

## Asia 2015 6<sup>th</sup> - 8<sup>th</sup> of Jul

### AUTOMOTIVE LIGHTWEIGHT

# PROCUREMENT SYMPOSIUM

Jumeirah Himalayas Hotel in Shanghai, China



#### SYMPOSIUM FOCUS

- Aluminium
- Carbon Fibre
- Composites
- High Strength Steel
- Magnesium

## HIGHLIGHTS

### • INTERNATIONAL SPEAKERS

AUDI - MAGNA - DGS - GEELY - NOVELIS - JSC - VOESTALPINE, ...

### • LIGHTWEIGHT TECHNOLOGY EXHIBITION

DGS - StrikoWestofen - Kurtz - Novelis – Idra

### • SIMULTANEOUS INTERPRETING

Chinese - English / English - Chinese

#### ATTENDING COMPANIES



#### MEDIA & ORGANIZATION PARTNERS



Brings together the procurement and supply side of lightweight materials and their advanced processes in accompany with cost balance or reduction....

## AluMag® offers the four following services - worldwide:



Market Research

- Aluminium Extrusion Customer Database
- Foundry & Tool Maker Database
- Automotive Application, Material & Process Analyses
- Various Industrial Application Research & Analyses

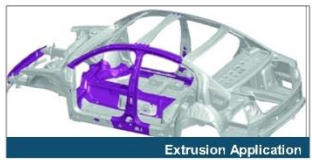
AluMag as your provider of automotive research and forecasting studies, offers you and your business, the market intelligence you need to realize the best strategic decisions



Material - Process - Application Trend Analysis

### Large variety of market access, local & global:

- business database with 6,970+ companies and 18,700+ contacts
- 150+ satisfied customers worldwide
- Arranged 20+ roadshows/events since 2008



Extrusion Application

### Your Benefits:

- Learn about your [potential] clients and competitors
- Obtain an inside view of the market
- Identify opportunities and threats
- Minimize risk and optimize profits
- Position your company successfully
- Based on data off the shelf, secondary re-search and interviews, AluMag generates validated researches



Market Development

- Analysis & Development of Market Opportunities
- Accelerate Market Penetration
- Manage New Product Launches
- Establish a Sales Force Sales on Demand

AluMag guides and supports your organization globally through the different market development phases until we have successfully launched, implemented or executed your project.



Map of activity - SAMPLES

Manage and integrate each aspect of your organization by initiating, planning, controlling, executing and closing out a new project. AluMag offers liaison management services as an addition to our customer's staff by bringing in the resources that define us.



JATCO Head Quarters Meeting in Japan

### Your Benefits

- Analysis and development of Markets
- Realize opportunities
- Accelerate market penetration
- Establish a sales force
- Provide warehousing and distribution services
- Manage new product launches
- Sales on demand



Roadshows / Events

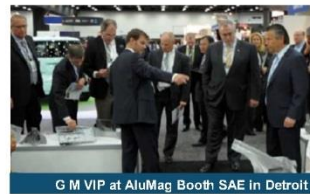
- Organization of Technical & Commercial Roadshows
- Oversea Commercial & Technical Events
- Host In-House Events & Presentation
- Common Technology Booth at Leading Exhibitions

AluMag roadshows, tech-meetings and symposia are the first class events used by exhibitors and guest as a unique benchmark platform.



Daimler Sindelfingen as Roadshow Location

The AluMag think tank events are bringing in decision makers and executives in EUROPE, ASIA and NAFTA.



G M VIP at AluMag Booth SAE in Detroit

### Upcoming Events:

- 2015 Jul: Automotive Light-weight Procurement Symposium in Shanghai, China
- 2015 Nov: Automotive Light-weight Procurement Symposium in Detroit, USA
- 2016 April Common tech- booth at the SAE World Congress in Detroit, USA
- 2016 Jul: Automotive Light-weight Procurement Symposium in Shanghai, China



Strategic Localization

- Warehousing & Distribution Service
- Supplier & Tie-up Localization
- Identification & Trade-off of new Technology
- Foreign Market Business Cases and whose Realization

AluMag has the global expertise to search, identify, evaluate and validate potential strategic business opportunities for expansions and partnerships that will assist your business growth plans regionally and globally



On-Site Greenfield Planning Meeting

### Services for:

- Search, develop and present potential acquisition candidates for regional and global business expansions
- Localization of new manufacturing / service sites for business expansions
- Identification of new technology supplier development related to products, processes and materials
- Search, develop and present potential business partners / suppliers to support regional and/or global supply programs
- Evaluate potential competitor profiles for new or existing business in non-presence geographies
- Evaluate new emerging technologies and processes for business expansions

### Are you:

- looking for specific data, information and outlook about product, material, customer, supplier, technologies, ...
- want to discuss your project, increase sales, access new markets, ...
- interested to participate in one of our roadshows / events or organize your customized showcase ...
- looking to localize, expand into new markets, countries, tie-up targets, ...

please contact your AluMag Team to receive a quote or proposal

## CONTACTS & PROJECT TEAM



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**Asia Automotive Lightweight Procurement Symposium**  
**6th – 8th of July 2015**  
Jumeirah Himalayas Hotel in Shanghai, China.



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**AluMag®**  
Europe ■ India ■ Americas ■ Asia  
**THE MARKET DEVELOPER**

## Company Speechs by:

<u>Audi AG</u>	<u>10</u>
<u>Magna Steyr Engineering AG &amp; Co KG</u>	<u>16</u>
<u>DGS Druckguss Systeme AG</u>	<u>42</u>
<u>Guangdong Hongtu Technology Co.,Ltd</u>	<u>58</u>
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# Agenda

## Agenda: (Is Continuously Being Updated)

### Monday The 6th Of July – Jumeirah Himalayas Hotel, Shanghai – 6th Floor

06:00pm - 10:00pm

Pre-registration and Welcome Reception

### Tuesday The 7th Of July – Jumeirah Himalayas Hotel, Shanghai – 6th Floor

08:30am – 09:15am

Registration & Morning Coffee / Tea

09:15am – 09:30am

Welcome:

Mr. Jost GAERTNER, Managing Partner at ALUMAG Automotive GmbH

09:30am – 10:25am

Opening Keynote:

Mr. Frank VENIER, Strategy and Innovation; Lightweight Design Centre at AUDI AG

**Lightweighting SUV - The New Audi Q7 In Multimaterial Car Body Design**

10:25am – 11:00am

Break for Refreshments/Coffee/Tea, Snacks, Networking, Tech Exhibition

11:00am – 12:00am

Paper 1 – Part 1:

Mr. Gerhard KRACHLER, Director Advanced Development & Product Strategy at MAGNA STEYR Engineering AG & Co.KG

Paper 1 – Part 2:

Mr. Christian JURICEK, Manager R&D Europe at COSMA MAGNA International

**Magna's Global Advanced Lightweight Competences**

12:00pm – 01:45pm

Break for Refreshments/Coffee/Tea, Lunch, Networking, Tech Exhibition

01:45pm – 02:25pm

Paper 2:

Mr. Andreas MUELLER, CEO at DGS Druckguss Systeme AG

**Localization And Industrialization Of Cast Aluminium Structural Applications**

02:30pm – 03:10pm

Paper 3:

Mr. Li WAN, Vice President at Guangdong Hongtu Technology (Holdings) Co Ltd

**Aluminum Alloy High Vacuum Die Casting Technology And It's Application On Automotive Structural Parts**

03:15pm – 03:45pm

Paper 4:

Mr. Lothar HARTMANN – Managing Director Foundry Machines & Trimming Presses at Kurtz GmbH

Mr. Michael BARTEL – Asia Sales Manager Foundry Machines & Trimming Presses – Kurtz GmbH

Low Pressure Casting

A traditional casting technology helping to step ahead for light weight solutions in engine block manufacturing

03:45pm – 04:15pm

Break for Refreshments/Coffee/Tea, Snacks, Networking, Tech Exhibition

04:15pm – 04:55pm

Paper 5:

Mr. Peter BERNSCHER, Member Of The Board & Director Automotive Body Parts at Voestalpine Metal Forming GmbH

**Lightweight Solutions In The Automotive Industry By Voestalpine**

05:00pm – 05:55pm

Closing Keynote:

Mr. Jochen SIEBERT, Managing Partner at JSC Automotive Consulting Co. Ltd.

**Outlook And Hurdles Of The Chinese Economy And Automotive Industry**

05:55pm – 06:00pm

Summary:

Ms. Ying ZHOU, Project Coordinator China – Japan at ALUMAG Automotive GmbH

06:00pm - 10:00pm

Reception Sponsored By StrikoWestofen

Dinner Speech – Part 1:

Mr. Rudolf RIEDEL – Group Managing Director at StrikoWestofen GmbH

Dinner Speech – Part 2:

Mr. Rainer ERDMANN – Managing Director Asia Operations at StrikoWestofen Thermal Equipment Co.Ltd

**Profits With Light Metal Castings Start In The Melt Shop**

# Agenda

## Agenda: (Is Continuously Being Updated)

### Wednesday The 8th Of July

08:15am – 08:55am

Opening Keynote:

Prof. Fei XIONG Chief Engineer & Director of Auto Lightweight Department at GEELY

#### **Automotive Lightweight Promoting The Application Of Aluminium**

09:00am – 09:40am

Paper 1:

Mr. James LIU, Managing Director and Vice President of Asia Auto at NOVELIS China

#### **High Volume Aluminum Solutions For Lightweighting**

09:45am – 10:25am

Paper 2:

Dr. Jin HOU – General Manager – Sapa Technology Asia

#### **High Performance Aluminium Alloys For Automotive Light-Weighting**

10:25am – 11:00am

Break for Refreshments/Coffee/Tea, Snacks, Networking, Tech Exhibition

11:00am – 11:40am

Paper 3:

Mr. Yoshikazu MUKAI, Executive Vice President & Technical Specialist at Kobelco Automotive Aluminium Rolled Products (China) Co.,Ltd – Shanghai Branch

#### **Kobe's R&D Activities For Automobile Lightweighting**

11:45am – 12:25pm

Closing Keynote:

Mr. Martin SHI, Chief Editor at GASGOO International And Senior Analyst at GASGOO Research Institute

#### **The Status And Development Trends Of China Automobile Lightweight**

12:30pm – 12:35pm

Summary:

Mr. Jost GAERTNER, Managing Partner at ALUMAG Automotive GmbH

12:45pm – 01:00pm

Walk To The SNIEC Shanghai New International Expo Centre

01:00pm – 01:40pm

Reception With Snacks & Finger Food at the SNIEC

01:40pm – 05:30pm

Individual Or Guided Visit At The 2015 "Aluminium China " And "China Diecasting" Exhibitions

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Backup Speech

Mr. Jost GAERTNER, Managing Partner at AluMag Automotive GmbH

#### **Top 16 Global Ranking Of Aluminium And Magnesium Foundries By Revenue**

# EXHIBITOR

**DGS Druckguss Systeme AG**  
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**TITLE**

**High performance Aluminium Alloys For Automotive Light-Weighting**



- ALUMINIUM SOLUTIONS AND HIGH
- PERFORMANCE ALLOYS FOR
- AUTOMOTIVE LIGHT-WEIGHTING

•JIN HOU, SAPA TECHNOLOGY

•ASIA AUTOMOTIVE LIGHTWEIGHT PROCUREMENT SYMPOSIUM  
JULY 6-8 2015, SHANGHAI

## •OUTLINE OF THE PRESENTATION

- A SHORT INTRODUCTION OF SAPA GROUP
- SAPA'S** ALUMINIUM EXTRUSIONS IN AUTOMOTIVE
- HIGH PERFORMANCE CRASH ALLOY
- EXTRUSION DESIGN IS EQUALLY IMPORTANT
- DEVELOPMENT IN FABRICATION TECHNOLOGIES OPEN NEW
- DESIGN POSSIBILITIES
- CONCLUDING REMARKS

**sapa:**

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•YOU WILL FIND OUR PRODUCTS ALL AROUND YOU

			
•AT HOME	•IN YOUR OFFICE	•IN YOUR CAR	•TRAVELLING
<ul style="list-style-type: none"> <li>•Front doors</li> <li>Windows</li> <li>Stepladders</li> <li>Designer furniture</li> </ul>	<ul style="list-style-type: none"> <li>•Building construction</li> <li>Windows</li> <li>•Partition walls</li> <li>Computers</li> </ul>	<ul style="list-style-type: none"> <li>•Lots of components</li> <li>Accessories</li> <li>•Side impact bars</li> <li>•Airbag deployment doors</li> </ul>	<ul style="list-style-type: none"> <li>•Train carriage bodies</li> <li>Handrails</li> <li>•Luggage racks</li> </ul>

**sapa:**

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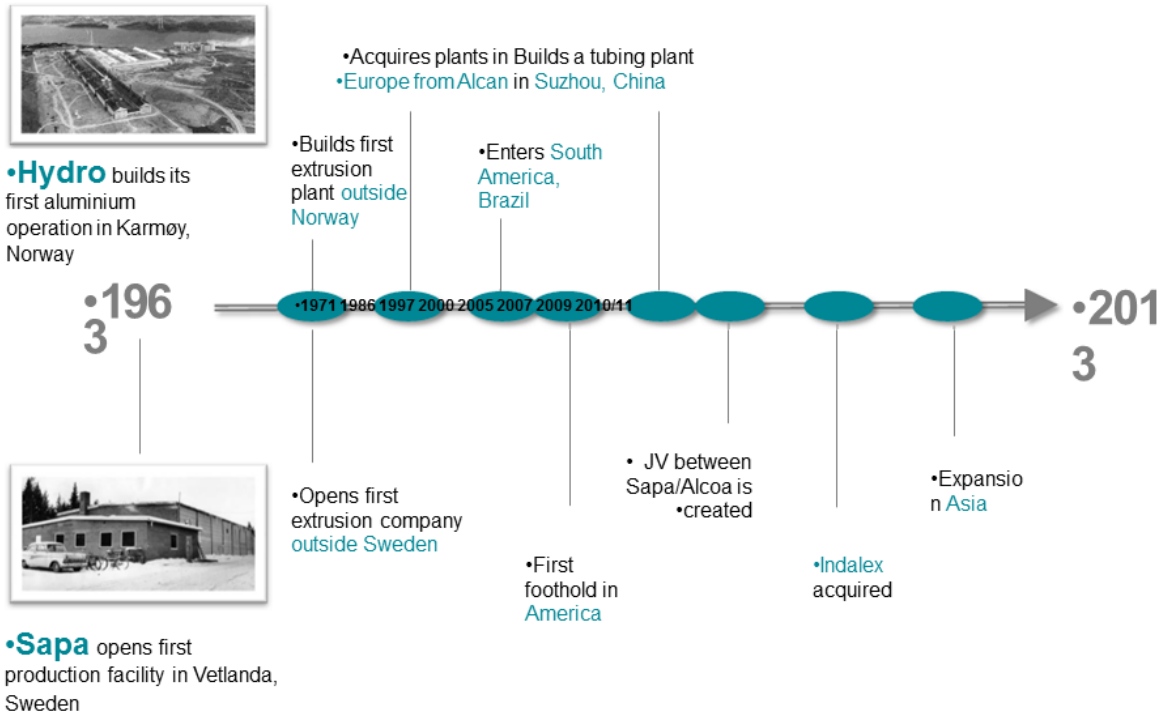
•WORKING ACROSS A BROAD PART OF THE ALUMINIUM  
•VALUE CHAIN



**sapa:**

5

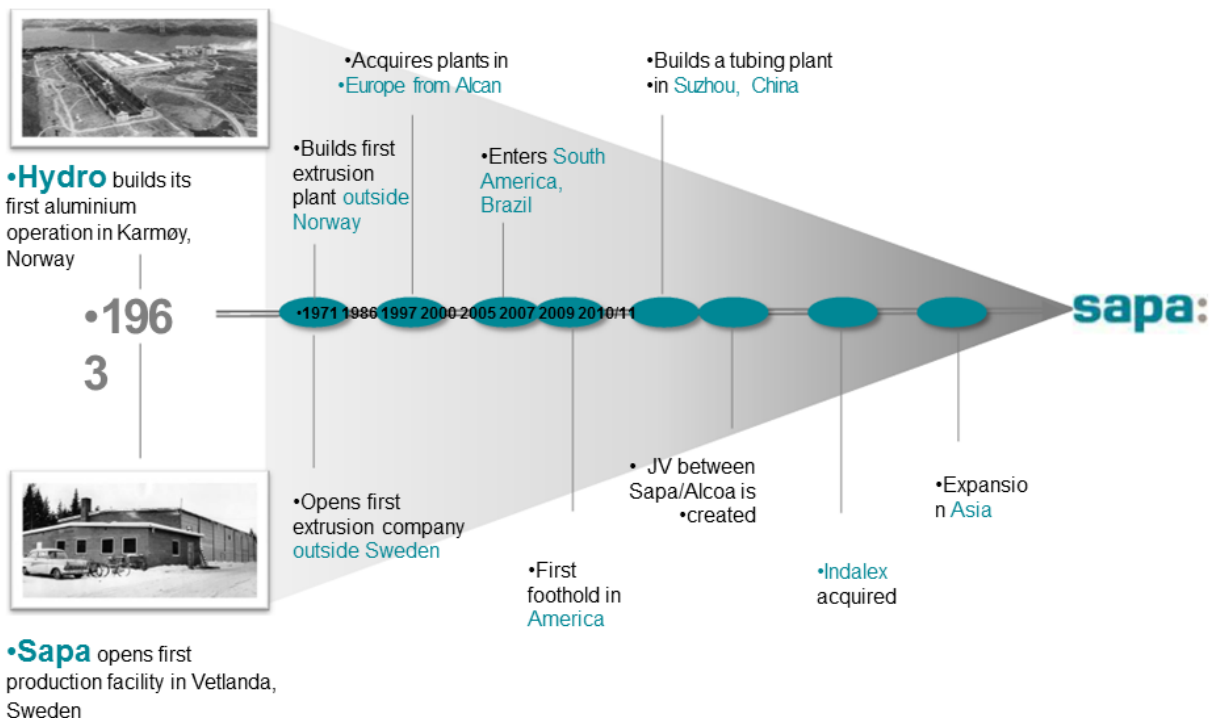
## •A 100 YEARS OF COMMON KNOWLEDGE...



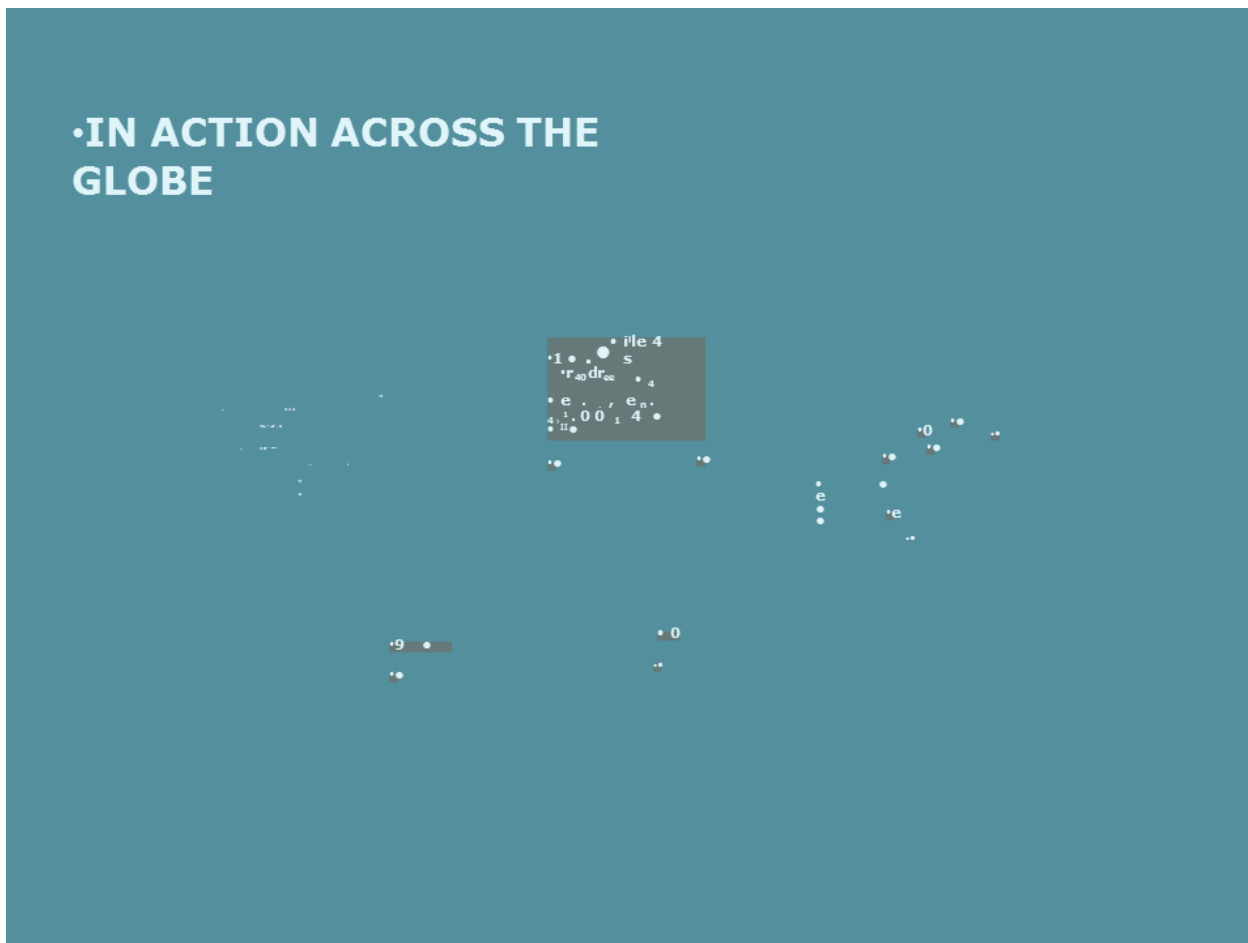
**sapa:**

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## •...MERGED INTO A NEW COMPANY CALLED SAPA



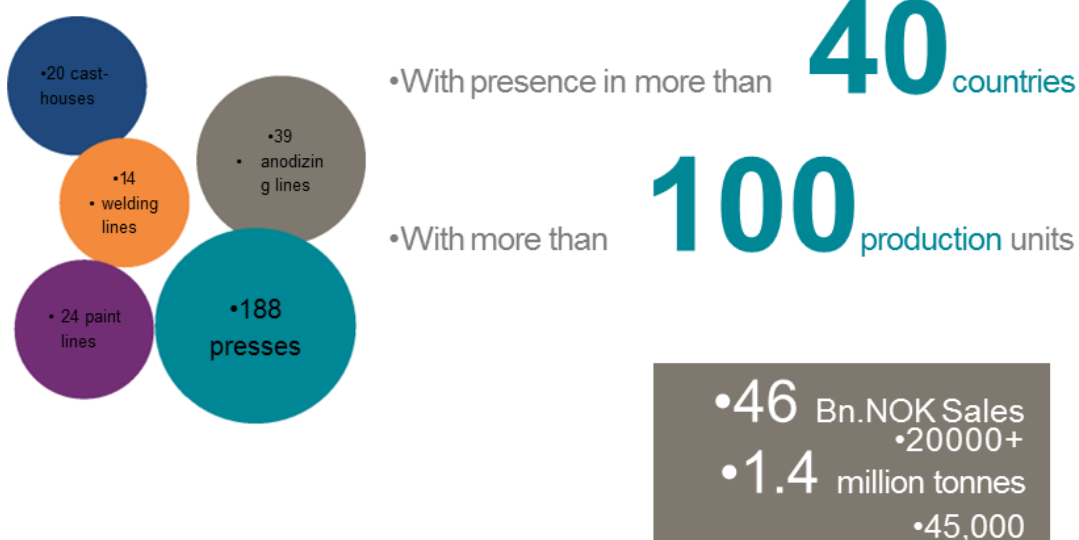
## •IN ACTION ACROSS THE GLOBE



**sapa:**

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•MEETING CUSTOMER NEEDS – GLOBALLY AND LOCALLY



•**23,500** employees

## •OUTLINE OF THE PRESENTATION

•A SHORT INTRODUCTION OF SAPA GROUP

•**SAPA'S ALUMINIUM EXTRUSIONS IN AUTOMOTIVE**

•HIGH PERFORMANCE CRASH ALLOY

•EXTRUSION DESIGN IS EQUALLY IMPORTANT

•DEVELOPMENT IN FABRICATION TECHNOLOGIES OPEN NEW

•DESIGN POSSIBILITIES

•CONCLUDING REMARKS

## **sapa:** •ALUMINIUM EXTRUSIONS HAVE UNIQUE PROPERTIES FOR ...



## sapa: .... LONGITUDINALS, CRASH BOXES AND BUMPERS

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• **Lower Energy Beam** (located below bumper beam on SUV)

Product photo removed on hand-out slide

• **Crash boxes and bumper solutions**

• **Bumper beam**

## sapa: POWERTRAIN & DRIVELINE COMPONENTS <sup>12</sup>

• **Engine mounts**

• **Fuel rails**

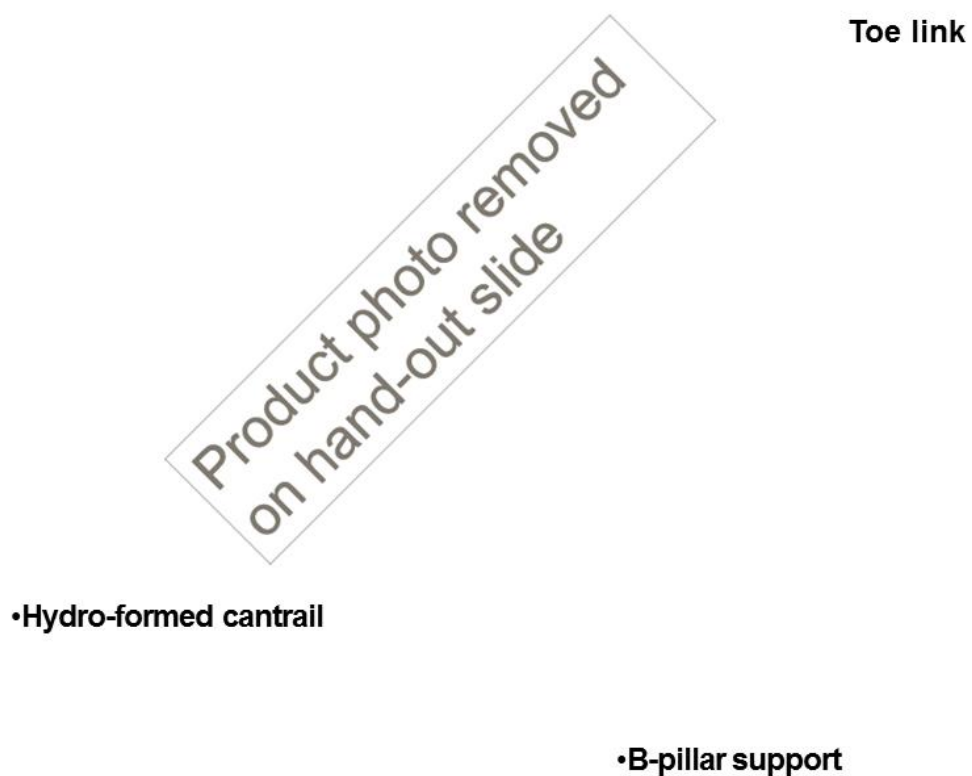
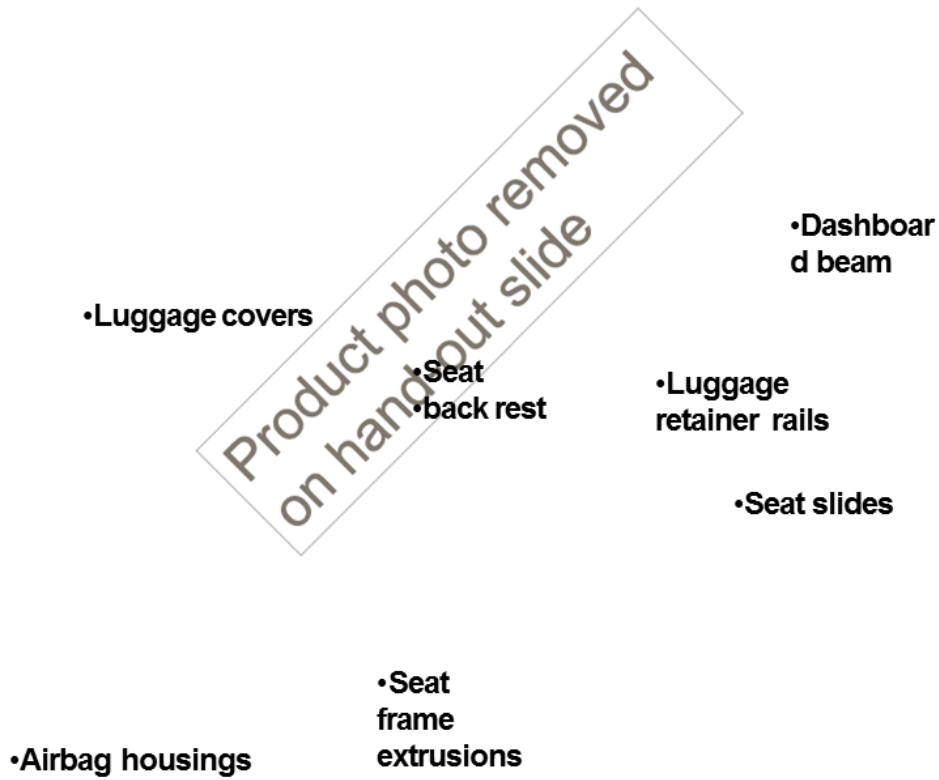
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• **Oil sump lath**

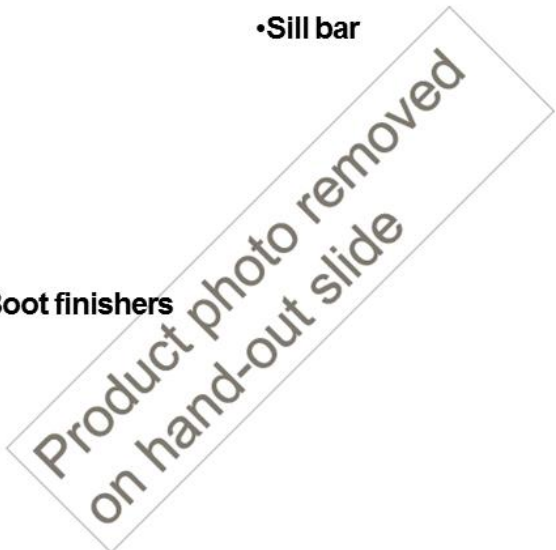
• **Fan rings**

• **Turbo air intake**

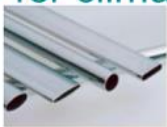
• **Start heater**



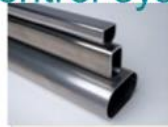
- Sill bar
- Boot finishers
- Door sill finishers
- Roof rails



- Precision Tubing products are widely used in automotive HEX
- for climate control system, engine cooling and fluid lines



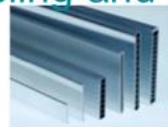
•Precision drawn tubes (PDT)  
\*For heaters, radiators, condensers, evaporators, coolant lines, oil coolant lines



•Welded tubes  
\*For structural components, radiators, heaters, charge air coolers, manifolds



•Welded tubes with inner fins  
\*For oil coolers



•Multi-port extrusions (MPE)  
\*For condensers, evaporators, oil coolers, charge air coolers, radiators and heaters – and can be supplied with HYBRAZ™ coating for direct CAB brazing



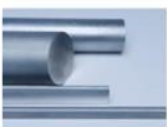
•HYCOT™ coated tubes  
\*For fuel lines, air-conditioning lines, power steering lines, coolant lines, oil cooling lines



•Aluminium cables



•Fuel cooler



•Forging stock (FOBS™)  
\*For extruded cold-drawn coiled rod for automotive components, such as screws and nuts



•Internal HX





**sapa:**

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•Welded Tubes: an alternative to cast parts for the customer

•Formed Structural Parts

Axle components

Body in white components

Drive shafts

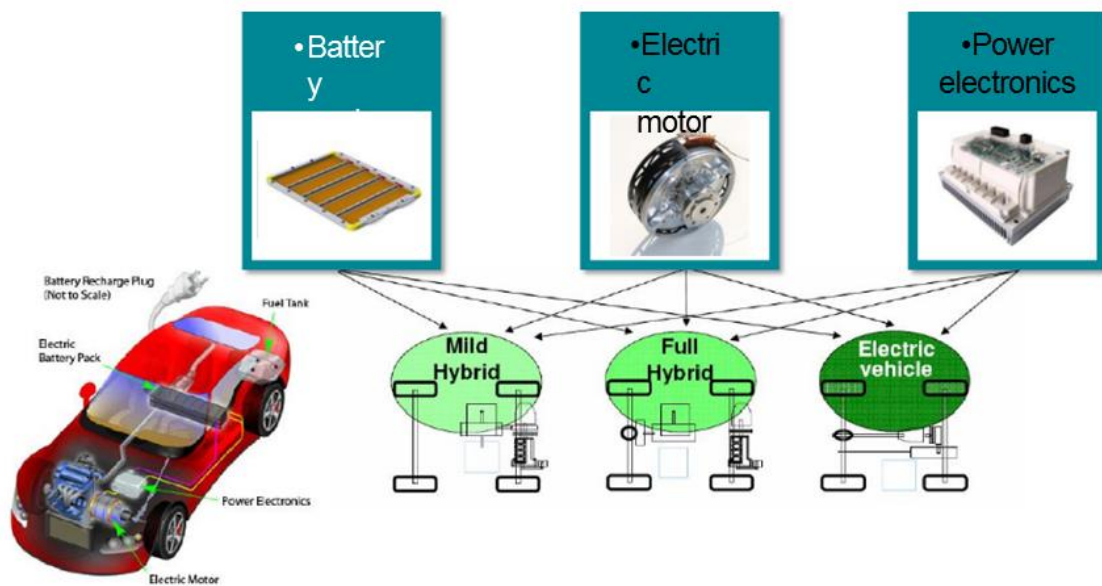
Air suspension components (pistons and outer guidance)

Product photo removed on hand-out slide

**sapa:**

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•NEW APPLICATIONS FOR E-MOBILITY



## •BATTERY PACKS



## •SC-13 BATTERY CABLE SHOWS POTENTIAL FOR •WEIGHT AND COST SAVING

- SC-13 is an extruded solid aluminium rod
- As a standard the cable is HYCOT®
- coated with either PA, PE or XPE coatings

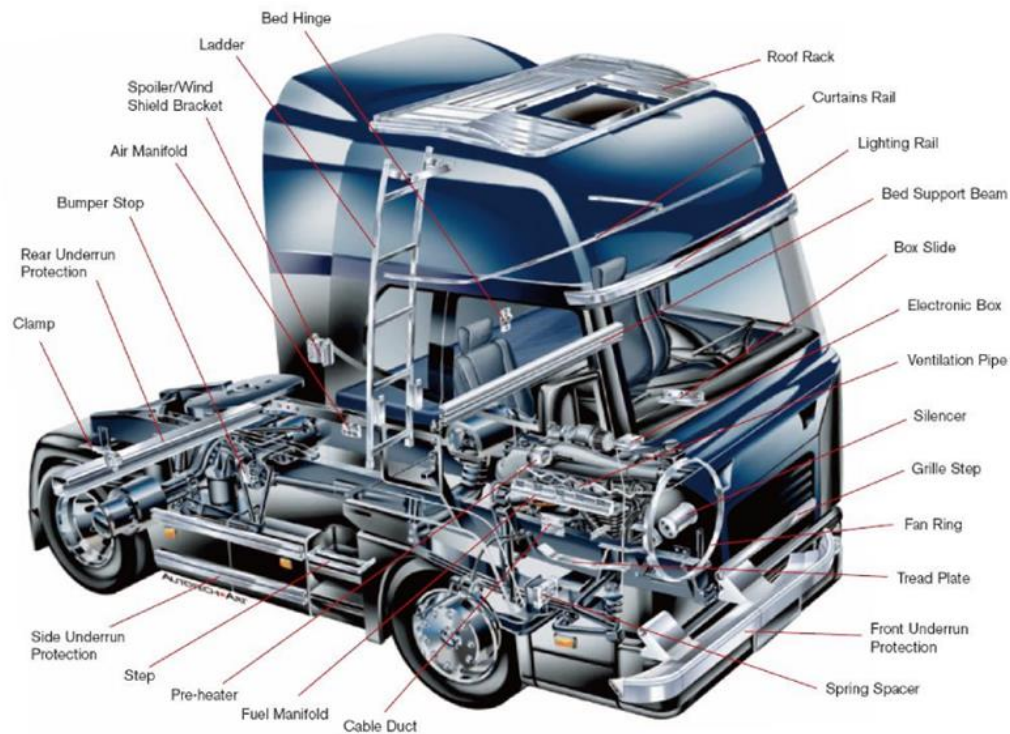
Delivering shapes of round, flat or oval,  
we deliver diameters up to Ø18 mm

Weighs 1/3 of the copper equivalent

Processability: Aluminium alloys allow  
specifically designed mechanical  
properties

Aluminium cabling increases the  
potential weight and cost savings





## •OUTLINE OF THE PRESENTATION

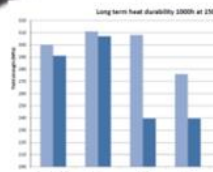
- A SHORT INTRODUCTION OF SAPA GROUP
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## sapa:

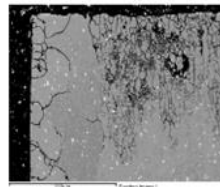
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### •DEMANDS FOR CRASH ALLOYS

- High strength and high ductility
- At the same time



- Short and long term heat durability
- Corrosion resistance



## sapa: SAME ALLOY DIFFERENT CRASH PERFORMANCE

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- Same chemical composition Same chemical composition
- Sapa crash alloy Standard alloy



**sapa:** SAME STRENGTH AND SAME ELONGGATION  
DIFFERENT CRASH PERFORMANCE

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•Sample A Sample B



•Rp0.2 / Rm / A5 / crush grade  
•~ 290 / 306 / 13-14 / 9 (Sample A), 3 (Sample B)

**sapa:** SAME STRENGTH AND SAME ELONGGATION  
DIFFERENT CRASH PERFORMANCE

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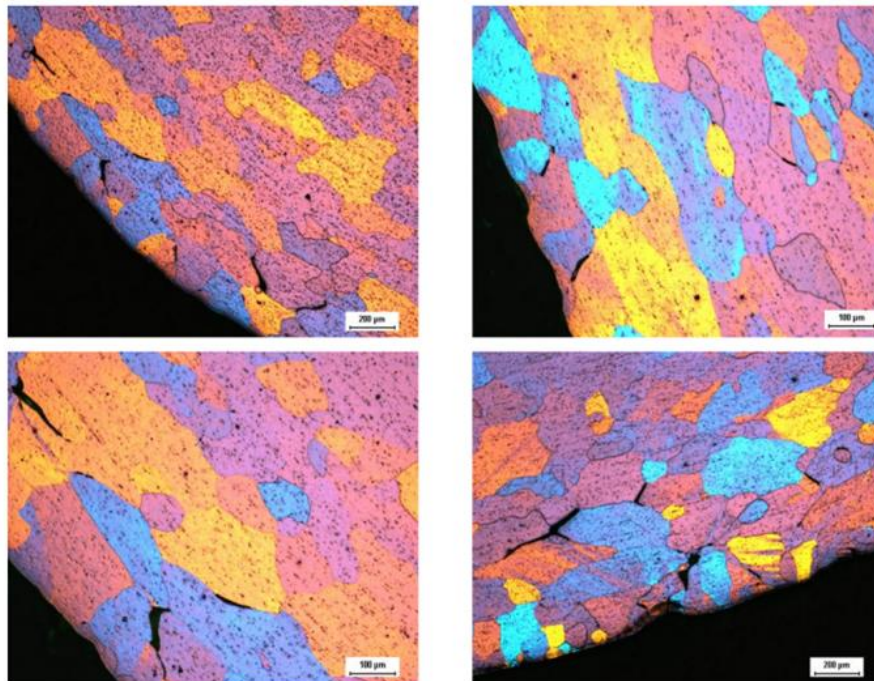
•Sample A Sample B



•Rp0.2 / Rm / A5 / crush grade  
•~ 290 / 306 / 13-14 / 9 (Sample A), 3 (Sample B)

## sapa: •INITIATION OF CRACKS AT •GRAIN BOUNDARIES

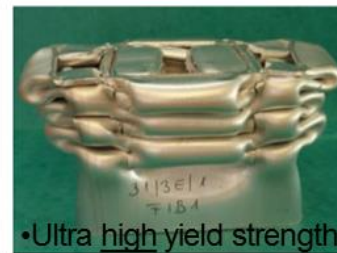
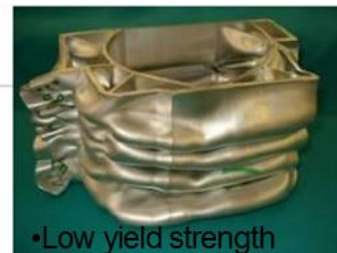
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## sapa: •MECHANICAL PROPERTIES

•28

- Basically, 4 different grades are defined, each grade often labelled according to lower yield strength limit



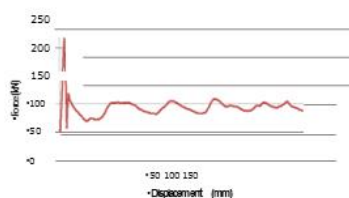
•Class	•R <sub>p0.2</sub> (MPa)	•R <sub>m</sub> (MPa)	•A <sub>5</sub> (%)
•Low yield strength •(C20)	•(180 -220) •200 – 240	•(≥205) •≥220	•(≥10) •≥11
•Mid yield strength •(C24)	•240 - 280	•≥260	•≥10
•High yield strength •(C28)	•280 - 330	•≥305	•≥10
•Ultra high yield strength •(C32)	•320 - 360	•≥340	•≥10

## sapa: EXAMPLE OF TESTING

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### •Quasistatic compression testing

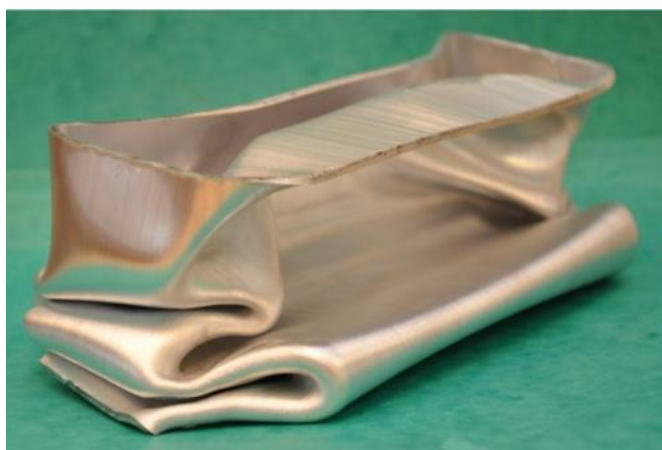
- Profiles compressed slowly in axial direction in a hydraulic press to  $\frac{1}{3}$  of original length (normally 300mm or 200mm original length)
- Load-displacement diagram shows the absorbed energy
- Visuell inspection and subjective evaluation of crash performance Small starter cracks are allowed



## sapa: EXAMPLE OF TESTING

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### •QUASISTATIC VS DYNAMIC •COMPRESSION TESTING



- No difference in crash performance!



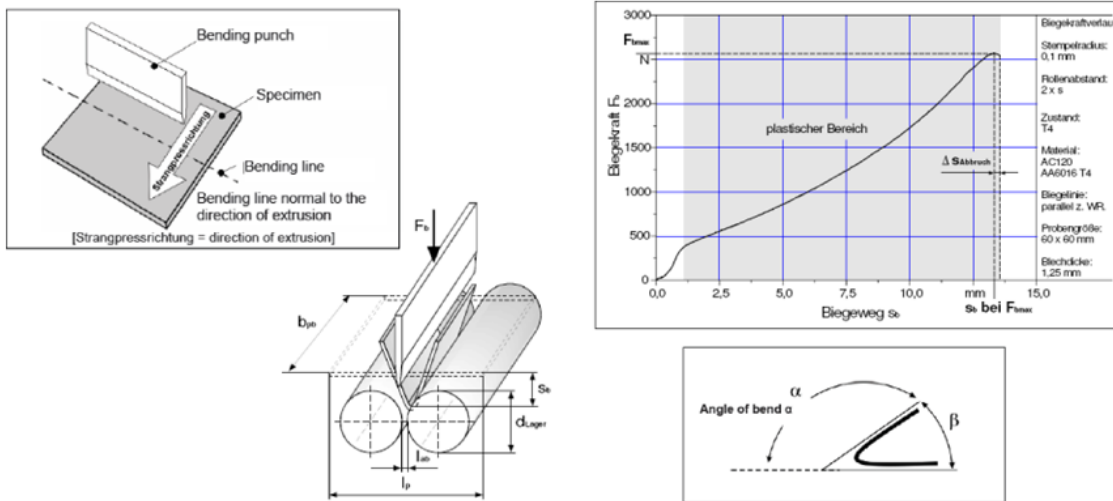
## sapa: EXAMPLE OF TESTING

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### •3-point bending test

•A sample 60 x 60 mm is bent between two supporting rollers until the bending force is dropped by 15 N from max force

•The bending angle is measured and give a quantitative measure on the ductility



## sapa: EXAMPLE OF TESTING

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### •3-point bending test results

•Orientation

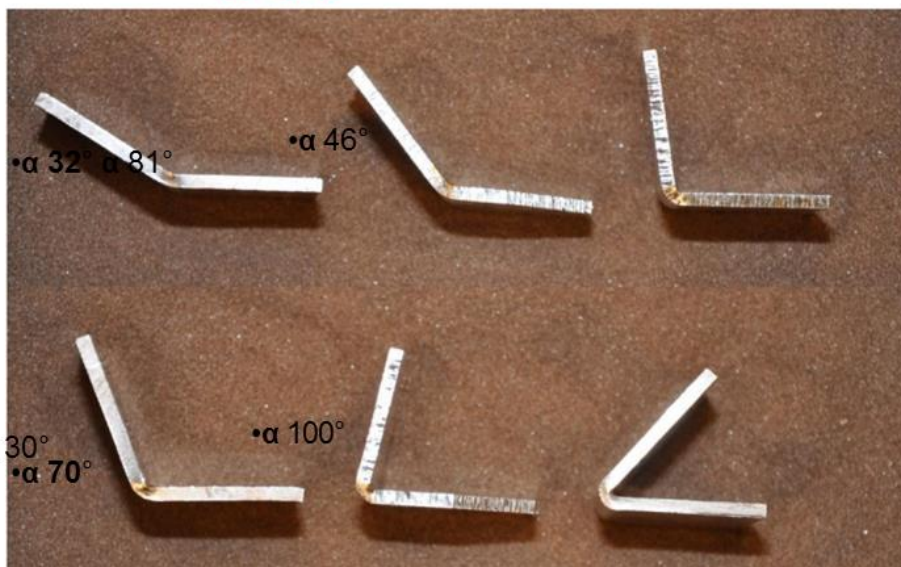
•90° 45° 0°

•(Rp0.2/Rm/A50)

•6063

•Poor results  
•(220/240/11)

•Good results  
•(230/245/11)





## •OUTLINE OF THE PRESENTATION

- A SHORT INTRODUCTION OF SAPA GROUP
- SAPA'S** ALUMINIUM EXTRUSIONS IN AUTOMOTIVE
- HIGH PERFORMANCE CRASH ALLOY
- EXTRUSION DESIGN IS EQUALLY IMPORTANT
- DEVELOPMENT IN FABRICATION TECHNOLOGIES OPEN NEW
- DESIGN POSSIBILITIES
- CONCLUDING REMARKS

## **sapa:** DESIGN AND OPTIMIZATION BY SAPA

### •Design Optimization

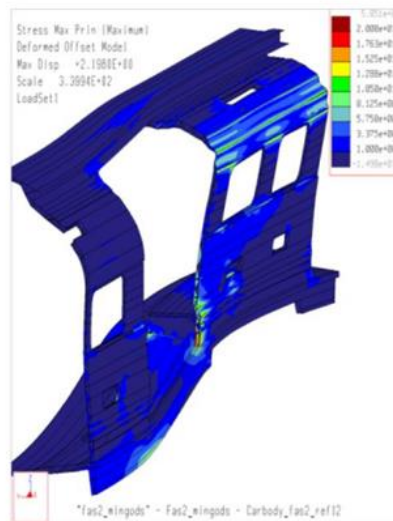


### •Crash Management



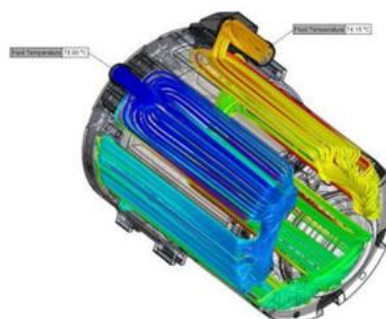
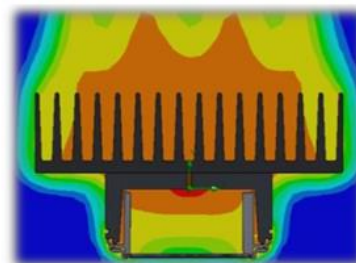
### •STRUCTURAL DESIGN & ANALYSIS

- FEA (static and dynamic)
- Assembly/Tolerance Analysis
- Snap-fit Design



### •THERMAL DESIGN & ANALYSIS

- Air Cooling
  - Forced or Natural Convection
- Liquid Cooling
  - Water or Coolant
- Key Optimization Goals
  - Heat Transfer
  - Pressure Drop
  - Extrudability
  - Weight
- Cost



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## sapa: SAPA'S FABRICATION PROCESSES

39

- 1 CNC
- 1 Bending
- 1 Cutting
- 1 Drilling
- 1 Punching
- 1 Milling
- 1 Hydroforming
- 1 Friction Stir Welding
- 1 MIG-TIG Welding
- 1 Vibration deburring
- 1 Assembly of accessories



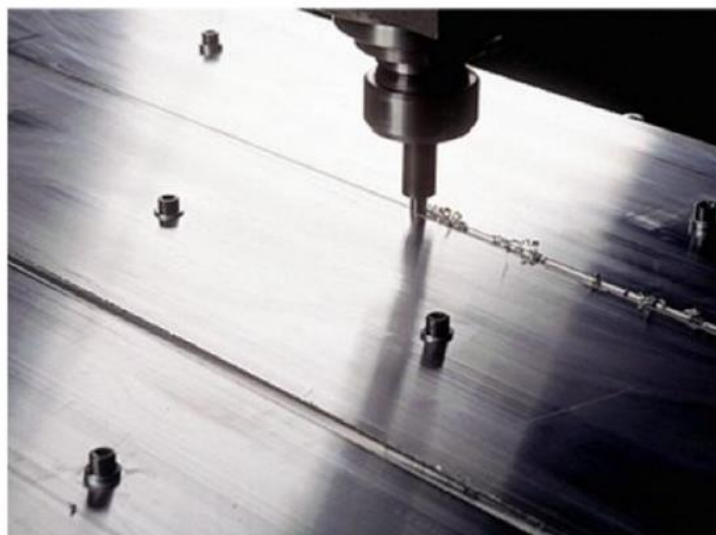
•... and much more

## sapa: ADVANCED TECHNOLOGIES

40

### •Friction Stir Welding

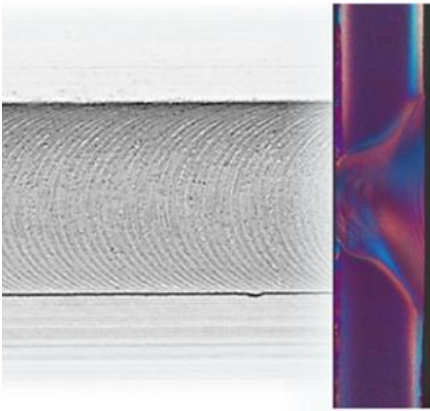
- . Unlimited size through fusing of smaller profiles
- . Molecular bonding with excellent properties
- . No melting, no warping, no change of properties



## sapa:

### • FRICTION STIR WELDING (FSW) PROCESS DEVELOPMENT

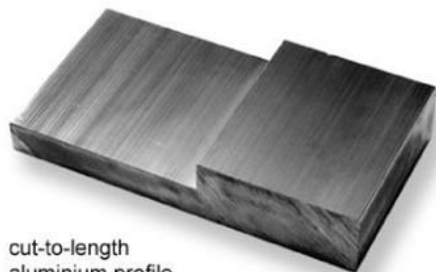
- Sapa part of the development
- since the beginning (early 90's)
- Sapa welds about 2 km/day



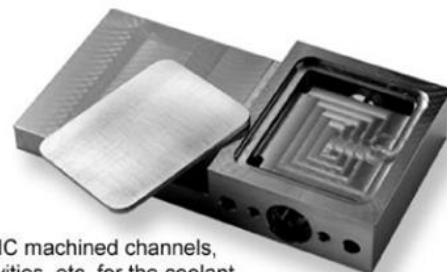
## sapa:

42

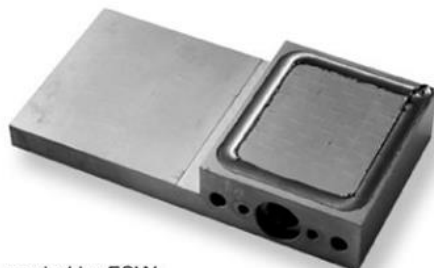
### • FRICTION STIR WELDING APPLIED • ON LIQUID COOLERS FOR ELECTRONICS



cut-to-length  
aluminium profile



CNC machined channels,  
cavities, etc. for the coolant



sealed by FSW  
in a CNC machine



machined, ground and  
surface treated – the finished component

**sapa:**

43

- EV BATTERY COOLERS (LIQUID COOLING) BY SAPA
- USING ALUMINIUM EXTRUSIONS AND FSW

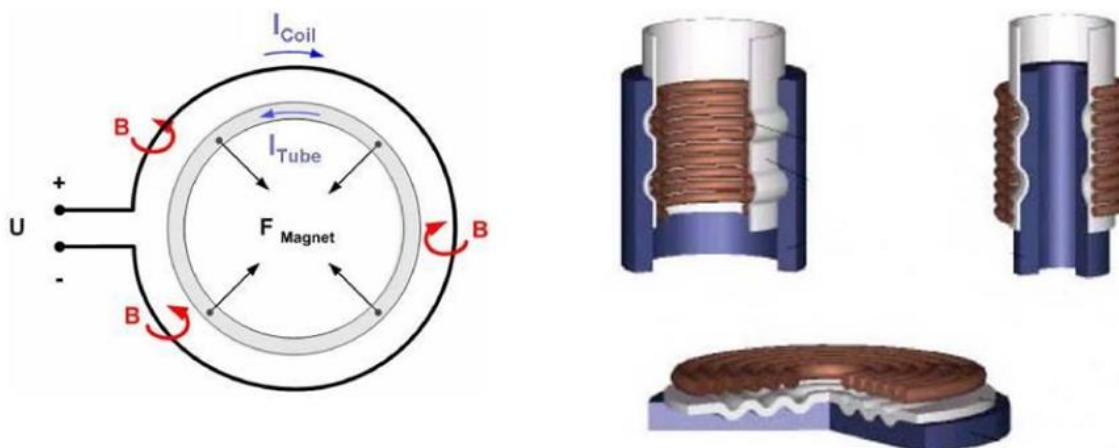
Product photo removed  
on hand-out slide

•Battery Cooling Plate

**sapa:** EMPT (Electro Magnetic Pulse Technology)

44

- Extremely fast forming and jointing with help of
- electro-magnetic induction pulse.



## sapa: •EMPT ADVANTAGES

•45

- No heat affected zone.
- Aluminium can be joint with e.g. plastic, steel, copper, etc.
- Very strong and reliable joint.

Product photo removed  
on hand-out slide

•Toe-link

•IP-beam structure

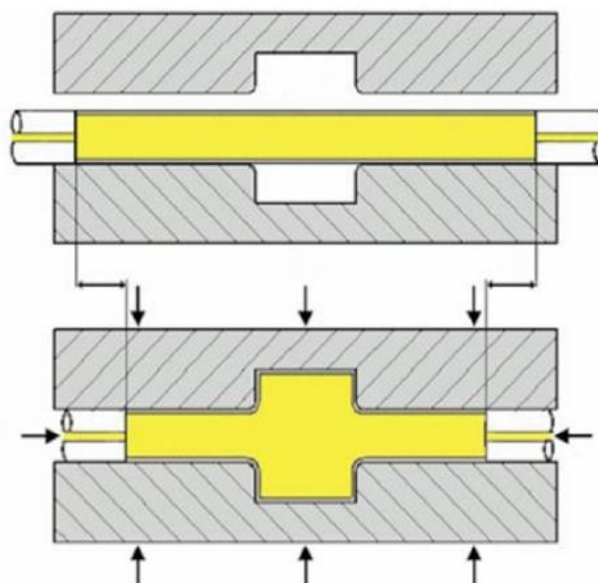
## sapa: HYDROFORMING PROCESS

46

- Pre-forming by bending (if necessary)
- Pre-forming in tool closure
- Final forming by high water pressure

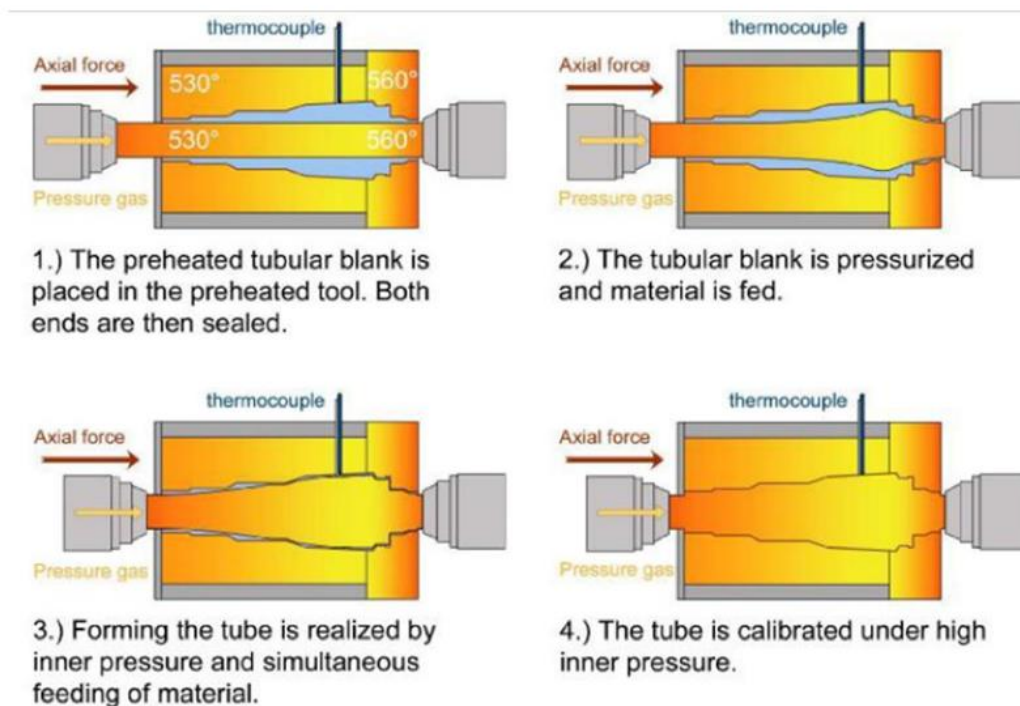


Air charge pipe, Volvo



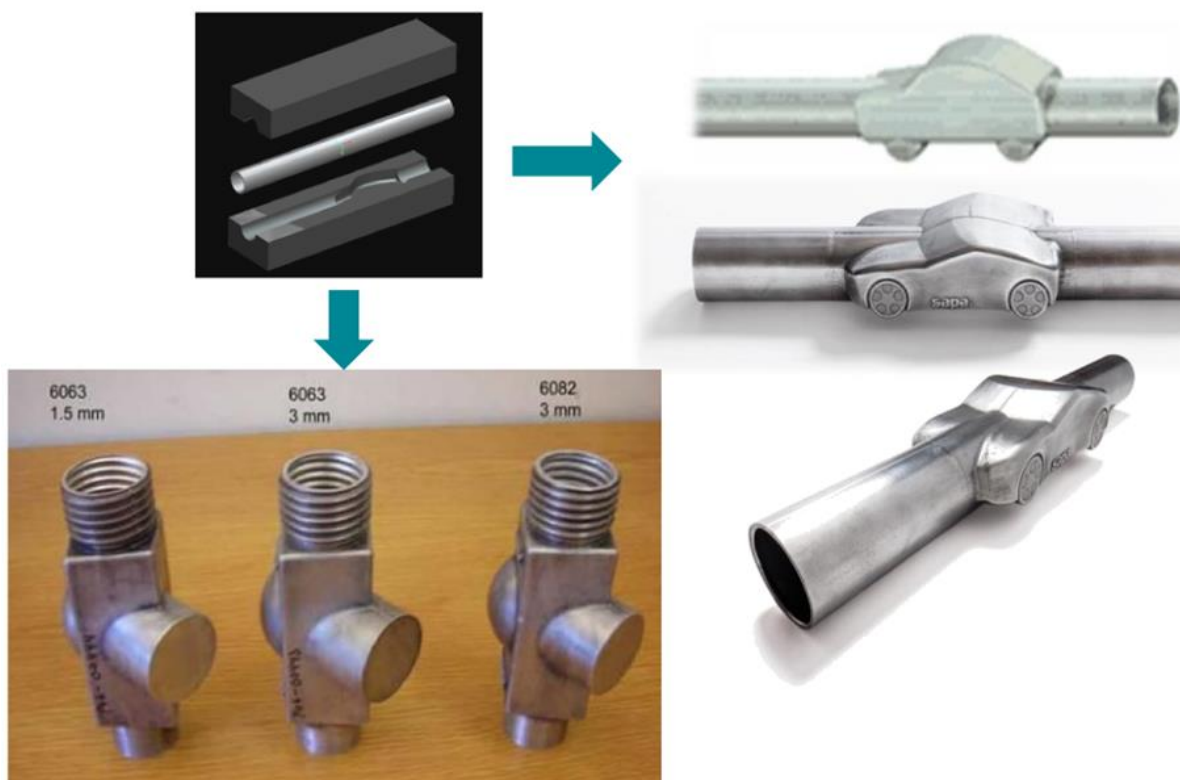
## sapa: •HOT GAS FORMING - THE PROCESS

•47



## sapa: •HOT GAS FORMING - POSSIBILITIES

•48



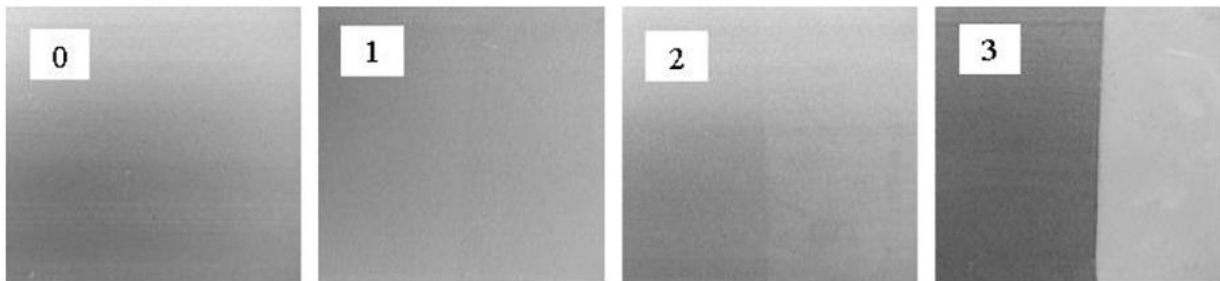


**sapa:**

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•EXCELLENT ALKALINE CORROSION RESISTANCE

•The new coating pass pH13.5 test!



•(Gradings in corrosion test)

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**sapa:**

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## •CONCLUDING REMARKS

- Needs and demands from automotive industry have always been
- key drivers for Sapa to develop new aluminium alloys, new
- applications and advanced manufacturing technologies
- With our global coverage, Sapa is aiming to become your preferred
- partner in automotive light-weighting, globally and locally
- Over 1000 engineers in Sapa are ready to answer your calls and
- serve you with any questions related to aluminium extrusions and its
- application in automotive
- Dedicated R&D and product development resources in Sapa are
- willing to work with you side-by-side to meet the challenge of
- automotive light-weighting



## FOR FURTHER INFORMATION AND CONTACTS<sup>52</sup>

Welcome To Visit  
Sapa Booth at

Aluminium China 2015

**Sapa booth No. 3D40**

•More info

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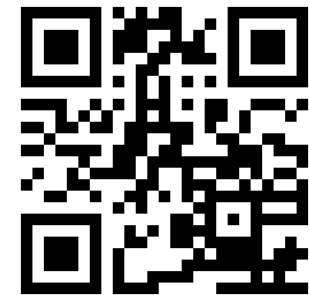
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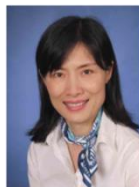
**Europe 2016** 27<sup>th</sup> - 29<sup>th</sup> of Nov  
 AUTOMOTIVE LIGHTWEIGHT  
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