

High Pressure Aluminum Die Casting Partner

DAEYONG INDUSTRY

DAEYONG INDUSTRY CO.

GLOBAL DIE CASTING PARTNER DAEYONG

1983-1990

1983 DaeYong Established
1983 Start the Biz with Daewoo (Lead Wire)
1989 Start the Al Die Casting Biz
1989 Supply HDD to Samsung

1993 Move to SiHwa Plant
1993 Start to produce Automotive parts
1994 Start the Biz with Delphi, USA

1991-2000

1996 Achieve ISO 9002
1996 DaeYong Vietnam Established
1997 Achieve QS 9000 – TS16949
1999 DaeYong IkSan plant Established
2000 Achieve ISO 14000

2001 Achieve OHSAS 18001
2002 Start the Biz with GM
2003 Start the Biz with Wabco & Tesma
2004 Start the Biz with BorgWarner & NSK

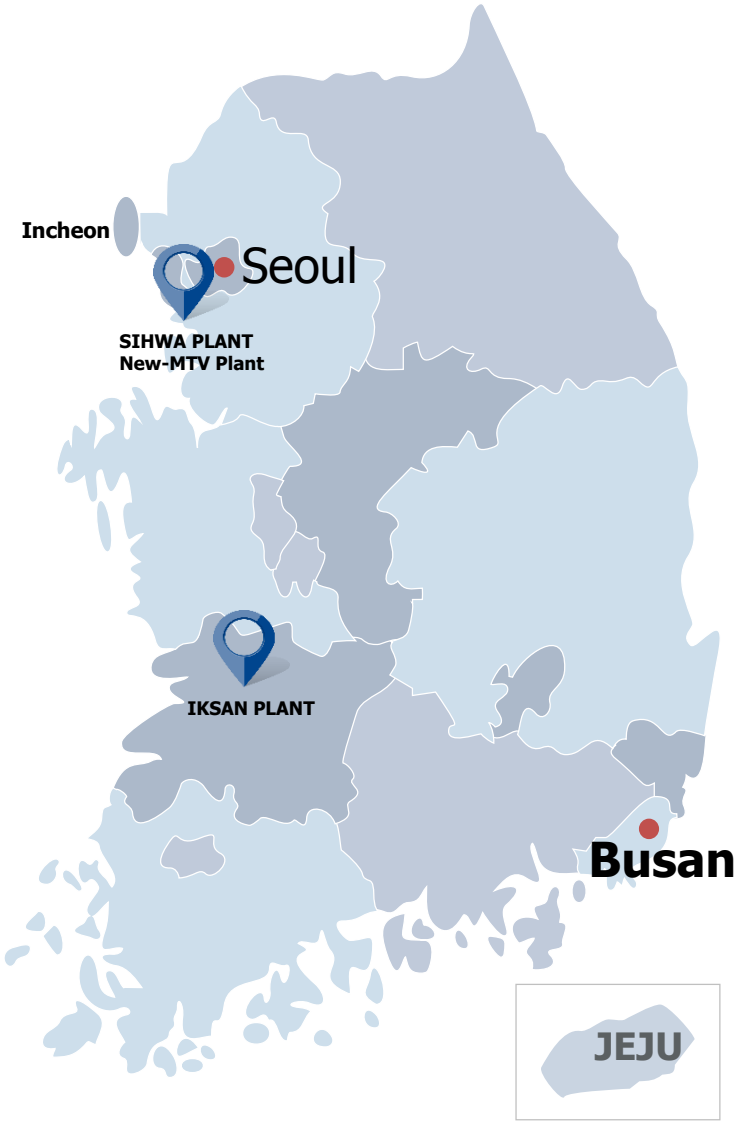
2001-2010

2006 Start the Biz with Kefico, Pierburg
2007 Move to new expanded SiHwa plant
2007 Start the Biz with Allison
2008 Start the Biz with Valeo

2011-Present

2011 Received Patents (10-1017255, 10-1011972) for heat exchanger unit casting mold
2014 Start the Biz with Hitachi USA
2015 Opened New Plant in MTV (Multi Techno Valley) Sihwa
2017 Achieve IATF 16949

DAEYONG Plants



SiHwa Plant
650 employees
34,014 square meters
32 km from Seoul



***MTV Plant (Multi Techno Valley)**
Established on 23 Oct 2015
100 employees
52,669 square meters
32 km from Seoul
5 minute by car from SiHwa Plant



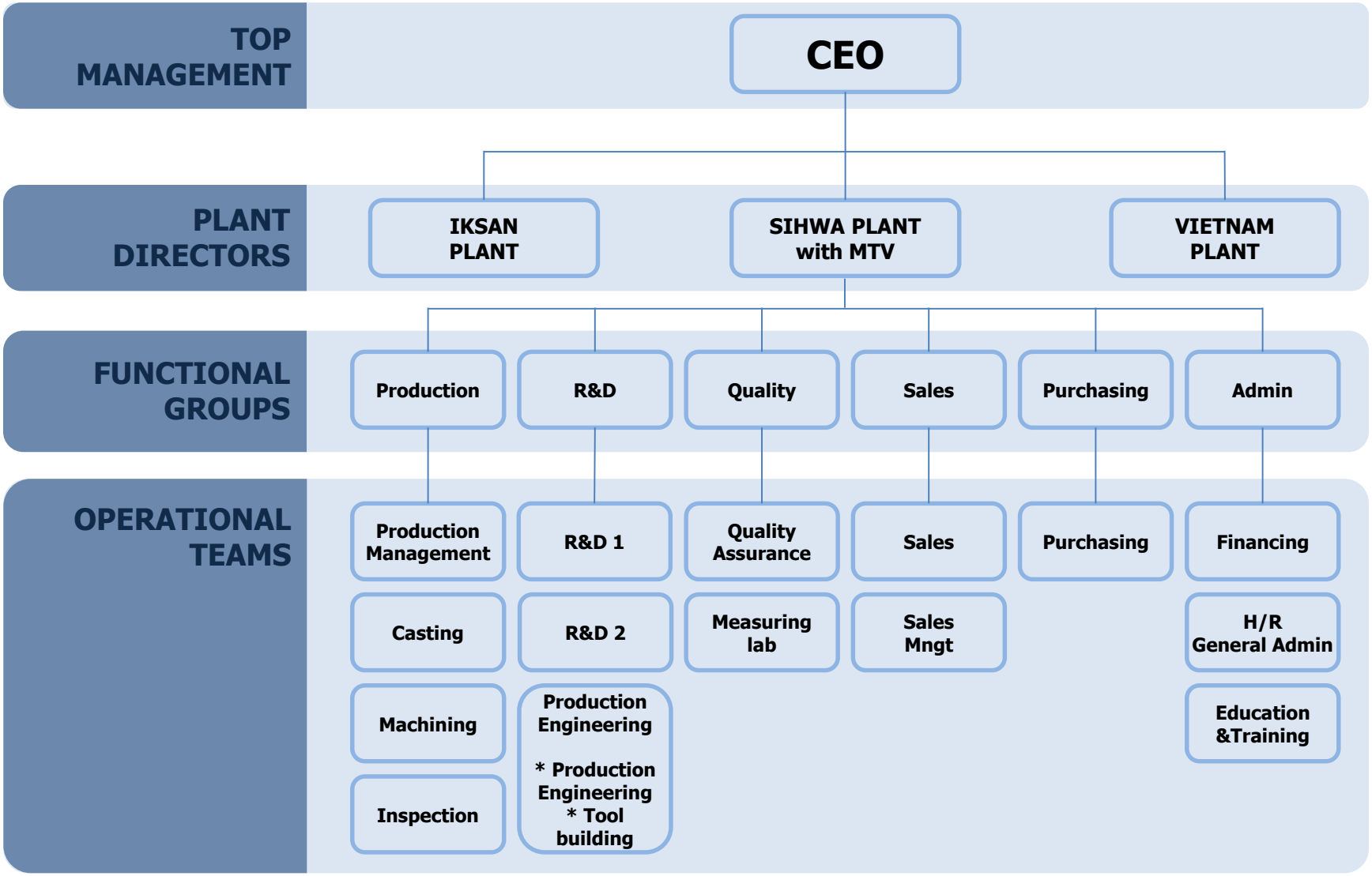
IkSan Plant
205 employees
30,000 square meters
200 km from Seoul



Vietnam Plant
Lead Wire
120 employees
3,300 square meters
Central Vietnam



DAEYONG Organization



DAEYONG MANAGEMENT SYSTEM_CERTIFICATE

- **IATF 16949: Since 2017**



DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 169115-2014-AQ-KOR-IATF
Valid until: 20 December, 2017 - 19 December, 2020
IATF Certificate No.: 0282556

This is to certify that the management system of

Daeyong Industry Co.
#901/902/903, 115, Gongdan 3 Dae-Ro, Jeongwang-Dong, Siheung-Si, Gyeonggi-Do, Korea
53, Mtv 28 Ro, Jeongwang-Dong, Siheung-Si, Gyeonggi-Do, Korea
and, if applicable, the remote support locations as mentioned in the Appendix accompanying this Certificate

has been found to conform to quality management system standard:
IATF 16949:2016

This certificate is valid for the following Scope:
MANUFACTURE OF ALUMINIUM DIE CAST PARTS

EXCLUSION: 8.3 PRODUCT DESIGN

Place and date:
Katy, TX. 20 December 2017

For the issuing office:
DNV GL - Business Assurance
Seoul, Republic of Korea

Robert Kozak
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.
ACCREDITED UNIT: DNV GL - Business Assurance, 1400 Ravello Drive, Katy, TX 77449. Tel.: 281-396-1000. www.dnvglcert.com

Page 1 of 2

- **ISO 14001: Since 2004**



DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

Certificate No: 157404-2014-AE-KOR-KAB
Initial certification date: 30 October, 2000
Valid: 11 September, 2018 - 27 December, 2019

This is to certify that the management system of

Daeyong Industry Co.
H/O & Plant 1 : 901/902/903, 115 Gongdan 3 dae-ro, Siheung-si, Gyeonggi-do, Korea
and the sites as mentioned in the appendix accompanying this certificate

has been found to conform to the Environmental Management System standard:
ISO 14001:2015, KS I ISO 14001:2015

This certificate is valid for the following scope:
Manufacture of Aluminium Die Cast Parts for the Automotive Applications, Computer Peripherals and Electronic Household Appliances

Place and date:
Seoul 11 September, 2018

For the issuing office:
DNV GL - Business Assurance
18F, Kyobo Bldg., 1, Jong-ro, Jongno-gu, Seoul, Korea

Jang-Sup Lee
Acting on behalf of the Management Representative

KAB-EC-13
Accredited by Member of the IAF for EMS

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.
DNV GL Business Assurance Korea Ltd is accredited by Korea Accreditation Board (KAB) as an Environmental Management System certification body (Accreditation number: KAB-EC-13).
ACCREDITED UNIT: DNV GL Business Assurance Korea Ltd, 18F Kyobo Bldg., 1 Jong-ro, Jongno-gu, Seoul, Republic of Korea. TEL:+82 2 724 8413.
dnvgl.kr/assurance

- **ISO 45001:2018**



DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

Certificate No: 162242-2014-AHSO-KOR-KAB
Initial certification date: 01 September, 2014
Valid: 11 September, 2018 - 27 December, 2019

This is to certify that the management system of

Daeyong Industry Co.
H/O & Plant 1 : 901/902/903, 115 Gongdan 3 dae-ro, Siheung-si, Gyeonggi-do, Korea
and the sites as mentioned in the appendix accompanying this certificate

has been found to conform to the Occupational Health and Safety Management System standard:
ISO 45001:2018

This certificate is valid for the following scope:
Manufacture of Aluminium Die Cast Parts for the Automotive Applications, Computer Peripherals and Electronic Household Appliances

Place and date:
Seoul 11 September, 2018

For the issuing office:
DNV GL - Business Assurance
18F, Kyobo Bldg., 1, Jong-ro, Jongno-gu, Seoul, Korea

Jang-Sup Lee
Acting on behalf of the Management Representative

KAB-OC-27

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dnvgl.kr/assurance

Typical Production Process

DIE CASTING



SHOT BLASTING



MACHINING



Typical Production Process

WASHING/DRY



FINAL INSPECTION



PACKING



Typical Production Process

SHIPPING



CUSTOMER

Melting

Upper deposition holding furnace







Melting Capacity

Holding Capacity : 1500Kg~1800Kg x3
Melting Capacity : 4 tons/hr x3
Higher quality molten aluminum

G.B.F treatment (Gas Bubbling Filtration)

Individual Keeping furnace
Temperature Variation : ±5 ℃

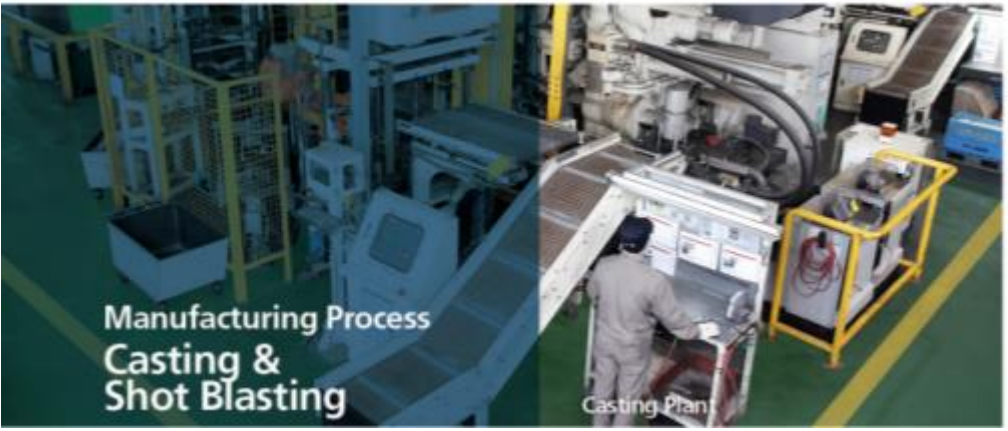
Density Index

Inspection and control material quality





Die Casting / Shot Blasting







Casting Capacity

Tons	SiHwa/MTV	IkSan	Annual Al Usage
800 Tons	24	2	24,000 Tons/Year
650 Tons	1	1	
350 Tons	38	28	
Total	**63**	**31**	

Casting Capacity

Accumulated Know-how and continuous investment!

- High quality products with complicated structure
- Multi injection speed control system
- **Super high speed injection – manufactured by Toshiba**
- Available casting volume: ~16in*10in
- Using various Al type satisfy international standard
- *Applied standard: KS, JIS, DIN, ASTM, JED, BS
- **Mold manufacturer is 100% dedicated to DaeYong**

Surface Treatment

Conveyer & Apron type of shot blasting / Barrel

- In House control
- Make product surface clean and tidy

Machining / Washing







Machining & Washing Capacity

Machine Type	SiHwa	IkSan
CNC Tapping Center	417	99
NC Lathe Machine	14	5
High Pressure Washer	5	3
Washer	11	1

Machining

Stable Quality and strict internal control

- Stable machining quality considering assembly process for customer
- Tighter internal spec control than customer's requirement
- Rapid tool movement with using tapping center
- **Majority of machining equipment from Brother**
- **80% of PCD tool among entire tool expenses**
- **Tool design by Mapal**
- **Accurate tool setting with tool pre-setter (Zoller)**
- Optimized rack to prevent the damage

Washing/ Drying

High pressure washing

- **High pressure washing (Max 500 bar)**

Inspection / Packing









Assembly & Inspection

Highly responsible, skilled operators with continuous improvement of working environment

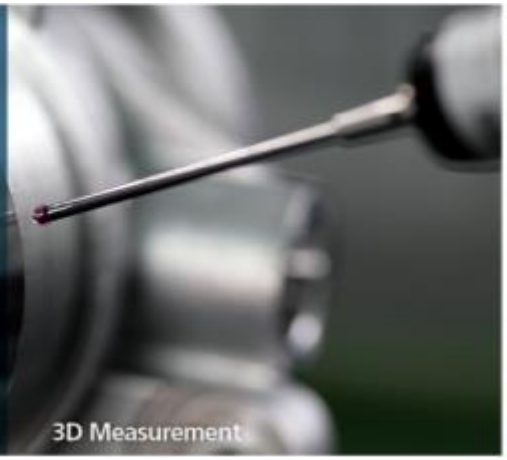
- **100% visual inspection**
- Gage inspection
- Machine vision inspection
- Leak test
- Assembly
- Early Production Containment

Packing & Delivery

- Barcode system
- Automatic banding & wrapping system
- Various export experience

Quality System









Measurement Equipment	Units	Reliance Test Equipment	Units
3D Measurement Equipment	9	Spectrometer (0.01%)	2
*3D Vision CMM	1	***C/T Scanner (size: 1930*2438*3073mm)**	1
Surface Roughness/Profile	2	Salt Spray Tester	1
Profile Projector	2	UTM Tester	2
Laser Thermo Tester	1	Hardness Tester	2
Roundness tester	2	*Component Cleanliness Cabinet	1
Video Microscope System	2	*Particle Counter	1
Metallurgical Microscope	1	X-ray	1
		Mounting Press	2

Daily Quality Review



Daily meeting
to check
Internal & External
Nonconformance

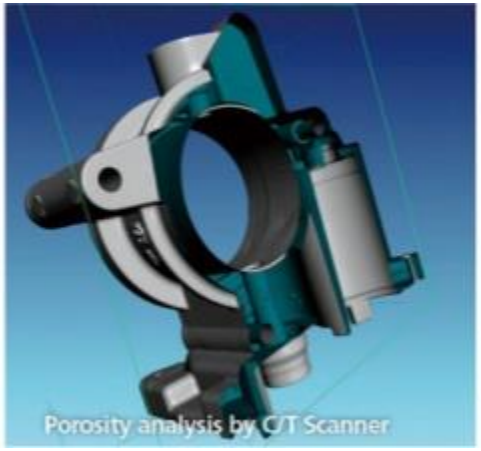


Check fast response tracking board
for concern and major internal nonconformance in early morning

Daily check to follow up on important action item list for internal defects
*High responsibility, engineers and continuous improvement of quality

Engineering System







Engineering

DaeYong's engineers provide you with fast & accurate engineering experiences by the latest technology and equipment

- *Certified as a R&D center by Korean Industrial Technology Association
- 2011, received patent on mold for block unit of heat exchanger
  (Patent No. 10-1017255 / 10-1011972)
- 30 new projects of development capability per year
- Optimized packaging design following customers' request
- ***Early involvement in new project (products design support)**
- Accurate tooling design with considering PFMEA by simulation tool
  (thermal & flow simulation, model building 3D printer, C/T Scanner)
- 14 weeks for off tool parts
- **Total 18 weeks to PPAP**
- Math data Capability : Unigraphics, IGES, STEP

Tool & Mold building

Save your cost and time!
Fast and deliberate manufacturing

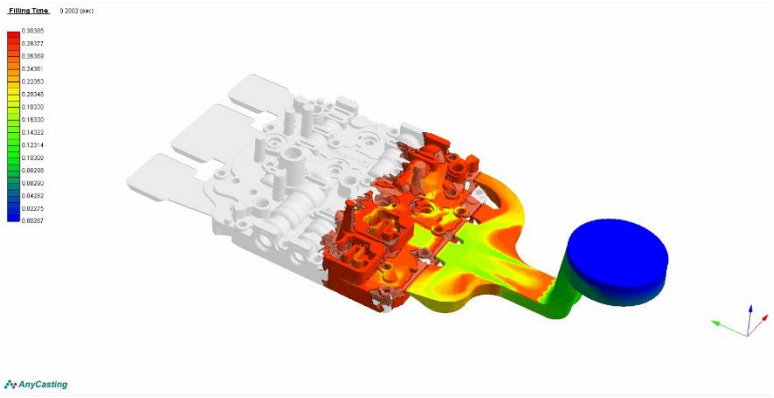
Tool Building

- **Machining fixtures are made in-house**
- Prompt treatment and maintenance
- Fast manufacturing speed

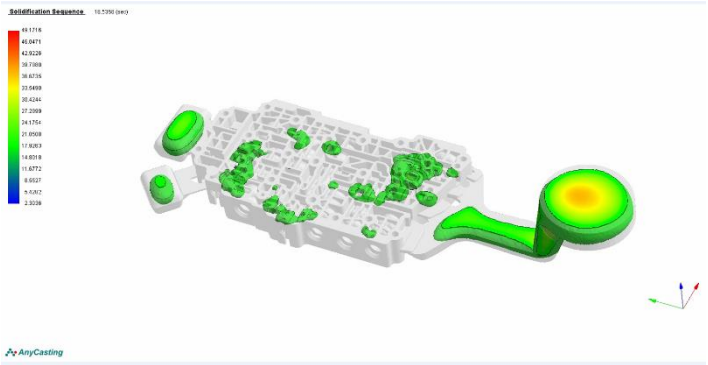
Mold Building

- Support high Quality casting parts with various experience
- 12 weeks for manufacturing
- **Molds built by mold maker who is 100% dedicated to DaeYong**

Engineering Circle



Flow simulation



Solidification simulation

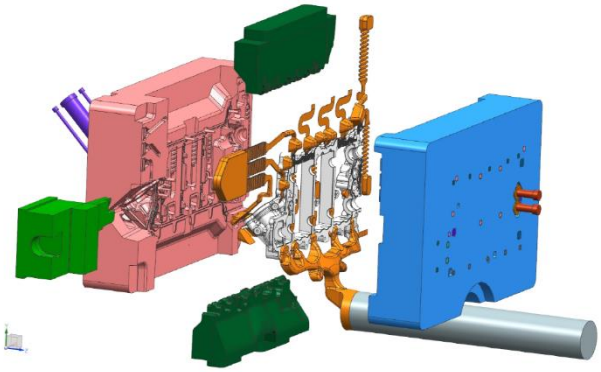
Review with 3d printed parts.
Product Design support
Design with FMEA

Mold design with simulation

Engineering Circle

Support high Quality casting parts with Various experience.
Full 3D modeling designed
Validated by CMM

Tool Building



Core Modeling



Mold Building

Trial and inspection

Engineering Circle



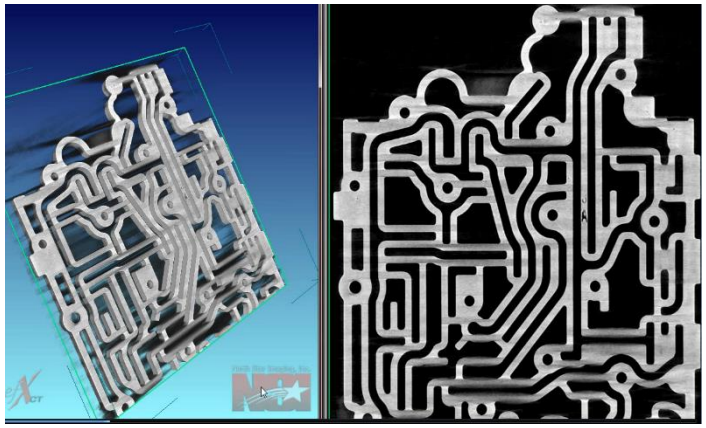
Casting Process



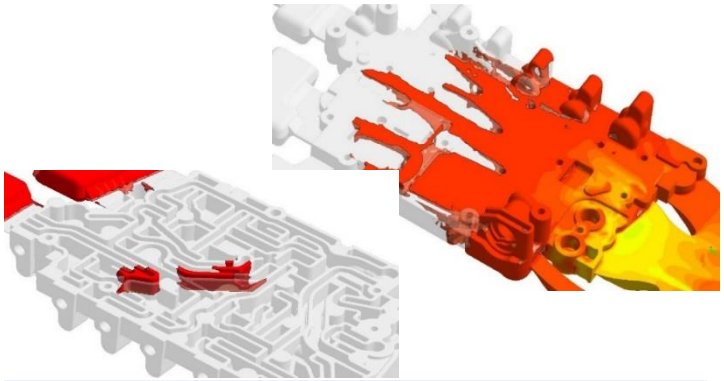
CT Scanner

CT Scanner inspection for development

Engineering Circ



CT Scanned result

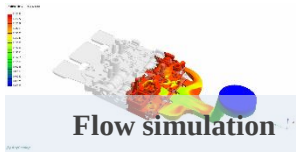


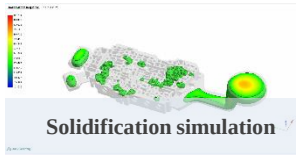
Simulation Results

Comparison simulation and Trial result.

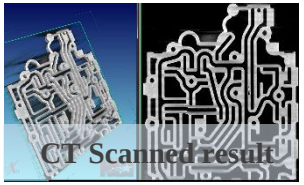
Process with FMEA
Comparison and find for root causes to make continues improvement

Engineering Circle - Summary


Flow simulation


Solidification simulation


Simulation Results


CT Scanned result

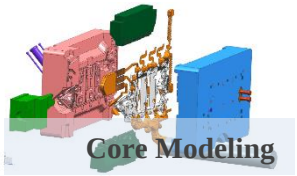

3D Printer

Mold design with simulation

Tool Building

Trial and inspection

Comparison simulation and Trial result.


Core Modeling


Mold Building

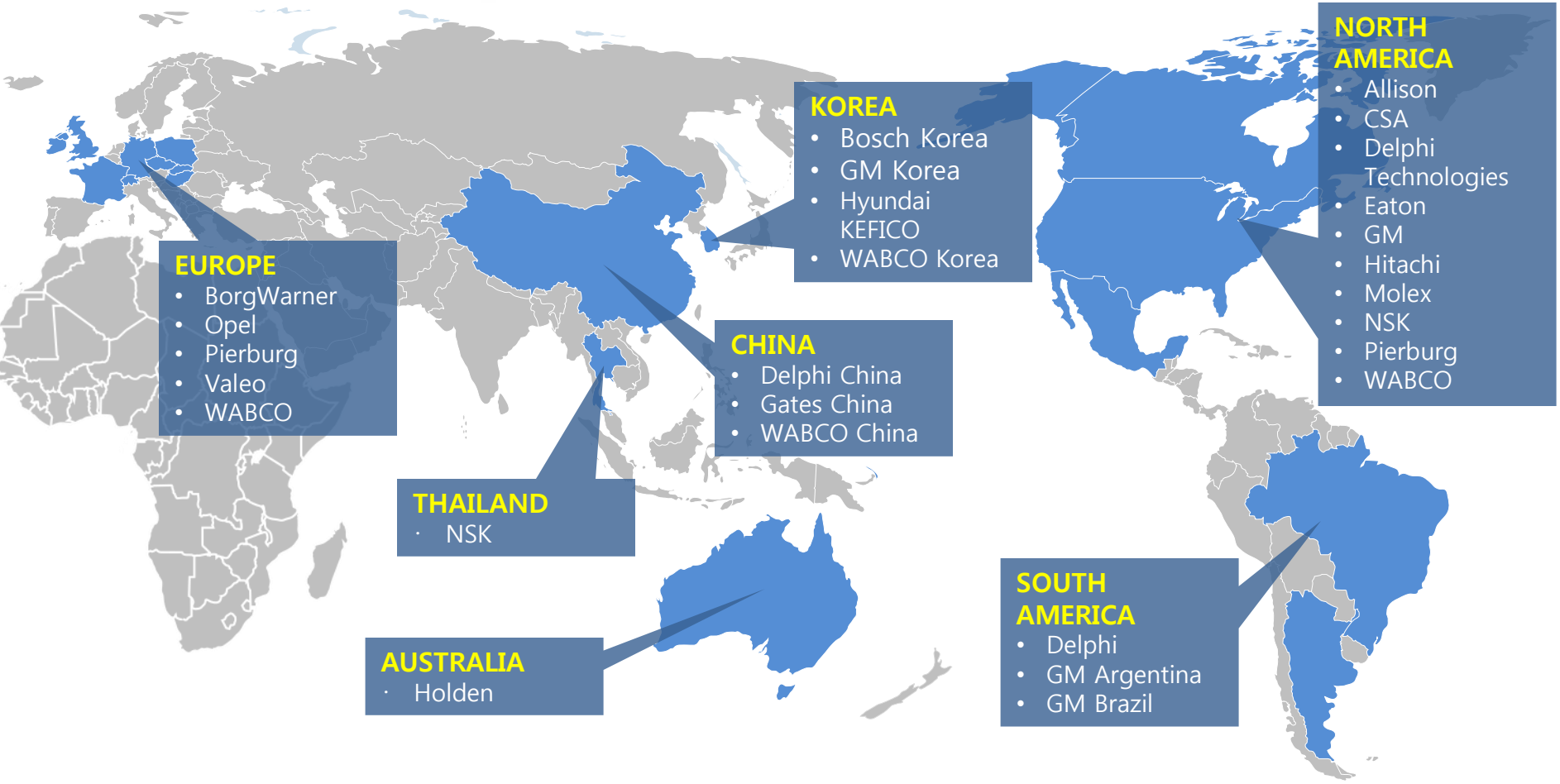

Casting Process



CT Scanner

Global Customer

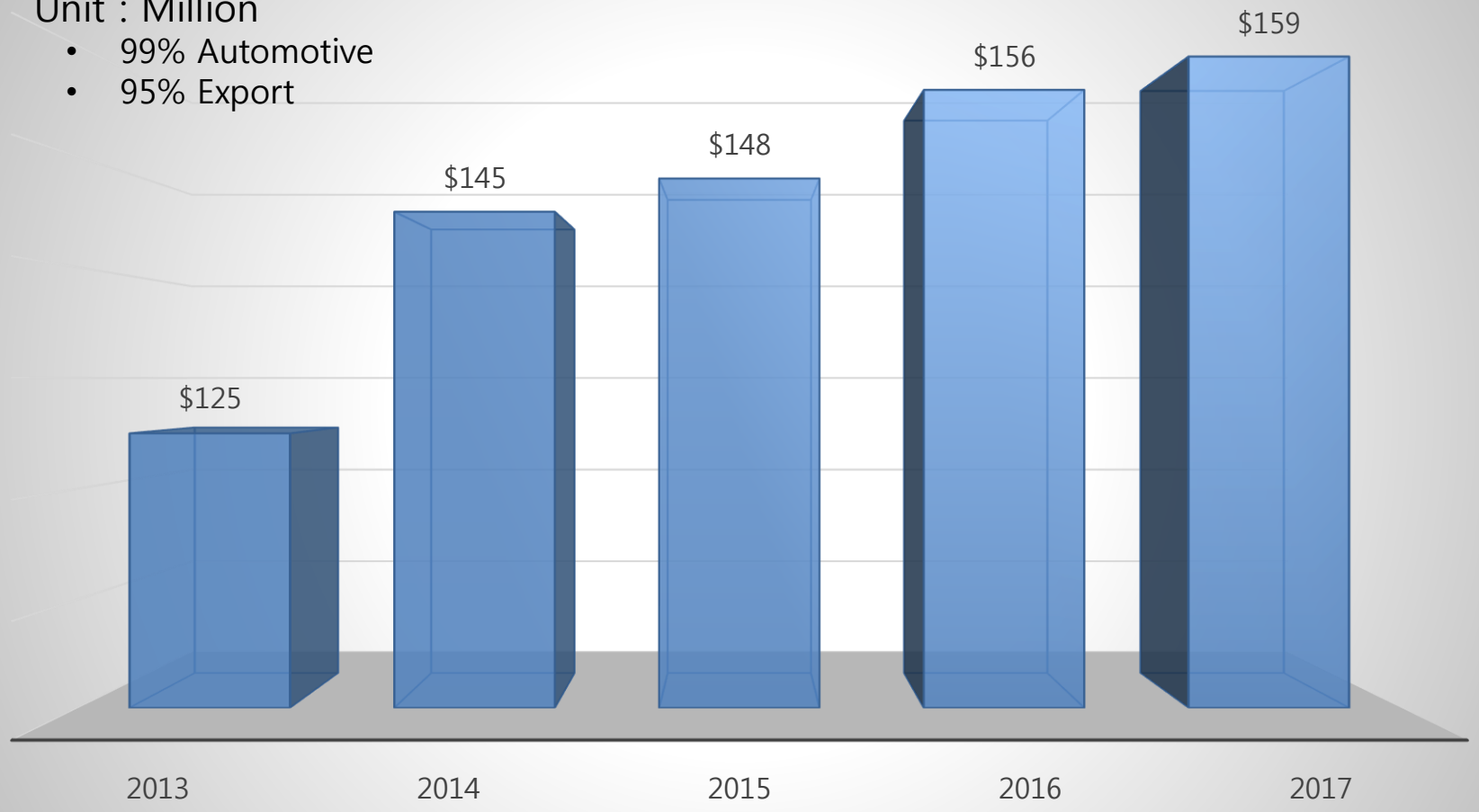
DELPHI PIERBURG NSK BorgWarner Valeo BOSCH



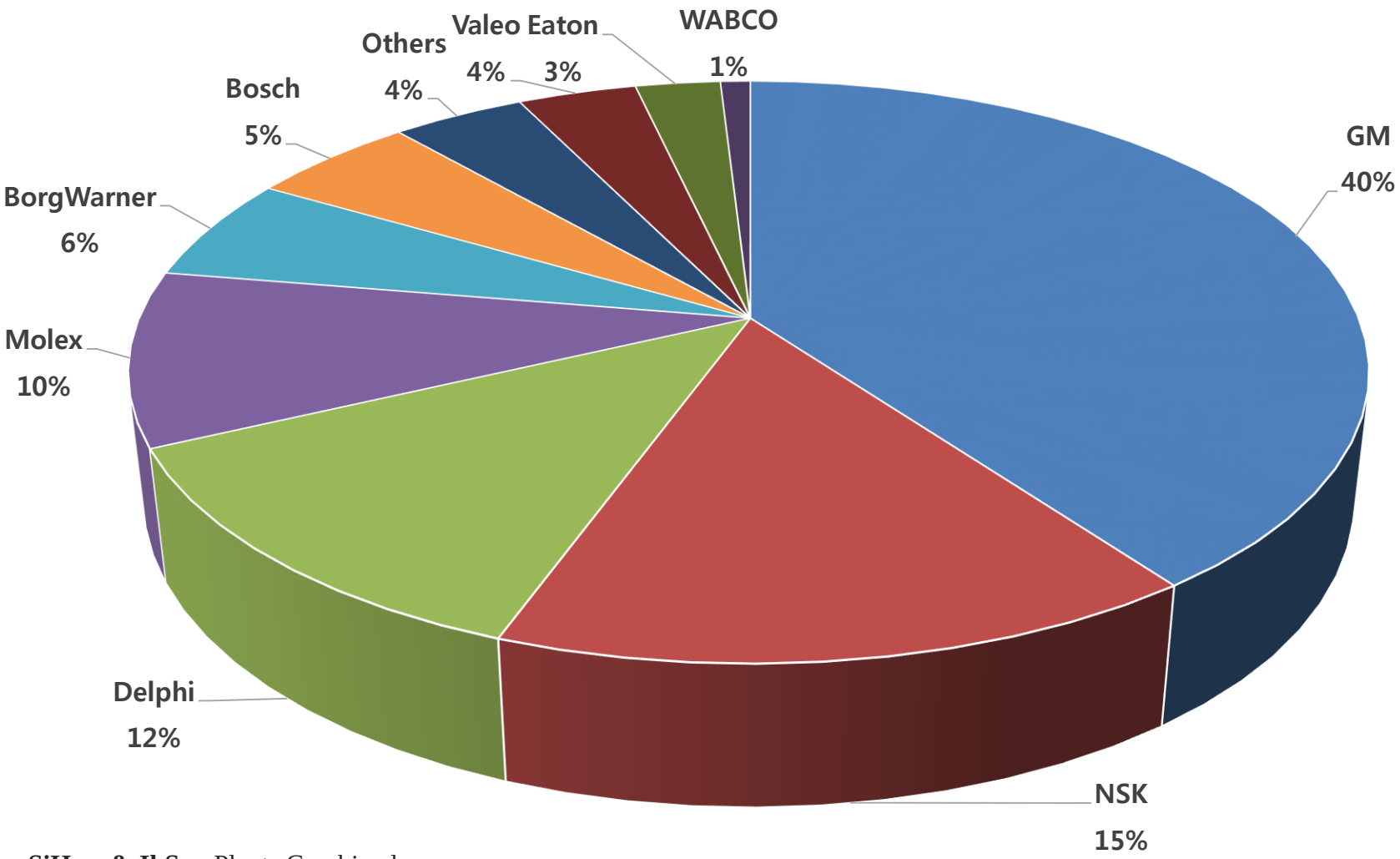
GM molex HOLDEN EATON Allison Transmission HYUNDAI KEFICO

Sales Performance

- Unit : Million
  - 99% Automotive
  - 95% Export



2017 Sales by Customer



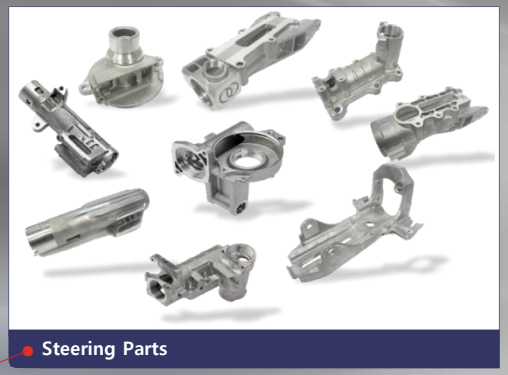
- **SiHwa & IkSan** Plants Combined
- **Others :** Allison, Continental, Cummins, Faurecia, Gates, Hitachi, Inteva, Litens, Pierburg & local customers



EGR/ ETC



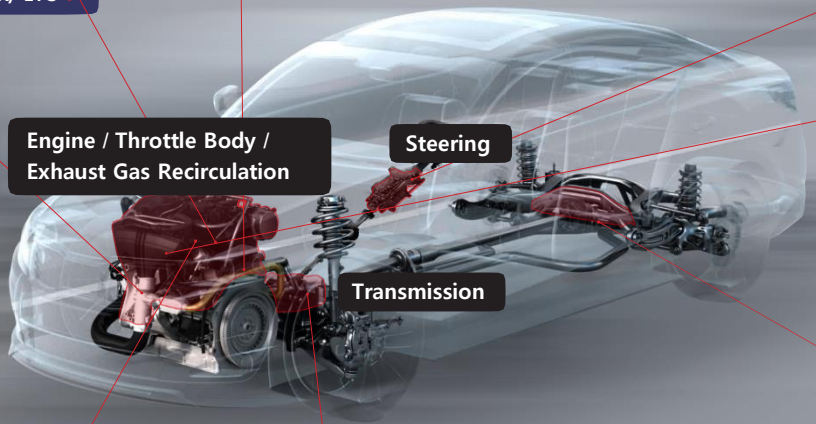
Air Compressor



Steering Parts

EV Part





Cam Carrier



Super Charger / Engine parts



Transmission Valve Body



Heat Exchanger



THANK YOU

DAEYONG INDUSTRY CO.