어링 플라스틱 제품에 대한 판매 및 생산기지로서 총괄독점 생산, 판매법인의 업무를 수행할 예정이다.

■ 현대머티리얼 연혁

2010년	6월	에이치엠코퍼레이션 주식회사 설립
	8월	현대자동차그룹 편입
	10월	현대머티리얼 주식회사로 상호변경
2011년 (758억)	7월	HYUNDAI MATERIALS JAPAN CORPORATION 설립
	8월	HYUNDAI MATERIALS CORPORATION, Shanghai 설립
2012년 (1081억)	9월	HMSK 설립
	10월	HM Czech 설립
2013년 (1583억)	3월	기획재정부 성실납세 표창
	5월	HMSK Logistics 설립
2014년 (1416억)	7월	대련공장 인수
	8월	HM RUS 설립
2015년 (2000억)	5월	MSC사와 MOU 및 업무제휴
	7월	엔지니어링 플라스틱 사업부 공식 Launch HMMX 설립

Trading

취급제품

- STS HRC(Hot Rolled Coil)
- 유화 (벤젠/톨루엔)
- 철 스크랩, 선철
- STS/탄소강 판재, 철강 원부자재 등



Logistics

취급분야

- 국내/해외 운송 업무 및 해상 포워딩
- 3자 물류/창고 보관/출하배송
- 공장내 생산 물류 지원

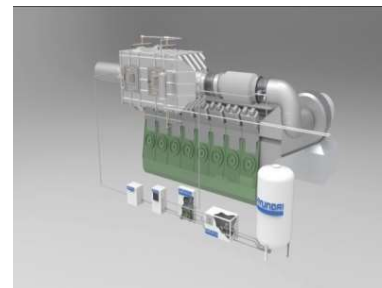


Engineering Plastic

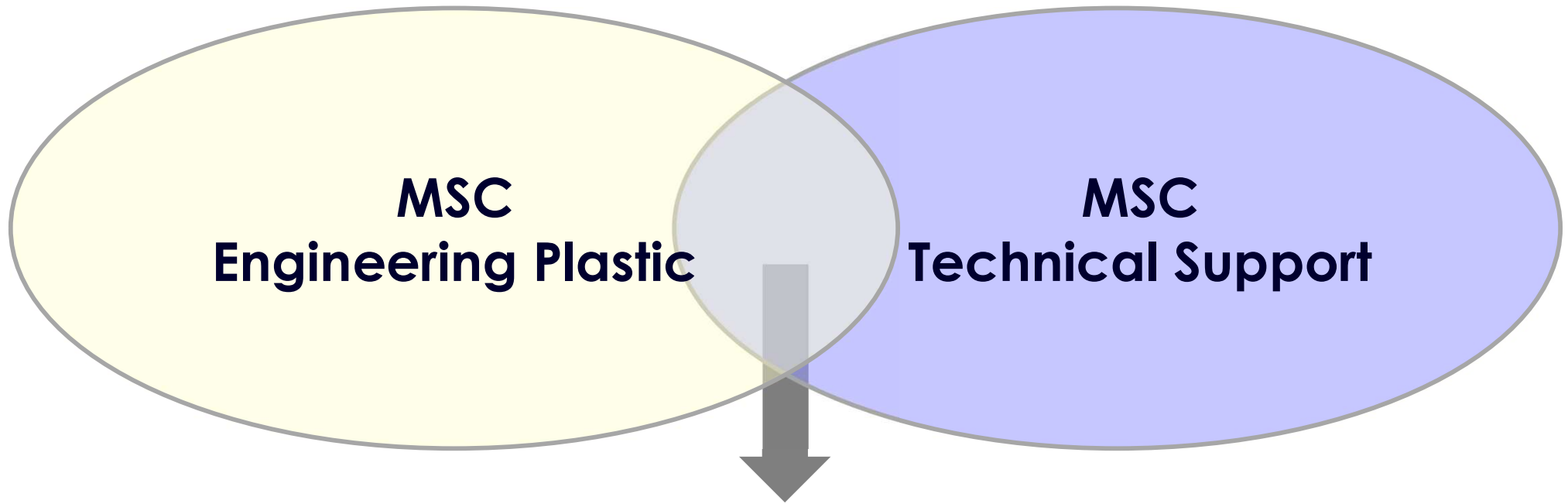


- 고객이 요구하는 성능에 만족하는 소재와 제품의 설계 및 디자인 초기 단계부터 양산까지 솔루션 제공
- 주요 제품 : PA, PPA 등

Selective Catalytic Reduction / Special Equipment Vehicle



- 연소를 통해 배출되는 배기가스 내 질소산화물을 촉매 층에서 환원제와의 화학적 반응으로 인체에 무해한 물과 질소로 분해하여 배출시키는 친환경 장치
- 축적된 노하우와 끊임없는 기술개발, 도전과 혁신으로 국내 최고의 특장차 회사로 추진



최고품질의 엔지니어링플라스틱
(PA, PBT, PPA, PP)

엔지니어링플라스틱 부품 개발 관련 최고의 기술 지원
(CAD / CAE / Concept Design / Injection Molding Support / Testing)

Thank you

**MSC always
will try to answer customer's need
with Competitive price, Qualified material, Differentiated Technical Support
do ours best in regard of mind, which break frame.**

www.mscpolymer.com

MSC Activities

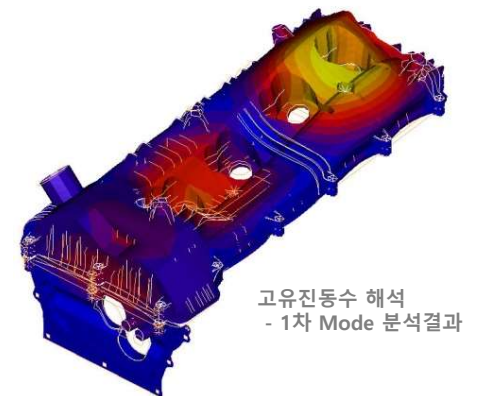
Automotive Material Specification

- HMC/KIA – MSC Poweron® Grade Certification
- 2013' 10 HMC/KIA Material Specification Registration (MSC Poweron® Grade)



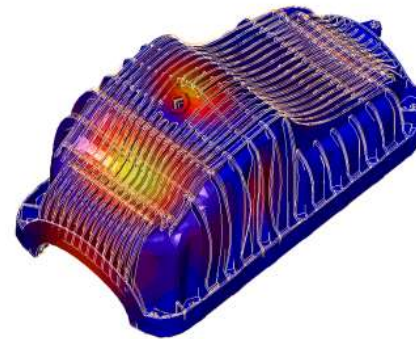
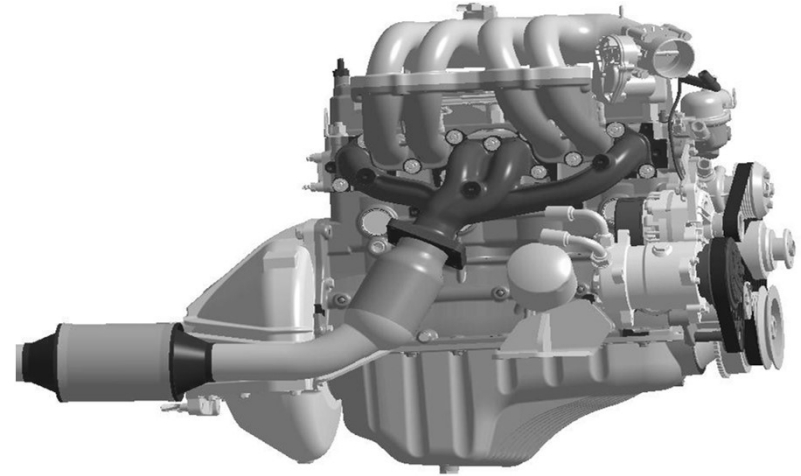
- OEM ; HMC/KIA
- Engine ; Tau Engine (Equus)
- Application ; Cylinder Head Cover
- Material ; MSC Poweron® CTS P6635HSL (PA66 GF35%)
- SOP ; 2014' 10

- Key Factor for Success ;
 - NVH Performance
 - Minimize Warpage
 - Thermal Stability
 - Mechanical Properties
 - Sealing Performance
 - NVH Performance

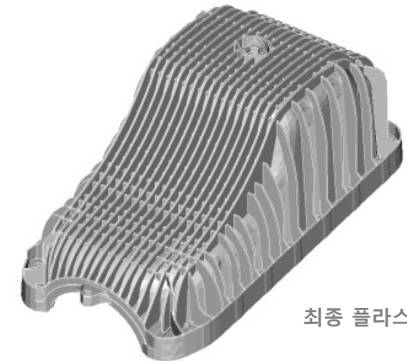


Korea 1st Engine Oil Pan

- GAZ U27S Engine Oil Pan
- Material
 - MSC Poweron® CTS P6643 HSLR
- SOP ; 2014
- Potential ; 100,000 Unit
- Vehicle : U27S 2.7 Liter Diesel Engine
- Weight ; 2.4 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis
 - Impact Analysis
- Korea 1st Oil Pan Mass Production



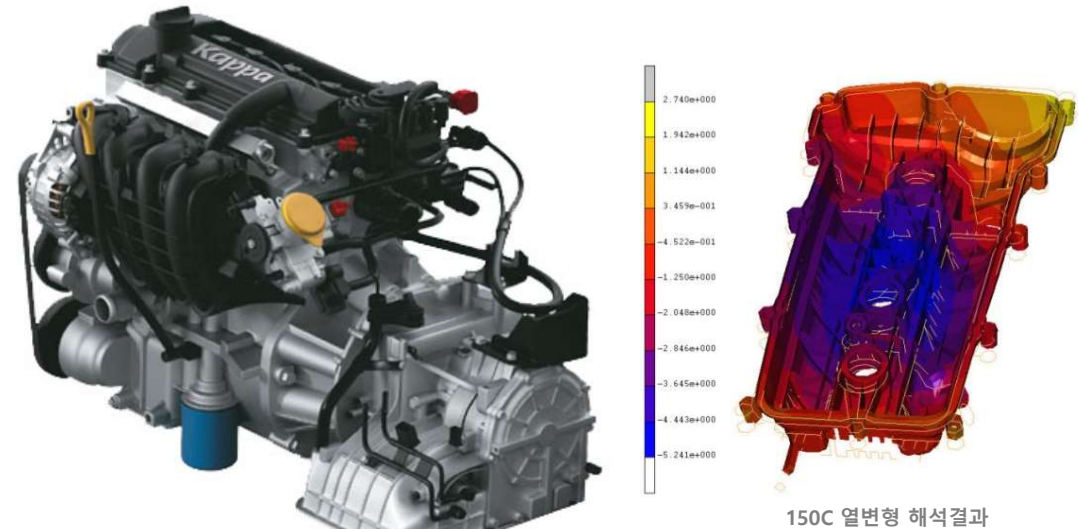
고유진동수 해석
- 1차 Mode 분석결과



최종 플라스틱 모델

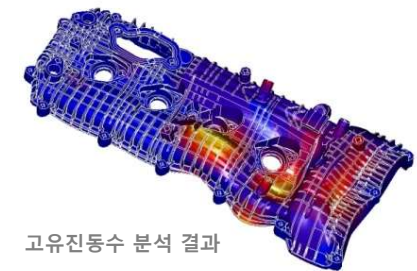
HMC/KIA Kappa Engine Cylinder Head Cover

- HMC/KIA Kappa Engine (1.0, 1.2, 1.4 Liter Gasoline Engine) Cylinder Head Cover
- Material
 - MSC Poweron® CTS P6635 HSL
- SOP ; 2017
- Potential ; 400,000 Unit
- Vehicle : Morning / Ray / Pride / Accent
- Weight ; 1.2 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis

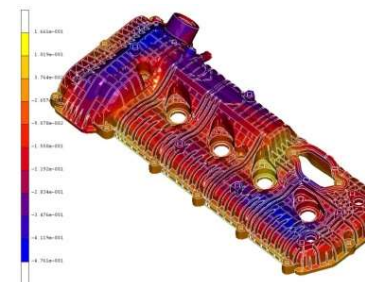


HMC/KIA Tau 5.0 Engine Cylinder Head Cover

- HMC/KIA Tau5.0 Cylinder Head Cover
- Material
 - MSC Poweron® CTS P6635 HSL
- SOP ; 2016
- Potential ; 10,000 Unit
- Vehicle : EQ900
- Weight ; 2.4 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis



고유진동수 분석 결과



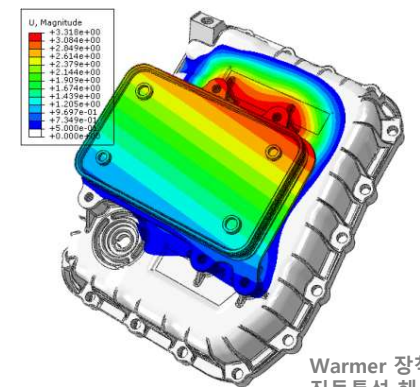
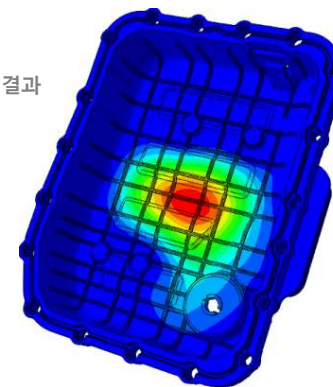
150C 열변형 해석결과

HMC/KIA Valve Body Cover GenII

- HMC/KIA GEN II Valve Body Cover (Mission Oil Pan)
 - MSC Poweron® CTS P6635 HSL
- SOP ; 2015
- Potential ; 1,500,000 Unit
- Vehicle : Small Engine
- Weight ; 0.7 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis
 - Impact Analysis



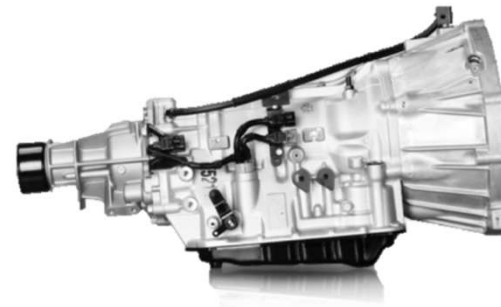
고유진동수 해석결과



Warmer 장착 후
진동특성 해석결과

HMC/KIA Mission Oil Pan

- HMC/KIA Mission Oil Pan
 - MSC Poweron® CTS P6635 HSL
- SOP ; 2016
- Potential ; 100,000 Unit
- Vehicle : Large Engine
- Weight ; 0.9 Kg
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis
 - Impact Analysis

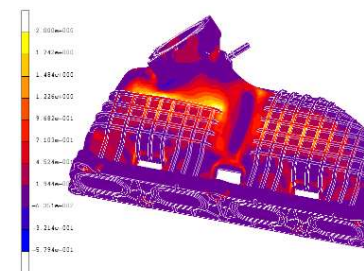
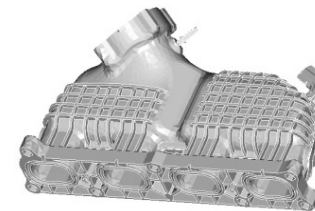


최종 플라스틱 모델

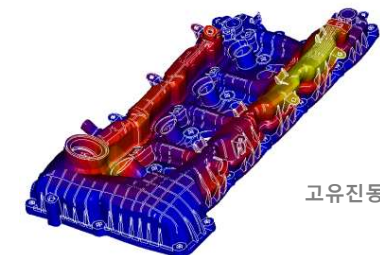
SsangYong Motor Y400 Aim and Cylinder Head Cover

- 쌍용자동차 Y400 (렉스턴후속) AIM & Cyliner head Cover
 - CHC - MSC Poweron® CTS P6635 HSL
 - AIM – MSC Poweron ® CTS P0633 HSL
- SOP ; 2017
- Potential ; 100,000 Unit
- Vehicle : Diesel Engine
- Weight ; AIM – 0. / CHC 1.0 Kgf

- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis
 - Impact Analysis



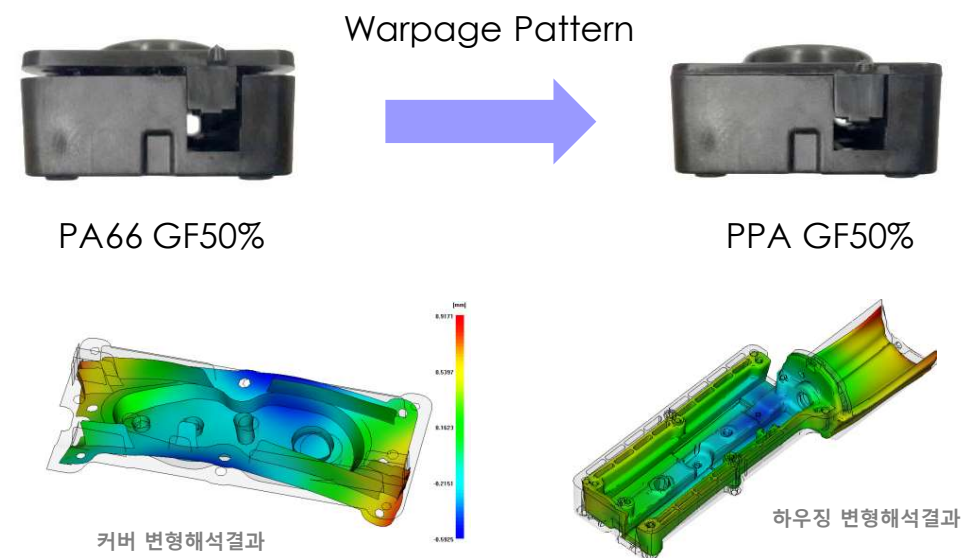
내압해석결과



고유진동수 해석 결과

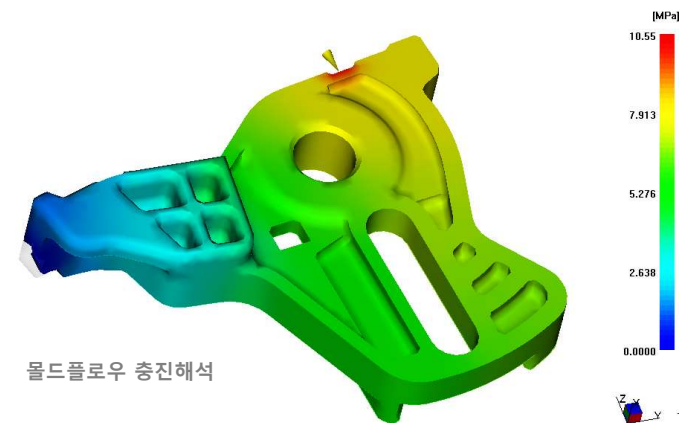
HMC/KIA K7 Rear Sunshade Motor Housing

- Rear Sun Shade Motor Housing
- SOP ; 2016
- Material : MSC HTS G10 (PPA GF50%)
- Potential ; 10,000 Unit
- Vehicle : K7
- Weight ; 0.2 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis
 - Impact Analysis



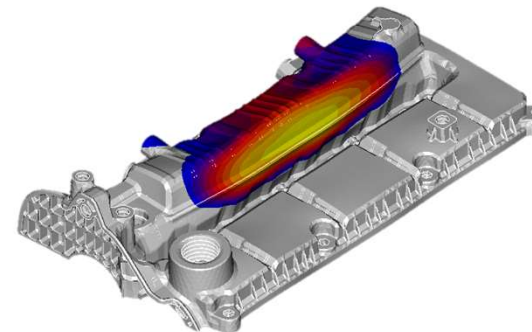
HMC/KIA Door Latch

- Door Latch Part
- SOP ; 2017
- Material : MSC HTS G7 (PPA GF35%)
- Potential ; 100,000 Unit
- Vehicle :
- Weight ; 0.2 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Warpage Analysis

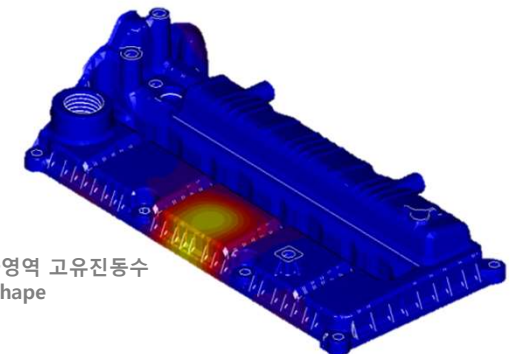


HMC/KIA New U Engine Cylinder Head Cover

- HMC/KIA New U Engine
 - MSC Poweron® CTS P6635 HSL
- SOP ; 2017
- Potential ; 100,000 Unit
- Vehicle : 1.6L Diesel Vehicle
- Weight ; 1.1 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis
 - Impact Analysis



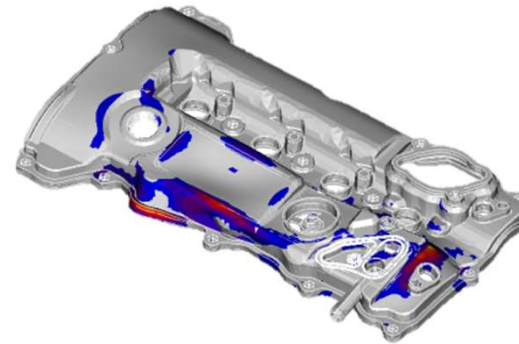
고유진동수해석



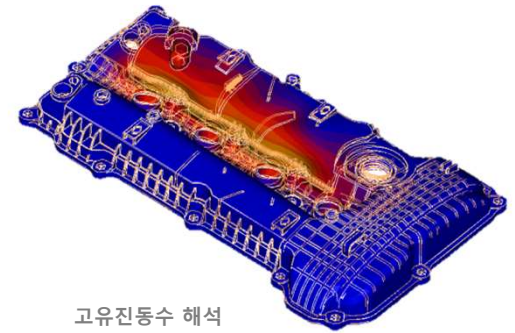
고주파영역 고유진동수
모드 Shape

HMC/KIA Nu MPI/GDI/T-GDI/CVVL Engine Cylinder Head Cover

- Nu MPI/CVVL/GDI/T-GDI
 - MSC Poweron® CTS P6635 HSL
- SOP ; 2019
- Potential ; 1,000,000 Unit
- Vehicle : 1.8L,2.0L Gasoline Inline4 Engine
- Weight ; 1.1 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis
 - Impact Analysis



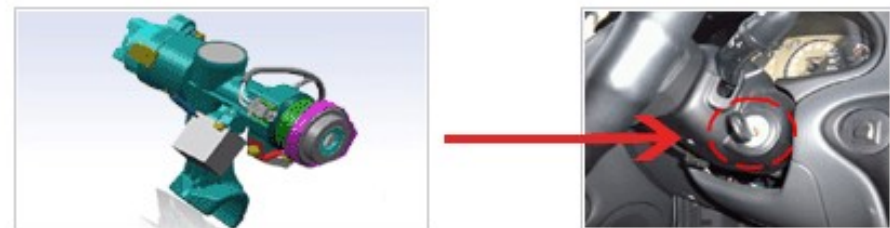
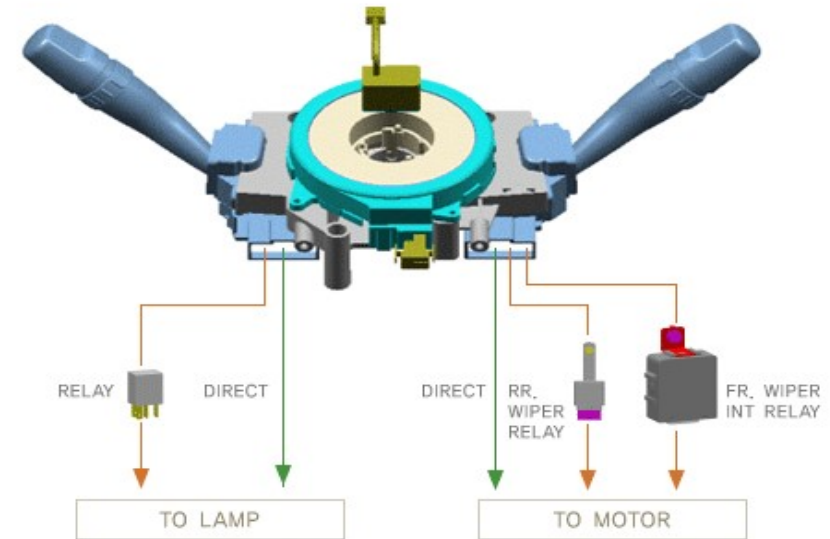
고유진동수 해석



고유진동수 해석

HMC/KIA Wiper Lock Body Parts

- HMC/KIA Wiper Lock Body Parts
 - MSC Poweron® CTS P6630 HSL
- SOP ; 2013
- 1st : DaeDong
- Potential ; 5,000,000 Unit
- Vehicle : HMC/KIA All
- Weight ; 0.1 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis
 - Impact Analysis



Mercedes-Benz Fuel Heater(PTC)+Temperature Sensor

- Mercedes-Benz Fuel Heater(PTC)+Temperature Sensor
 - MSC Poweron® CTS P6630 HSL
- SOP ; 2013
- 1st : UFI Filter(DKCA)
- Potential ; 1,500,000 Unit
- Vehicle : Diesel Fuel System in BenZ
- Weight ; 0.08 Kgf

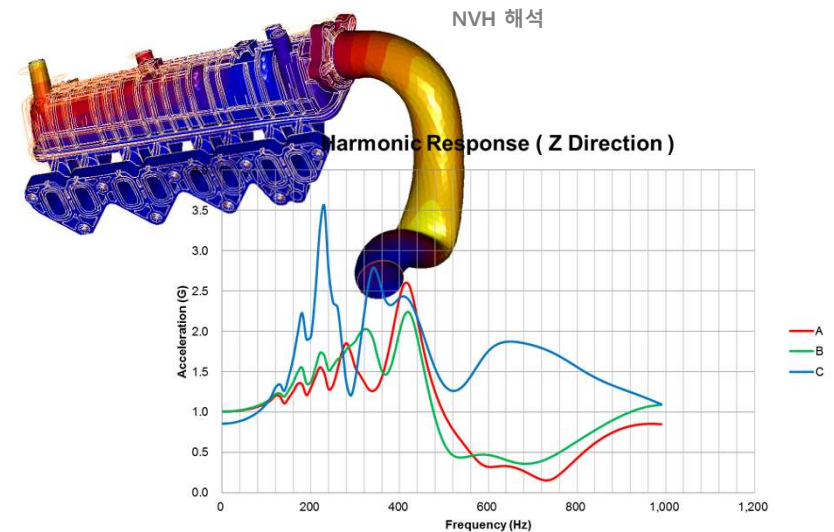


- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis
 - Impact Analysis



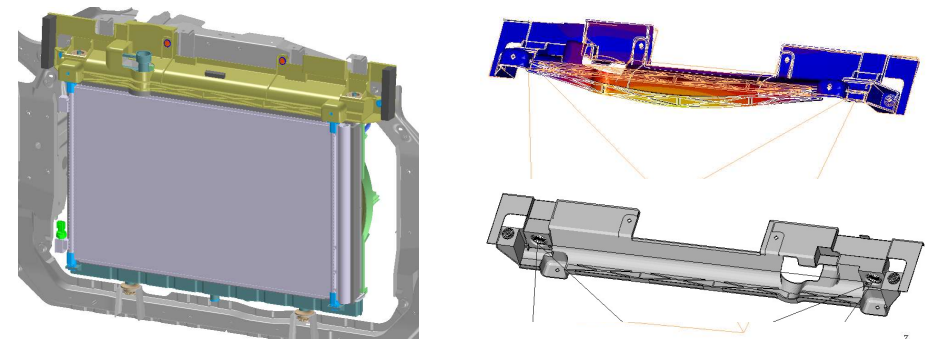
SsangYong Motors X100 AIM/CHC

- SsangYong X100 Engine AIM,CHC
 - MSC Poweron® CTS P6635 HSL
- SOP ; 2015
- Potential ; 100,000 Unit
- Vehicle : Tivoli / 1600CC Diesel Inline-4 Engine
- Weight ; 2 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Thermal Deformation Analysis



Nissan P32R Rogue Radiator End Bracket

- Nissan P32R Radiator End Bracket
 - MSC Poweron® CTS P6630 HSL
- SOP ; 2014
- Potential ; 100,000 Unit
- Vehicle : Rogue
- Weight ; 1 Kgf
- Key Factor for Success
 - Material Quality
 - MSC's Technical Capability for Customer
 - Vibrational Analysis
 - Noise Analysis
 - Warpage Analysis
 - Harmonic Stress Analysis



NVH 해석

Case History for PPS

SBW (Shift-by-wire)

Customer (OEM or final)	HKMC
Application Components	Actuator Cover & H/S
Material	PPS (GF+MF)50%
Expected Volume	450MT/Y
Production Timing	May. 2023



CVVD Actuator Cover

Customer (OEM or final)	HKMC
Application Components	Actuator Cover
Material	PPS GF40%
Expected Volume	180MT/Y
Production Timing	May. 2019



Case History for PPS

EV Front Door Hinge

Customer (OEM or final)	HKMC
Application Components	EV Front Trunk D/H
Material	PPS GF40% UV
Expected Volume	30MT/Y
Production Timing	Jan. 2023



Case History for PPS

EV In-wheel Motor Insulator

Customer (OEM or final)	HKMC
Application Components	EV In-wheel Motor Insulator
Material	PPS GF+MF 50%, Impact
Expected Volume	30MT/Y
Production Timing	Nov. 2024



Case History for PPS

Shipboard Cable

Customer (OEM or final)	Hyundai Heavy Industries
Application Components	Shipboard Engine Cable
Material	Extrusion PPS
Expected Volume	200MT/Y
Production Timing	Jan. 2024

