

A dark silhouette of a car's roof and upper body, centered horizontally. The car is facing right, with the front of the roof on the left and the rear on the right. The silhouette is dark and blends into the black background.

**A LONG EXPERIENCE FOR A SHORT BRAKING**

LPR Brakes

[www.lpr.it](http://www.lpr.it)



# GROWTH

## 50 YEARS OF HISTORY, GROWTH, CONQUEST AND EVOLUTION



YESTERDAY

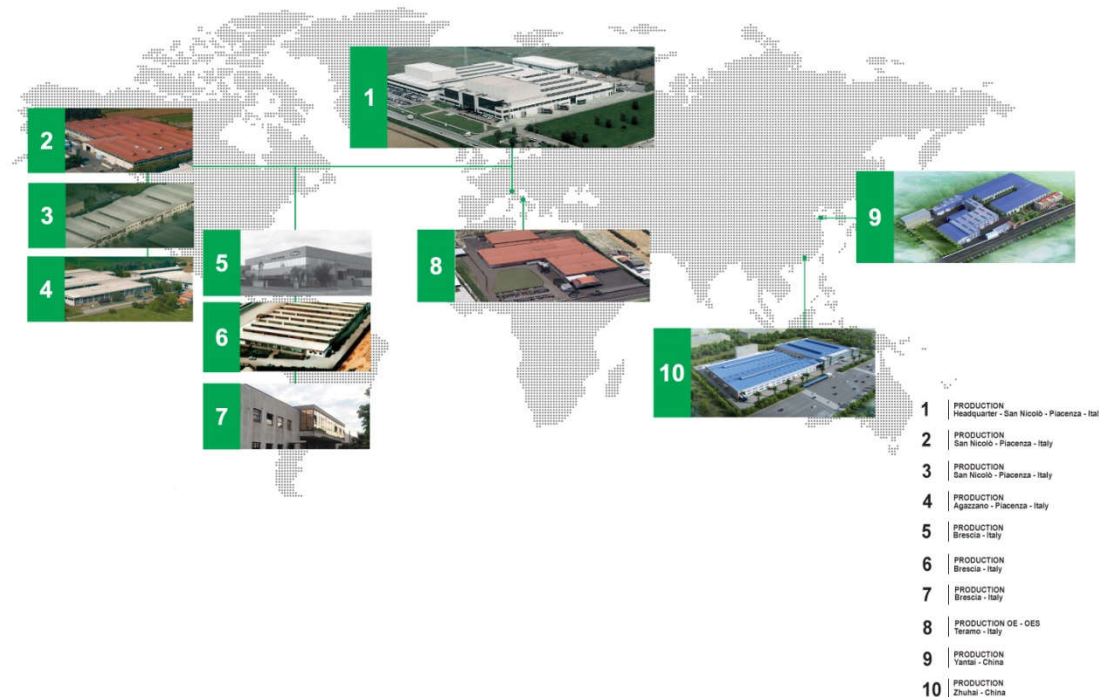


TODAY

- **1952:** Mr. Pietro Arici founded a company manufacturing brake & clutch hydraulics for first equipment.
- **1977:** the company moved and the name Lpr was born with a new focus towards brake & clutch hydraulics. Thanks to the management of the new President, Luciano Arici, and the level of investment in additional tools and plants, in only a few years LPR has become a world leader for quality and innovation.
- **Early 90's:** Lpr extended the range to include other products such as brake pads and shoes, discs, drums and hoses.
- **Today:** LPR owns manufacturing plants and distribution centres in strategic places to fully satisfy the current market demand and to provide its customers with a great service and high quality products.

# THE PLANTS

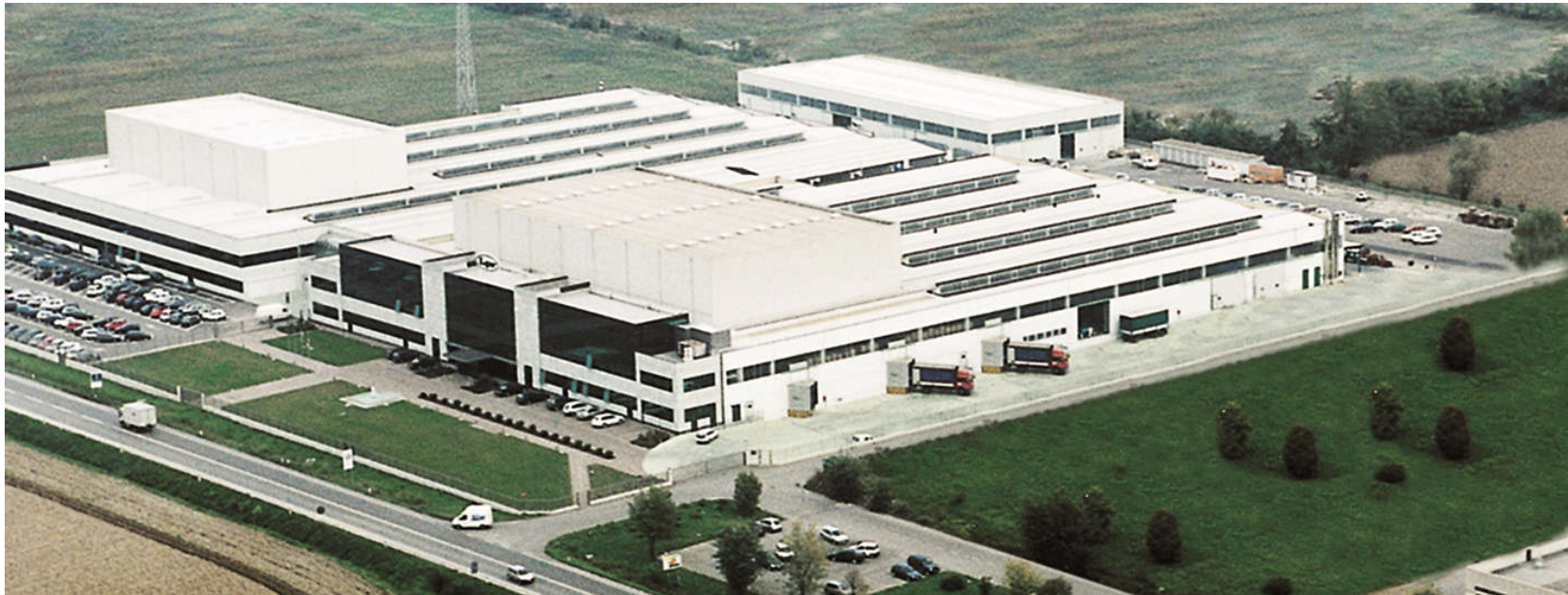
## LPR WORD LOCATIONS



LPR owns manufacturing plants and distribution centers in strategic places to fully satisfy the current market demand and to provide its customers with a great service and high quality products.

- ✓ **10** – plants and distribution centres worldwide
- ✓ **96%** – Car parc covered
- ✓ **17,530** – items in range
- ✓ **25,000,000** – pieces produced in 1 year

# THE PLANTS HEADQUARTER



- ✓ Since 1999 new headquarter.
- ✓ Over 55.000 m<sup>2</sup>

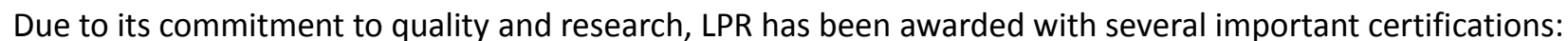


## THE PLANTS

### CHINA – ZHUHAI



- ✓ Founded in 2005
- ✓ Over 50.000 m<sup>2</sup>



- ✓ ISO TS 16949:2009
- ✓ ISO 9001:2008
- ✓ ISO 14001:2004
- ✓ Ferrari authorized supplier
- ✓ ECE R90 type-approval (IDIADA / KBA / VCA)

## CERTIFICATIONS

### RENAULT SUPPLIER AWARDS



LPR awarded to be in the top ten of Renault suppliers for the year 2014.



# CERTIFICATIONS

## PSA SUPPLIER AWARDS



**After - Sales**

**Delivery Performance Award**

**Paris, May 24th 2016**

LPR is a major supplier for PSA activities specialized in braking systems for the after-market business.

This category recognizes suppliers for their quality of service, as measured by their on-time, on-spec delivery of spare parts to the dealer network, which has a direct effect on customer loyalty.







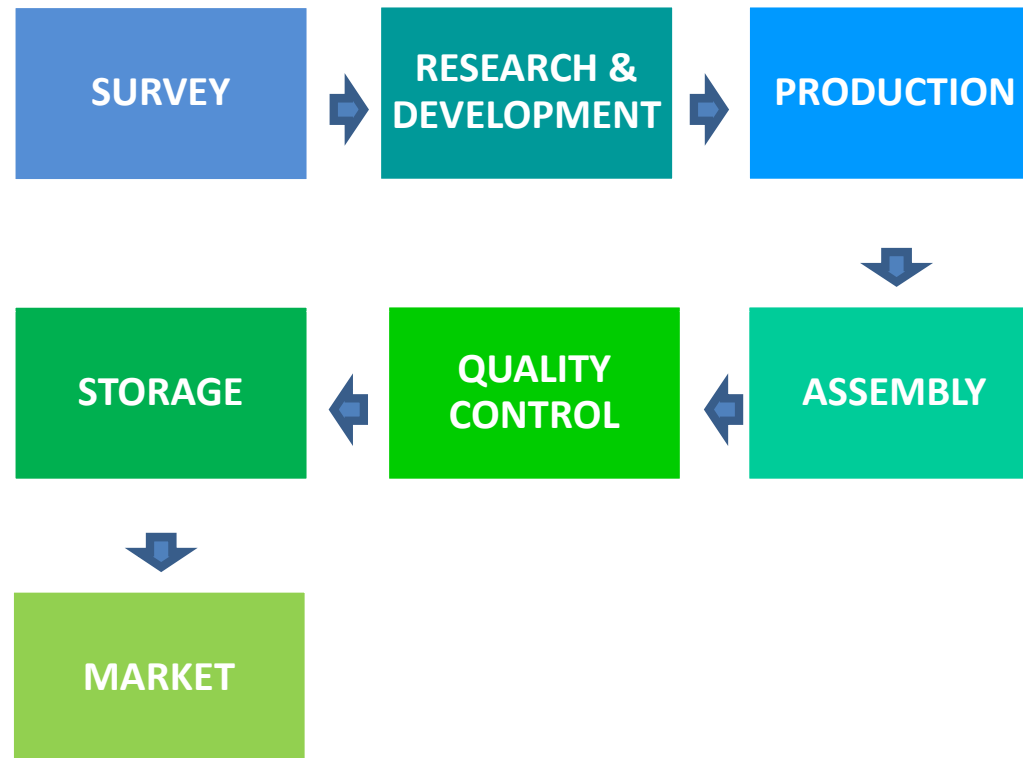
# **LPR PHILOSOPHY**

## **CUSTOMER SATISFACTION**

- Self sufficiency is the company's core philosophy, with all processes and operations performed within the organization: from the research and design of components, to the production, quality and global distribution.
- ✓ Self-Sufficiency
- ✓ Speed in developing new items
- ✓ Flexibility
- ✓ Availability
- ✓ Competitiveness
- All main guidelines to achieve:

## **CUSTOMER SATISFACTION**

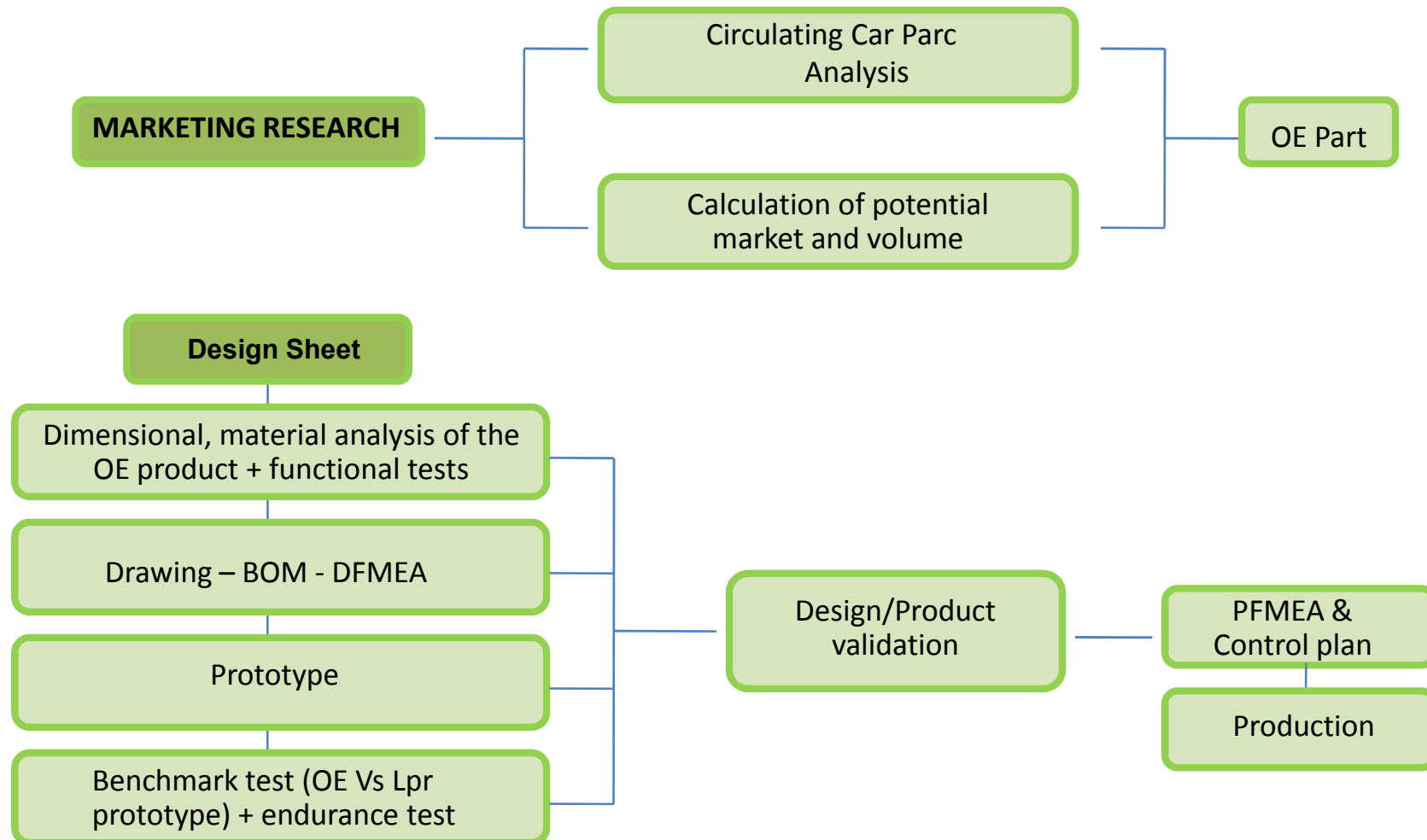
## SELF - SUFFICIENCY FROM THE DESIGN TO THE MARKET



Self-sufficiency is a key factor for the success of any company.

# DEVELOPMENT PROCESS

## FROM THE DESIGN TO THE MARKET





# **LPR PHILOSOPHY**

## **PRODUCT DEVELOPMENT**

- OE Reference (marketing research)
- Application (marketing research)
- OE sample (Lpr purchases an OE sample before the development of a new item)
- Creation of the Lpr part number
- Design of the Lpr part number
- Production of the Lpr prototype
- Performances comparison between the OE sample and Lpr existing products
- Formulation development (if necessary)
- Structured testing plan (dyno test, car test and laboratory test...)

Once the Lpr prototype is approved, both R&D and Quality Dept. release the new item for Production (through Manufacturing Instructions), but once the machine is set up to produce a new batch, the first units are checked by quality dept. to be sure all the important and critical dimensions are within tolerances.





# PRODUCT DEVELOPMENT OE RESEARCH

Main Sources:

1. **NEW OE REFERENCES:** Marketing Dept identify new OE and applications.

## Example: LPR REF 1748

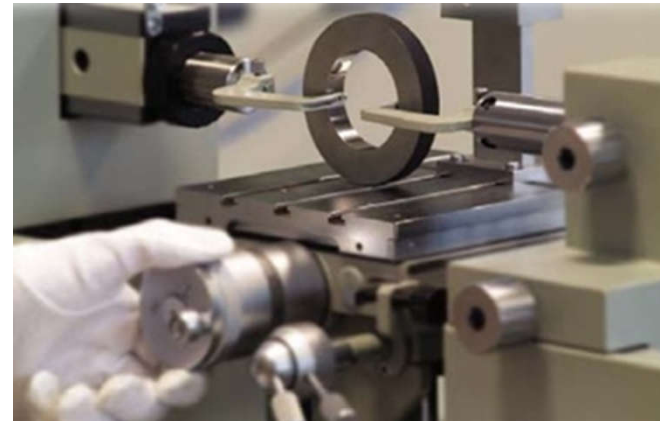
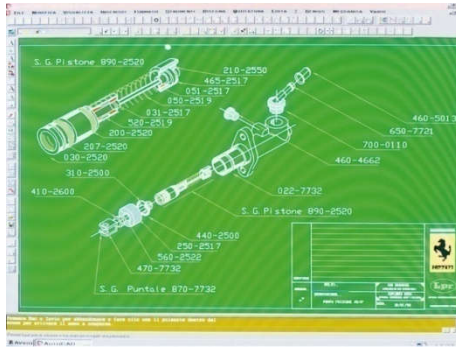
Make	Model	Fuel	Stroke	Type	CC	KW	Valves	Drive	Body	Serie	Year From	ArticleGroup	Oe01	status
MERCEDES	Sprinter 210D	Diesel	2.1	CDi	2143	70	16	RW	VAN	B906	2009	Master cylinder	0004317601	New
MERCEDES	Sprinter 216	Petrol	1.8		1796	115	16	RW	BUS	B906	2009	Master cylinder	0004317601	New

Then it checks the applications in the CarParc ranges of Europe, Asia, EMEA to be able to quantify the coverage of different market segments and geographical locations. In addition, Marketing Dept. checks also the sales forecast of the new applications in the global markets. When the several analysis are completed, the Marketing Dept. can assess which and how many parts are needed to meet market demand and decide where to focus the new developments.

2. **REQUESTS FROM CUSTOMERS:** Lpr can develop and produce specific spare parts on demand based on sample. Generally, the development time is between 3 and 6 months.

**The outcome of this process is a wide product range constantly growing.**

## SELF - SUFFICIENCY RESEARCH AND DESIGN



Research is a fundamental aspect of the growth and international success of LPR.

Commitment to research means not only better quality products, but also developing innovative technical solutions, improvement of all the production stages and a constant drive towards advanced technologies.

# SELF - SUFFICIENCY RESEARCH AND DEVELOPMENT



## Technical sheet

<b>LPR S.r.l.</b>		<b>SCHEDA PROGETTO Easy Kit</b>		<b>TEAM SVILUPPO PROGETTO</b>																																																																																																																																																																																																	
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<b>LPR R&amp;D</b>		<b>TESTS REPORT</b>	
Data	16/12/2009	Nr. Rapporto	03-10
Codice Prodotto	FF228000007-507	Copia a:	UFF. TECNICO
Tipo Prodotto		Easy kit	
Motivazione Prova: verifica prototipo sistema incrementale			
R.E.L.E.	Nr.	1709	
Note:	30/12/2009	Note:	
Strumentazione utilizzata		Archiviazione corpo in	
Banco di caratterizzazione Montaggio su veicolo		Nr. Test effettuati:	
		TOT 9 POS 6	
TIPO DI PROVA	SPECIFICA	RISULTATO	DOC. ALL. SI NO ESITO POS. NEG.
Verifica gioco fisso su banco caratterizzazione	*****	vedi allegato	x x
Note: Vedi risultati prove			
Montaggio su veicolo a prova su strada	*****	vedi allegato	x x
Note: Vedi risultati prove			

### RISULTATI OTTENUTI

#### Vedi risultati sperimentali

Il prototipo costruito risponde ai parametri dimensionali del sistema incrementale originale. Su entrambe le ganasce sono stati eseguiti i fori di ritenzione del sistema incrementale. La montabilità è garantita su entrambi i gruppi.

Le moli utilizzate sono quelle del K2 244 di provenienza Cato. La mola superiore è precaricata sufficientemente per garantire un corretto funzionamento anche durante le prime fasi di recupero del gioco. In ogni caso è necessario effettuare la pre-regolazione del sistema durante il monta-

La mola aggancio bieletta utilizzata è la MW0000000038/038. L'occhiello di aggancio lato bieletta è stato allargato manualmente per poterla sulla bieletta di spessore 5,9mm. In fase di produzione si rende necessaria la realizzazione di una mola con un occhiello di aggancio con c interna di almeno 5,9mm.

Si rende necessario (indicare sui disegni e le istruzioni di lavoro) il condizionamento del diametro esterno dell'equipaggio con abbatimenti di 40,3mm, al valore di 227,2+/-0,2mm.

La prova in laboratorio è stata eseguita utilizzando il piatto ed il cilindretto dell'orex 544 (abatimenti 40,25r).

Eseguita caratterizzazione del sistema originale e dei gruppi di entrambe le mani; si sono ottenuti i dati in esame a scopo comparativo i di autogestione: l'uno assemblato con elementi principalmente di nuova costruzione, l'altro in parte costituito da particolari già presenti in prod.

In tutti i casi i risultati sono comparabili a quelli ottenuti durante la caratterizzazione del sistema origin.

I gruppi sono stati montati su autovettura (Fiat Grande Punto 1.3Mj) targa DC180 TA di proprietà del sig. Battini Alessandro A.

La montabilità su piatto originale non ha evidenziato particolari anomalie.

Non si riscontrano interferenze tra le varie parti coinvolte. Principalmente sistema incrementale-cilindretto e sistema incrementale-mc.

La quota di abatimenti del piatto originale è di 40,3mm (molto simile a quella del piatto utilizzato durante la caratterizzazione in labor).

Dimensione del tamburo--> 228mm // installazione su autovettura avvenuta a 227,1mm con incrementale FF228000007-5.

Montaggio su autovettura.

I gruppi dopo alcuni giorni di utilizzo non evidenziano alcun particolare problema dopo assestamento. I giochi fra i vari elementi sono rispettati ed eventuale interferenza è scongiurata.

Come dalle prove di laboratorio il gioco fisso medio è di circa 0,3mm.

Si dà parere favorevole condizionato alle modifiche di cui sopra.

Le due bielette FF228000005-506 e FF228000007-507 che differiscono per l'impiego o meno della lama e della TC di produzione (228) e se ambedue risultate idonee, si pretende a considerare valida (per minori costi di sviluppo) la FF228000007-5.

## SELF - SUFFICIENCY RESEARCH AND DEVELOPMENT

### Raw material analysis

Chemical and material structure analysis are carried out inside Lpr Laboratories






# SELF - SUFFICIENCY RESEARCH AND DEVELOPMENT

Chemical analysis

Lpr laboratory tests

LABORATORIO ANALISI MATERIALI				
	DISEGNO: 001-4552	BOLLA N°:200780 DEL:19/2/10	RELAZIONE N°: 35	
	PARTICOLARE cilindro	MATERIALE gh 190	CERTIFICATO N°: 35	
	FORNITORE: zml	QUANTITA':	DATA: 22/02/2010	
	ROTTOFRENO-PINCEADITALY ROTTOFRENO-PINCEADITALY			

ANALISI QUANTOMETRICA						
SIGLA	ELEMENTI	1	2	3	4	5
C	Carbonio	3,31				
Si	Silicio	2,33				
Mn	Manganese	0,64				
S	Zolfo	0,06				
P	Fosforo	0,07				
Fe	Ferro	resto				
Ni	Nichel					
Cr	Cromo	0,09				
Cu	Rame					
Sn	Stagno					
Mo	Molibdeno					
Al	Alluminio					
B	Boro					
Pb	Piombo					
Zn	Zinco					
Mg	Magnesio					
Ti	Titanio					
Co	Cobalto					

NOTE:	Il materiale è conforme alla ghisa 156	IL LABORATORIO CHIMICO
		Sergio Paradisi

LABORATORIO ANALISI MATERIALI

DISEGNO:

57542 D

BOLLA N°173

22/01/2010

RELAZIONE N°:

25

SOTTOPRODOTTO: FIANCERDIAITALY

PARTICOLARE  
nastro

MATERIALE  
fe 360 B

CERTIFICATO N°:  
25

FORNITORE:  
comal

QUANTITA':

DATA:  
16/02/2010

SOTTOPRODOTTO: FIANCERDIAITALY

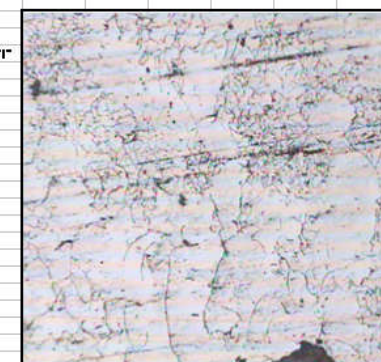
ANALISI QUANTOMETRICA

SIGLA	ELEMENTI	1	2	3	4	5
C	Carbonio	0,058				
Si	Silicio	0,023				
Mn	Manganese	0,32				
S	Zolfo	0,01				
P	Fosforo	0,018				
Fe	Ferro	resto				
Ni	Nichel					
Cr	Cromo					
Cu	Rame					
Sn	Stagno					
Mo	Molibdeno					
Al	Alluminio	0,06				
B	Boro					
Pb	Piombo					
Zn	Zinco					
Mg	Magnesio					
Ti	Titanio					
Co	Cobalto					

NOTE: Il materiale corrisponde all'acciaio FE 360B

IL LABORATORIO  
CHIMICO

ESAME MICROGRAFICO					
<b>Lpr</b>	DISEGNO: 93053	BOLLA N°: 93053	RELAZIONE N°: 224	<b>Lpr</b>	
	PARTICOLARE cilindro	MATERIALE gh 190	CERTIFICATO N°: 224		
	FORNITORE: parola e luraghi	QUANTITA': 1	DATA: 11/12/2009		
MICROGRAFIA N°: 1					
INGRANDIMENTO X: 200					
ATTACCO: NITAL 4%					
ZONA DI PRELIEVO DEL PROVINO: BORDO + CUORE					
Definizione grafite: grafite lamellare di tipo "I" e "III" dimensioni 3-6, distribuzione in prevalenza "A".					
Non si rilevano tracce di carburi liberi.					
Struttura perlitica.					
DUREZZA: HB					
HB: 205 - 210 - 212 - 215 - 218					
NOTE: Il materiale è conforme alla GHISA 156					
IL LABORATORIO CHIMICO					
Sergio Paradisi					





# SELF - SUFFICIENCY RESEARCH AND DEVELOPMENT

## Supplier certificate

Lpr requires its suppliers to forward a quality certificate for all the batches delivered.

QUALITY AND CONFORMITY CERTIFICATE

Z.M.L. Industrie S.p.A.  
CAST IRON DIVISION

Z.M.L. LAB-F-03038 A  
LABORATORY

ZML Code: 1127333  
Drawing: CILINDRO 001-0502-050  
Customer: LPR S.R.L.  
Production: ☒  
Sampling: ☐  
Preserie: ☐  
Quantity: 30223  
Delivery notes: ☐  
Date:   
Printer/Prod date: 17/02/2010  
Moulding line: DSA 2  
Material: GH 190  
Ref.Norm: FIAT 5705

HARDNESS [HV] TENSILE STRENGTH [N/mm2]  
Specification: 170-230 (10 N mm2)  
Production: Min 224 Max 229 Test 247 Normal

MICROSTRUCTURE  
Structure/Matrix  
Perlite: 100 %  
Ferrite: 0 %

SPECTROMETER ANALYSIS

Element	Value	Min	Max
C	5.99	5.99	6.00
Si	2.99	2.99	3.00
Mn	0.07	0.07	0.08
P	0.076	0.076	0.08
S	0.009	0.009	0.01
Cu	0.144	0.144	0.15
Cr	0.076	0.076	0.08
Al	0.003	0.003	0.004
Ni	0.038	0.038	0.04

NOTES:  
PRODUCT CONFORMITY DECLARATION:  
I HEREBY DECLARE THAT THE PRODUCT HAS BEEN PRODUCED IN CONFORMITY WITH THE PURCHASE ORDER/ORDINANCE AND OTHER SPECIFICATION AS ABOVE REQUESTED. THE INFORMATION RELATED TO THE CARRIED OUT CONTROLS ARE AVAILABLE FOR ANY EVENTUAL INSPECTION. THIS DOCUMENT IS ACCORDING TO UNI EN ISO 9001 (3.18).  
MATERIAL IS ACCORDING TO: UNI 50065 - UNI 50065-02 (Notes)

REFERENCE N°: 158-2010 DATE OF ISSUE: 17/02/2010 ISSUED BY: Mauro TOSI APPROVED BY: Roberto ROSSETTI

COPY TO: QUALITY ASSURANCE X QUALITY CONTROL X

COMAL FRILATTA S.p.A. ATTESTATO DI COLLAUDO

VIA MARCHE 12466 COLOGNO AL SERIO BS

UNI EN 10204 2.2. N° 0.12 HLVA2

Data: 22/09/2010 Numero: 147

Cilindrino LPR S.R.L. Ordine Cliente: 229/09/10 N° Impiego: 0

Decorazione griglia: DECA/ATO Qualita': 03/5408 Norma: EN10025

Nomenclatura: Peso Kg: DIT: N° 173 Richiesta di Intervento: Ness.

Pos.	Col. Num.	C	Mn	Si	P	S	Al	Ni	Cr	Mo	W	Co	Fe	As	Se	Te	U
10	029944D	0.0208	0.2720	0.0270	0.0150	0.0146	0.0401	0.0080	0.0912	0.0010	0.0020						
100	029944D	0.0208	0.2720	0.0270	0.0150	0.0146	0.0401	0.0080	0.0912	0.0010	0.0020						
100	029944D	0.0208	0.2720	0.0270	0.0150	0.0146	0.0401	0.0080	0.0912	0.0010	0.0020						
20	07042D	0.0588	0.3280	0.0230	0.0261	0.0126	0.0532	0.0000	0.0054	0.0010	0.0040						
100	07042D	0.0588	0.3280	0.0230	0.0261	0.0126	0.0532	0.0000	0.0054	0.0010	0.0040						
100	07042D	0.0588	0.3280	0.0230	0.0261	0.0126	0.0532	0.0000	0.0054	0.0010	0.0040						
30	062208D	0.0449	0.3080	0.0000	0.0120	0.0160	0.0000	0.0000	0.0000	0.0000	0.0000						
100	062208D	0.0449	0.3080	0.0000	0.0120	0.0160	0.0000	0.0000	0.0000	0.0000	0.0000						
100	062208D	0.0449	0.3080	0.0000	0.0120	0.0160	0.0000	0.0000	0.0000	0.0000	0.0000						
41.50	0.00	2.00	288.000	391.000	33.000	0.000	0.300										

Si dichiara che la fornitura e' conforme all'ordini.

Note: Il collaudo

6/28 - RPRD

seal's system

TEST REPORT

Miscela LTX 72 (tx 120/70)

DATA: 27/06/09

VULCANIZZAZIONE PROVETTE

PLACCHE DA 2 mm di SPESSORE m' a °C

Tomboli da 12,5 mm di spessore a 28 mm m' a °C

Codice Capitolo Richiesto	Metodo di Prova	Richiesto Requirements	Rilevato Tested	Unita di Misura
Durezza	Hardness	ASTM D 2240		SHORE A
Durezza	Hardness	ASTM D 1415	68-74	71 IRHD
Densita'	Specific Gravity	ASTM D 1817		1.203 gr/cm³
Carico di rottura	Tensile Strength	ASTM D 412 C	≥10	15 N/mm² (MPa)
Allungamento a rottura	Ultimate Elongation	ASTM D 412 C	200 min	380 %
Lacerazione	Tear Resistance	ASTM D 824 C		N/mm (MPa)
Resilienza	(Palmbeamer test)	ISO 4662		%
Chiusura		ASTM D 297		%
Abbraccio	Abbraccio Resistance	ASTM D 1630		%
Ozono	Resistance to Ozone	ASTM D 1149		%
Prova all' freddo	Low Temperature Brittleness	ASTM D 746	-40	Ok* °C
Idoneita'			0+25	+21 °C
Prova all' freddo	TR TEST	TR 50		ASTM D 1329 °C
Compressione Set	70 a 120°C del 25%	ASTM D 395 B		21 %
Compressione Set				%

VARIAZIONE DELLE CARATTERISTICHE

Ambiente	Tempo	Temper.	Durezza	Carico a rottura	Allung. a rottura	Volume %	Peso %				
	Un	°C	Req.	Tested	Req.	Tested	Req.	Tested			
DOT 3 FIAT	70	120	-15	-9	-40	-15	-40	-19	0+30	+2,5	
Aria	70	120	+8	+8	-30	-12	-30	-12			

Note: \* bend to 180°

Particolari: 200-1662 207-1662 200-4361

Indipendentemente dalle prove da sottoporre alle alterazioni, non garantiamo che gli esecutori seguano i procedimenti indicati, quando differiscono dai procedimenti preparati e adottati dal cliente.

Firma: Landini Alberto

# SELF - SUFFICIENCY

## RESEARCH AND DEVELOPMENT

### Tests

Before being released, new products need to pass all the tests

- OE reference performances
- Lpr prototype performances
- Endurance test
- Burst test





## SELF - SUFFICIENCY PRODUCTION AND ASSEMBLY



All production steps are made inside our own plant.



## SELF - SUFFICIENCY

### LABORATORY AND ROAD TESTS

Lpr is committed to the highest quality and observes important International standards such as ISO 9001:2008 and ISO TS 16949:2009. All that thanks to our quality control department which is equipped with the most advanced technologies and a very skilled personnel.



LPR s.r.l. designs and produces friction materials after an intense research activity and verify their performances and applicability through a high number of dyno evaluations and by severe road testing reproducing all mechanical and thermal stresses imposed to the braking system.

## SELF - SUFFICIENCY

### LABORATORY AND ROAD TESTS



All production steps take place inside our own plant.



## FLEXIBILITY AND AVAILABILITY WAREHOUSING

The fully automated warehouse contains 40,000 bins, what means around 15,000,000 parts.



These two types of warehouses allow Lpr to pick and pack high and low volumes orders in a very short time.

Vertical warehouses around 60 fully automated and very fast. These are mainly used to prepare slow moving parts.

**LPR GROUP**  
**FIVE BRANDS**

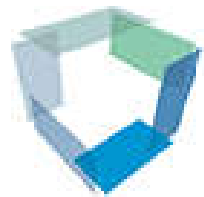






## **LPR PRODUCTS DATA**

### **TECDOC INFORMATION SYSTEM**



# **TecAlliance**

## **TecDoc Inside**

The information source for the vehicle repair market with the original data of the parts manufacturers.

TecDoc Informations System GmbH has established itself as the leading supplier of electronic spare parts information on the European market.

TecDoc furnishes the free vehicle spare parts market with current and comprehensive data for identifying and ordering parts – for both, PC as well as CV – directly from the databases of the cooperating automotive aftermarket manufacturers in a standardized catalogue form.

The core tasks of TecDoc are still the standardizing, gathering and distributing of data as well as the development of the necessary data techniques. Nevertheless, TecDoc intensively works on new projects in order to offer more efficient solutions to industry, trade and garages.

TecCom is the leading B2B platform in the international automotive aftermarket.

Use of TecCom simplifies and automates business processes between LPR and wholesale traders.

# LPR PRODUCTS

## HYDRAULIC



A range to cover global vehicle parc. Including OE, OES and Aftermarket sales.

- ✓ 2891 Brake and Clutch Hydraulics
- ✓ 1882 Brake and Clutch Hoses
- ✓ 96% Car parc coverage

# LPR PRODUCTS

## HYDRAULIC

Production capacity exceeds 100,000 finished units per day. Components production is within Lpr facilities, including pistons, push rods, screws washers and rubber and plastic parts.

During development and production processes the raw material and finished products are subjected to strict controls such as:

- ✓ Raw material analysis
- ✓ Prototype performances against OE
- ✓ Endurance test
- ✓ Burst test



# LPR PRODUCTS

## HYDRAULIC COMPONENTS



Machining



Washing



Assembly



Test





# HYDRAULIC PRODUCTION AND TESTES



Production



Assembly



Performance (OE & LPR)



Endurance Test

Production capacity exceeds 100,000 finished units per day. Components production is within LPR facilities, including all piston, rubbers and plastics. Range encompasses cast iron and aluminum with case hardened pistons as necessary.

All zinc plating is processed on site with state-of-the-art process. Assembly of washed and oiled parts is carried out using LPR self-designed and built equipment with many tasks being fully automated. All parts are subject to pressure testing before their release to warehouse.

# PRODUCTION

## Hydraulic

All machining operations are carried out on highly sophisticated numerically-controlled machinery. All machinery has been specially conceived, designed and developed by a team of skilled personnel



# ASSEMBLY & QUALITY CONTROL

## Hydraulic

Assembly is carried out with highest precision, whilst maintaining the flexibility required to meet the specification required by international standards.

All parts are subject to pressure testing before release to warehouse.

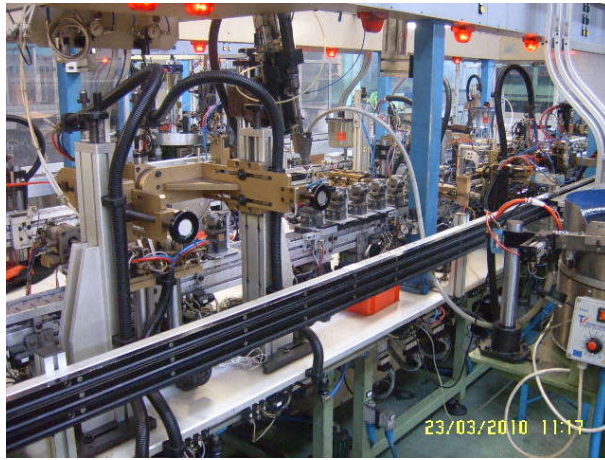




# ASSEMBLY & QUALITY CONTROL

## Hydraulic

In order to meet market requirements Lpr kept investing in new technology and introduced fully automated machines for the assembly and quality control of fast moving cylinders.





# PROTECTIVE COATING

## Hydraulic

Lpr has also made significant investment in plant for heat treatment, zinc plating and burnishing. All plant operates with respect for safeguarding the environment.



# LPR PRODUCTS

## BRAKE & CLUTCH HOSES



Range: 1882 Brake & Clutch hoses

Coverage: 96% European car parc

All Lpr hoses are manufactured and tested according to SAE J1401 International standard.

Lpr uses Semperit hose and manufactures the end fittings.

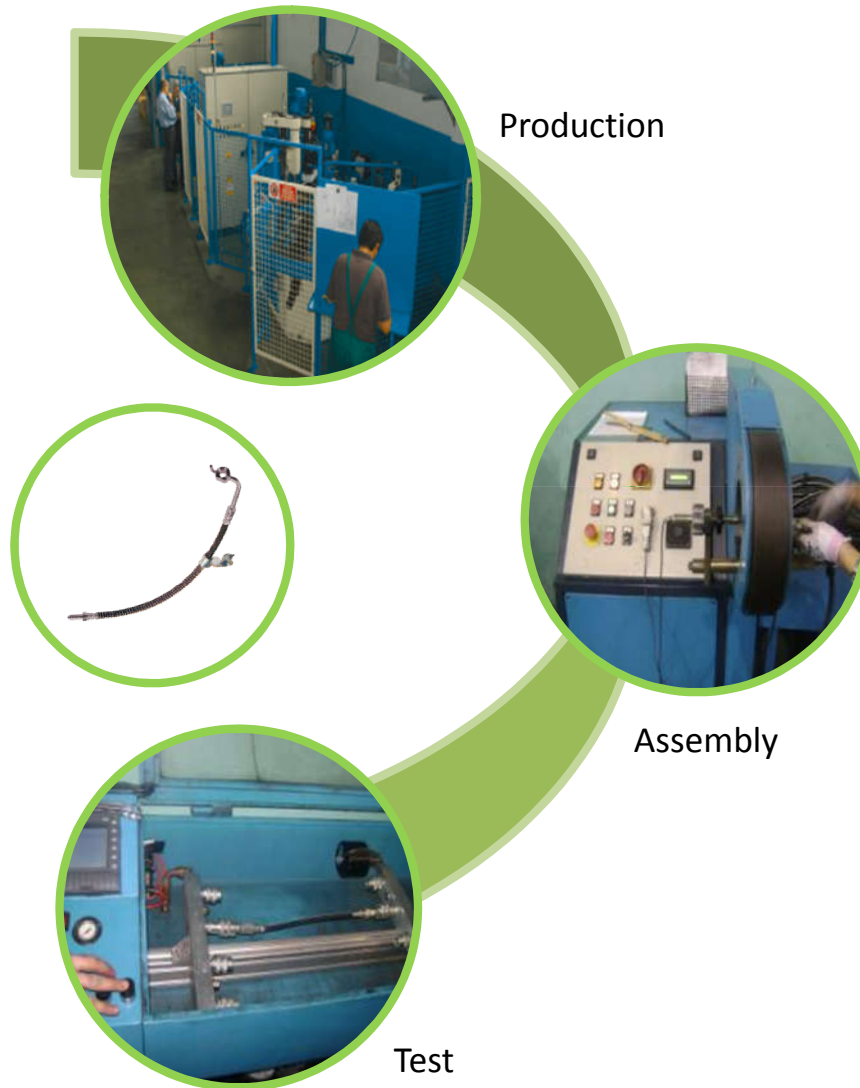
All of them are zinc plated to protect them against rust.



- **Tube:** SBR/BR, black smooth
- **Reinforcement:** Textile braided
- **Cover:** EPDM, black, grooved, oil and ozone resistant
- **Marking:** Continuous coloured marking, white: Semperit DOT1/8HL SAEJ1401. Additionally white longitudinal stripe.

# LPR PRODUCTS

## BRAKE & CLUTCH HOSES



All the hoses manufactured by Lpr are subjected to several tests such as:

- ✓ Hydraulic test
- ✓ Burst test
- ✓ Tensile strength
- ✓ Constriction test

Once per year Lpr performs all the tests required by SAE J1401 to ensure 100% quality and safety.

# BRAKE & CLUTCH HOSES

## PRODUCTION



Production



Burst Test



Assembly

### Key Features:

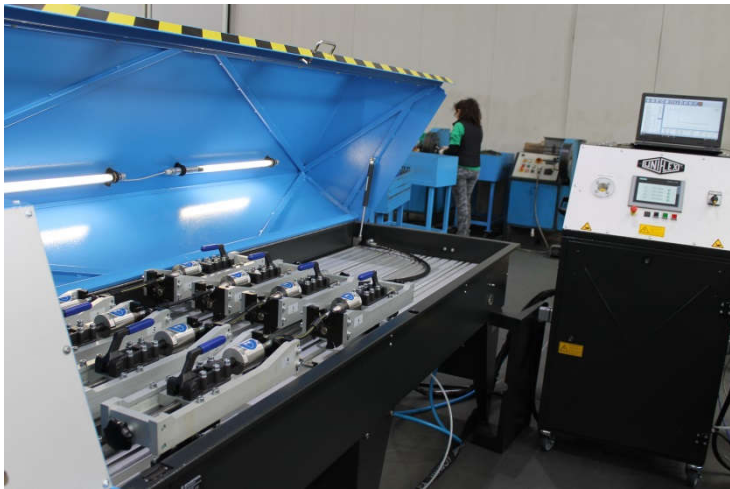
- ✓ Zinc plated steel end fittings to provide corrosion resistance
- ✓ High thermal, chemical and humidity resistance

All production steps are made inside LPR plant.



# BRAKE & CLUTCH HOSES

## PRODUCTION



# BRAKE & CLUTCH HOSES

## TESTS

- PRESSURE TEST
- CONSTRICTION TEST
- VOLUMETRIC EXPANSION TEST



manometer at P=69bar  
for the first 3 steps



manometer at P=103bar  
for the second 3 steps



pressure at P=200bar

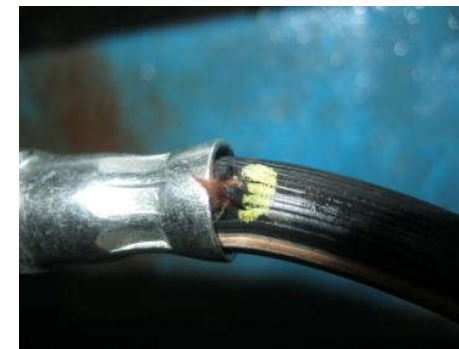


tools used

## - BURST STRENGTH TEST



P=280bar constant for 2 minutes and pressure arousal until burst occurs



LPR sample burst

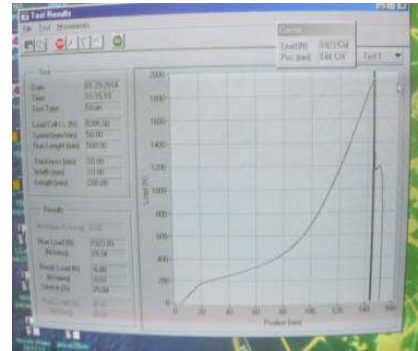
# BRAKE & CLUTCH HOSES

## TESTS

- BRAKE FLUID COMPATIBILITY
- WHIP TEST
- TENSILE TEST



sample ready for the test



test report diagram



samples after testing

- COLD BEND TEST



Start Test



Start TT Set 1



Start TT Set 2



# BRAKE & CLUTCH HOSES

## PRODUCTION

### - OZONE TEST

#### Ozone test condition:

- 100 Mpa for 72 hours at 40°C
- Hose on a cylinder 8 time the nominal outside of brake hose
- Hose on cylinder 24hr before test begin



Ozone machine

### -SALT SPRAY

### - WATER ABSORPTION TEST

### - HOT IMPULSE TEST

### - DYNAMIC OZONE TEST

### - BURST TEST:



Chamber temperature



Pressure of samples during cycle phase



Hoses connected to the circuit



# BRAKE & CLUTCH HOSES

## CERTIFICATE

  
INSTITUTE FOR TESTING AND CERTIFICATION, a. s.  
Zlín, Czech Republic

**CERTIFICATE**  
No. 11 0914 V/ITC

We certify hereby that the product  
**Rubber hoses assembly for hydraulic brakes of automobiles,  
DN 3,2, type : FBH**

issued for applicant  
**Semperflex Optimit, s. r. o.**  
Vitkovská 391/29, 742 35 Odry, Czech Republic  
NIP: CZ26425173

manufacturer by  
**Semperflex Optimit, s. r. o.**  
Vitkovská 391/29, 742 35 Odry, Czech Republic

conforms to requirements of the document:  
**SAE J1401:2003 - Road Vehicle-Hydraulic Brake, Hose Assemblies for Use With  
Nonpetroleum-Base Hydraulic Fluids.**

The Certificate has been issued on the basis of the following certification document:  
**Final Report No. 313500364/2011**

Institute for testing and certification, a. s., confirms that the product producer has  
created all the conditions needed to keep the product properties during the production  
process.

Approved and issued : 19/10/2011  
Valid until : 31/10/2014

  
RNDr. Radomír Čevelík  
general director

### SAE J1401

Assembled hose

100% pressure test by 20,7-24,8MPa/10-25sec		No leakage	OK
Constriction test /mm/		min.2,03	OK
Volumetric expansion test	69Bar	max.1,08cm <sup>3</sup> /m	0,5
	103Bar	max.1,38cm <sup>3</sup> /m	0,7
	200 Bar	max.2,00cm <sup>3</sup> /m	1,5
Burst pressure /Bar/ (276Bar/120 sec, then bursting)		min.700 (490 acc.SAE)	890
Brake fluid compatibility (120°C,72hours)	Constriction test /mm/	min.2,03	OK
	Burst pressure	276Bar/120sec+m B.P. min.345Bar	>600
Whip test (800RPM)		min.35 hours	>70
Tensile test (25mm/min) /N/		min. 1446	2200
Water absorption test 85°C/72h	Burst pressure /Bar/ (276Bar/120sec+mB.P. min.345Bar)	min.490Bar	750
	Tensile test (25mm/min)	min.1446N	2050
	Whip test (800RPM)	min.35 hours	>50
Salt spray test		no corrosion	-
Hot impulse test (11MPa/1min 150x, 146°C) + Burst pressure test		276Bar/120sec + min.345Bar	-



## **LPR PRODUCTS**

### **BRAKE DISCS AND BRAKE DRUMS**



**All LPR brake discs comply with the international certificates of safety.**

- ✓ 1618 Brake Discs
- ✓ 483 Brake Drums
- ✓ 94% Car parc coverage

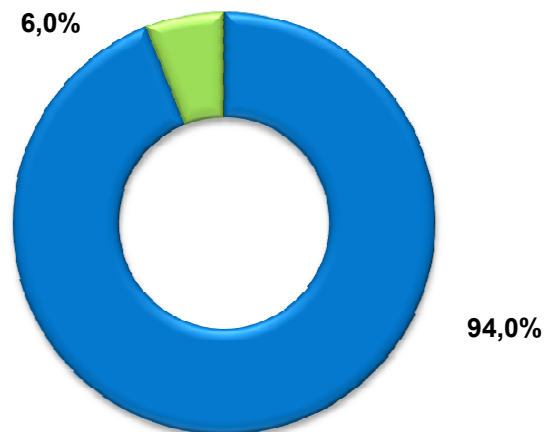


## PRODUCT DEVELOPMENT COVERAGE DISCS CATALOGUE

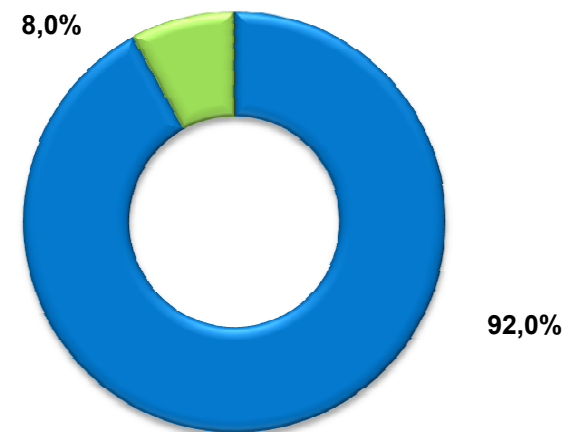
Lpr Discs catalogue contains over 1.300 disc references, plus further 300 references of coated discs for the main applications.

The coverage is 94% of the european car-parc and 92% of the asiatic/emea car-parc.

**Coverage EU Car-parc**



**Coverage Asiatic Car-parc**



# BRAKE DISC TESTS

Before being released, all products need to pass all the tests:



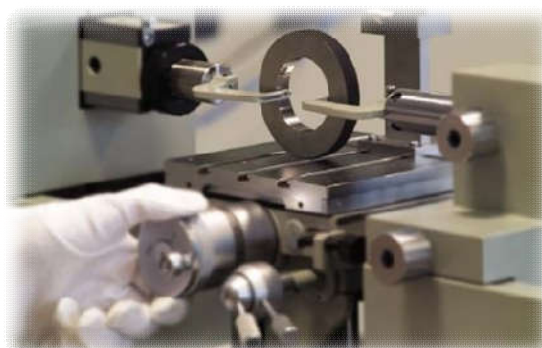
Balancing of ventilated brake discs



100% Quality Control



Dyno Bench

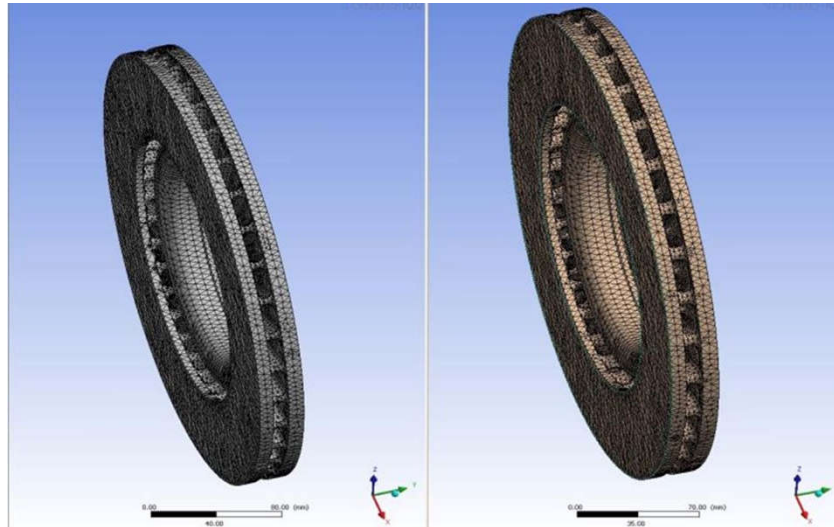


Laboratory Testing



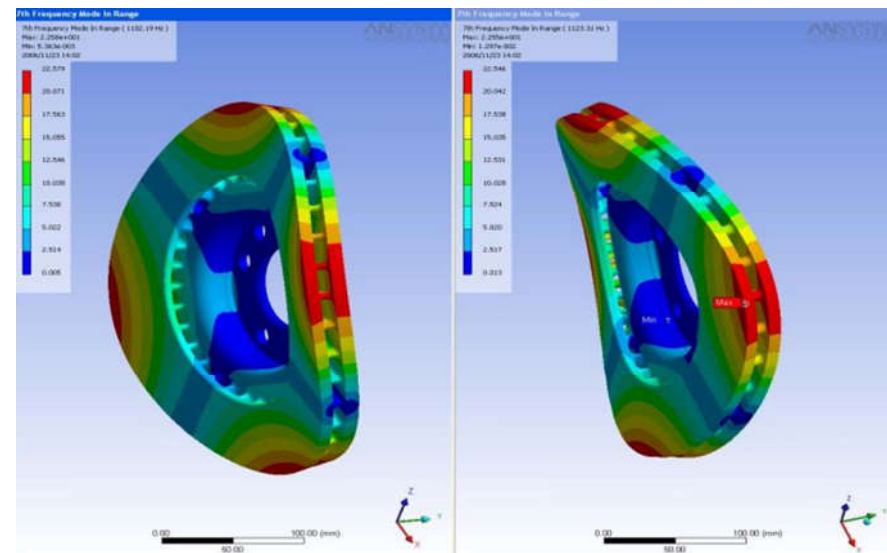


# BRAKE DISC RESEARCH & DEVELOPMENT

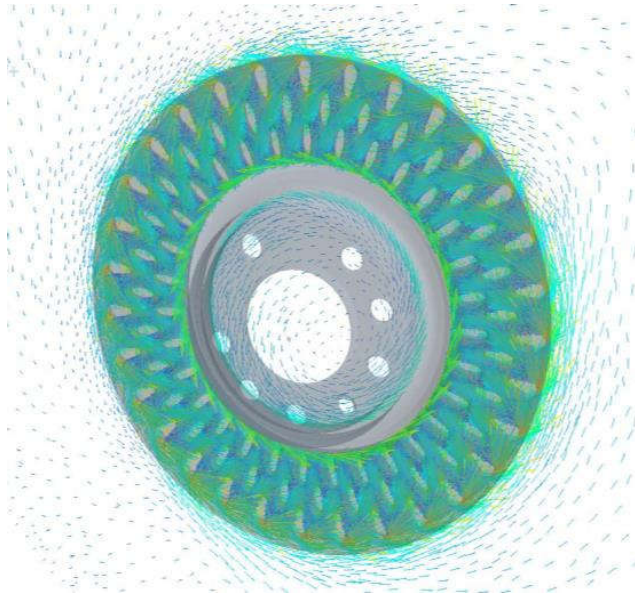


FEM

## MODEL ANALISYS

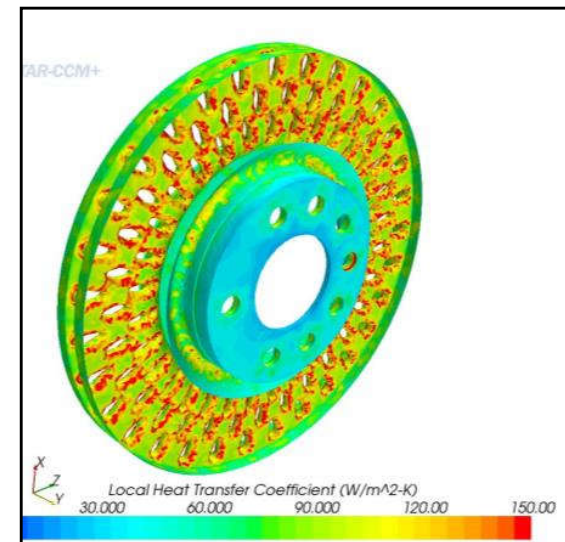
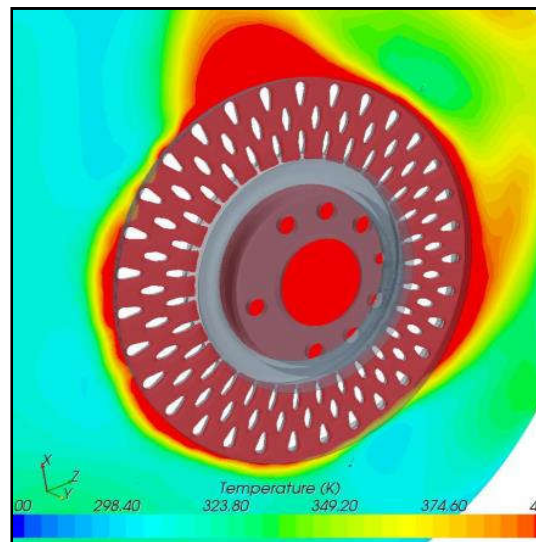


# BRAKE DISC RESEARCH & DEVELOPMENT



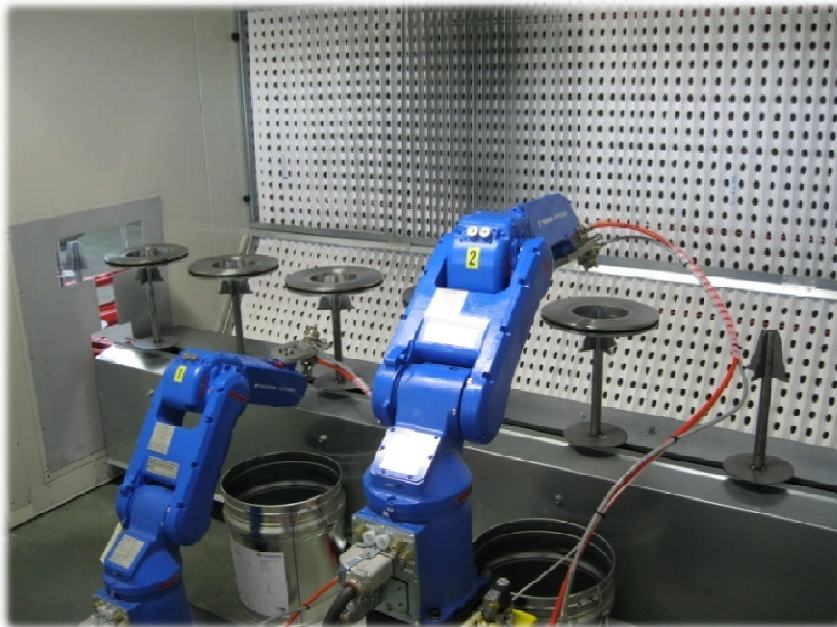
FLUID ANALYSIS

THERMAL SIMULATION



# LPR PRODUCTS

## BRAKE DISCS AND BRAKE DRUMS



- ✓ Alutherm
- ✓ Geomet (upon customer request)



## BRAKE DISC TESTS

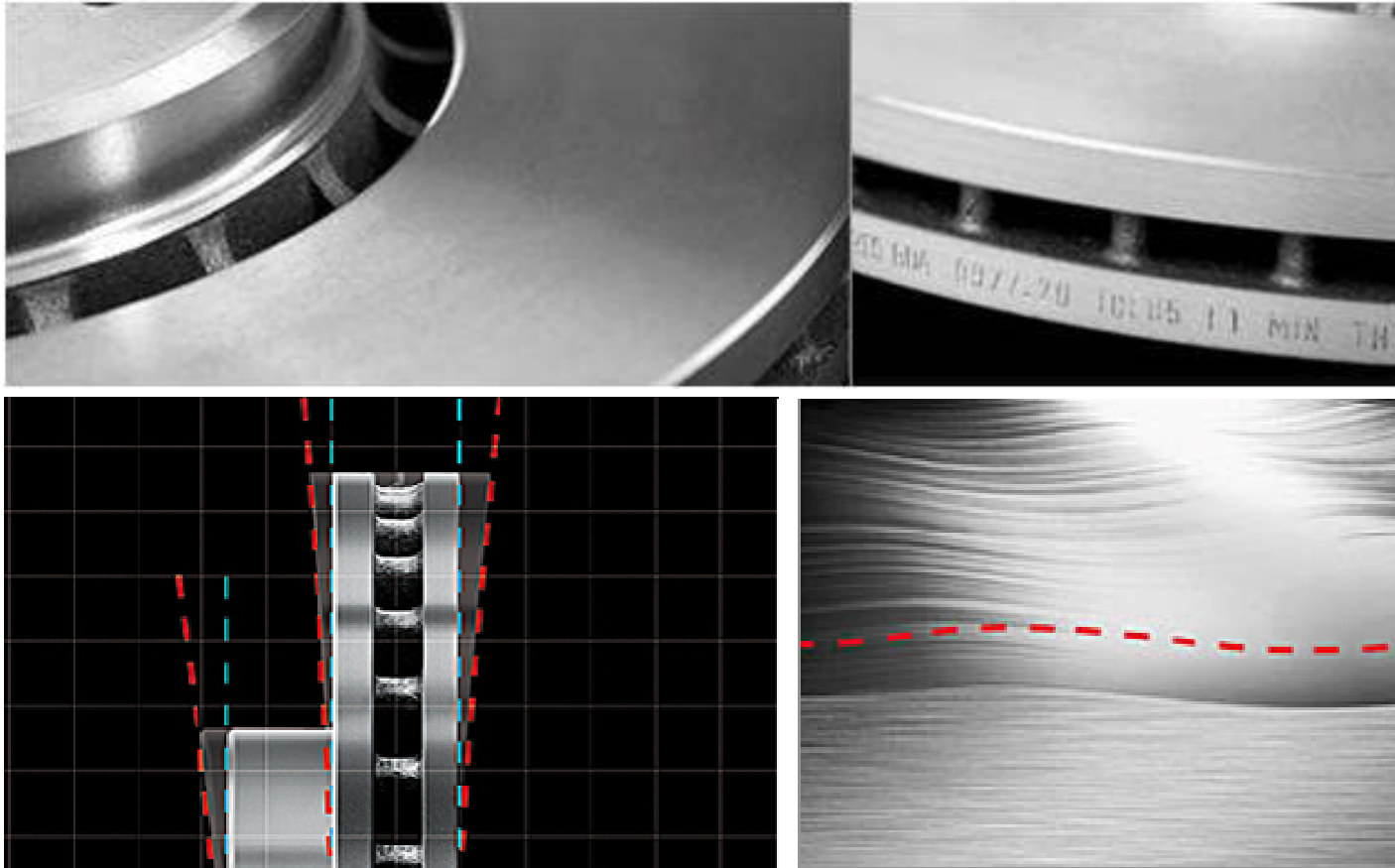


Dimensional and geometrical tolerances checks – run out - DTV





## BRAKE DISC PRODUCTION

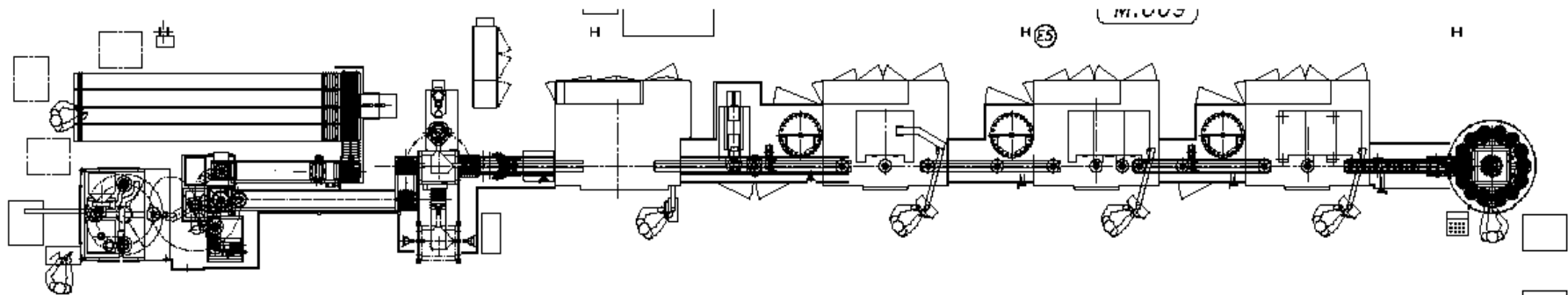


Surface finishing-marking-run out-DTV

# BRAKE DISC PRODUCTION



- turning steps machining
- drilling
- balancing
- marking
- painting
- 100% test by gauge



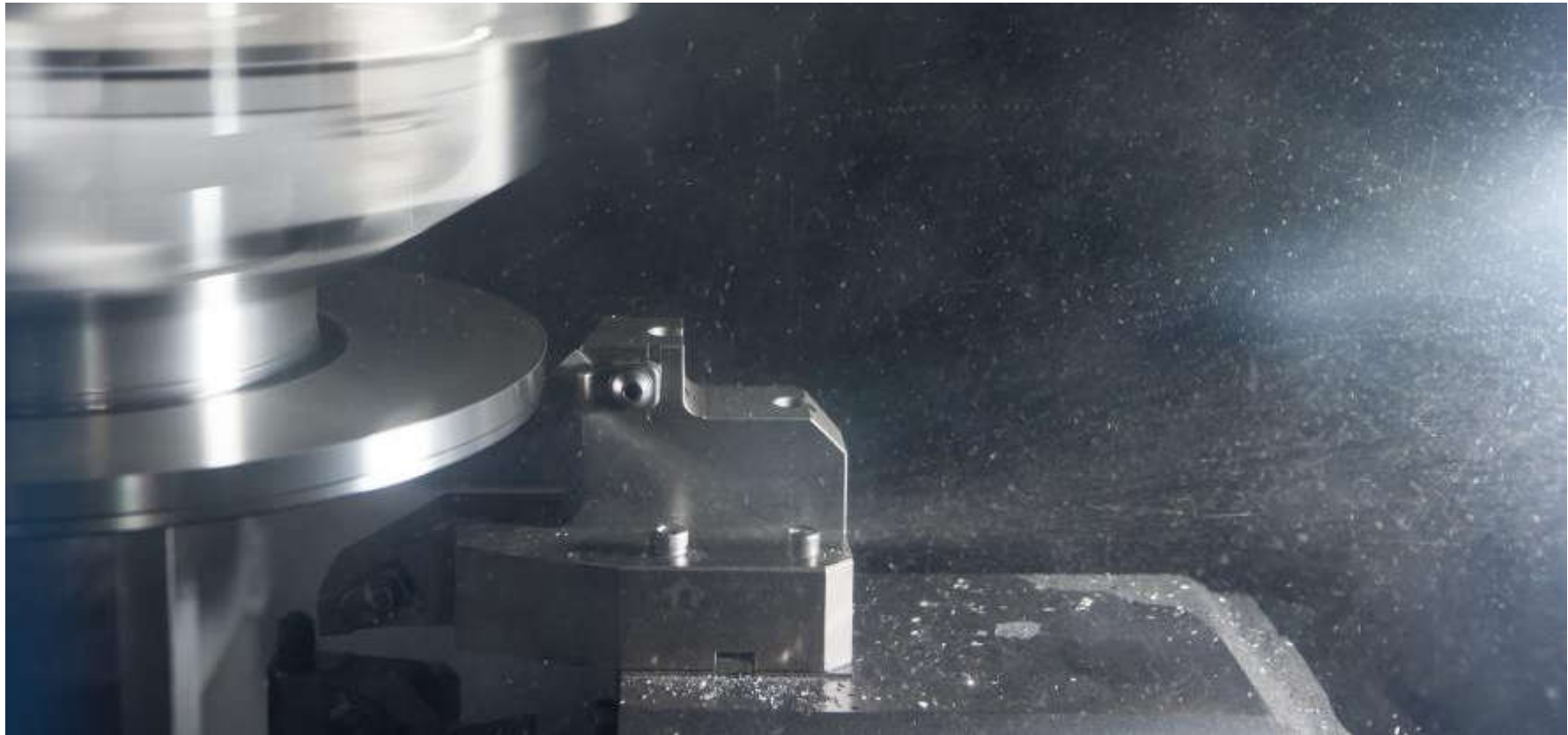
# BRAKE DISC PRODUCTION



CNC Machining



# BRAKE DISC PRODUCTION



Turning



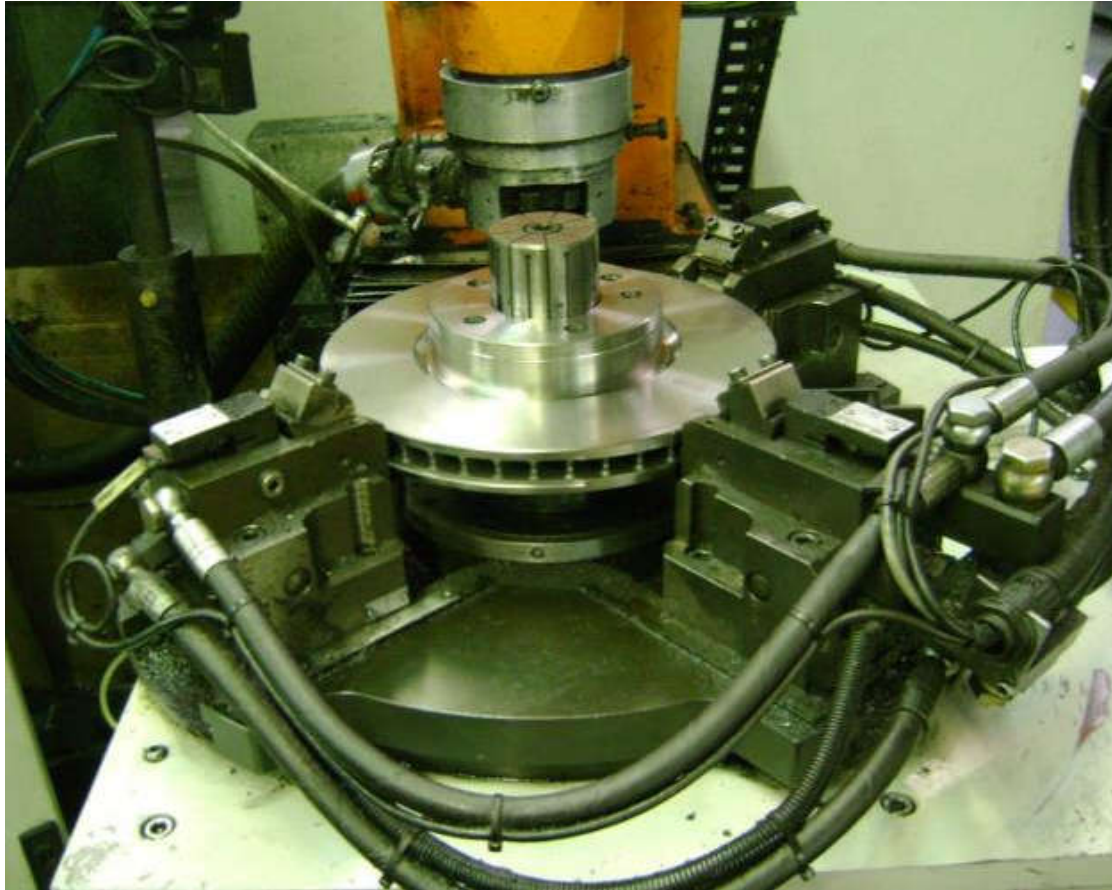
## BRAKE DISC PRODUCTION



Drilling



## BRAKE DISC PRODUCTION

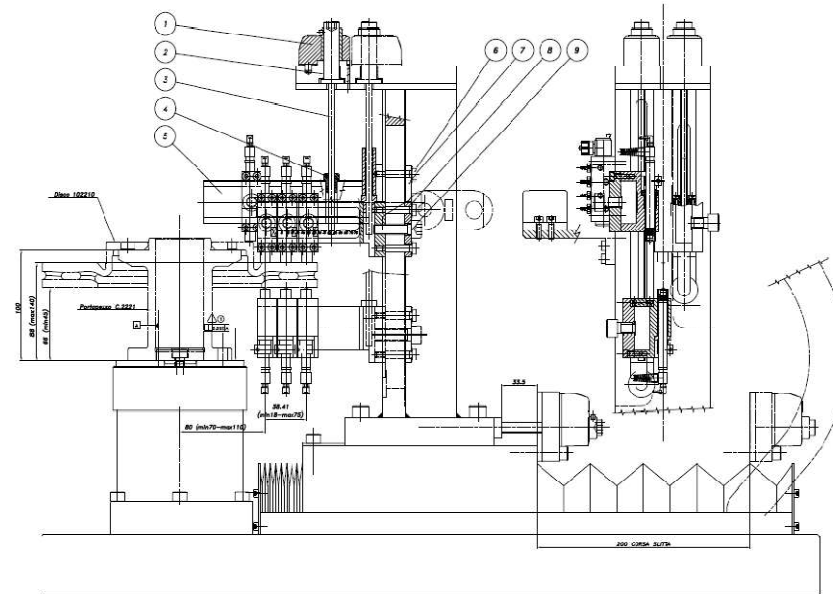


Balancing





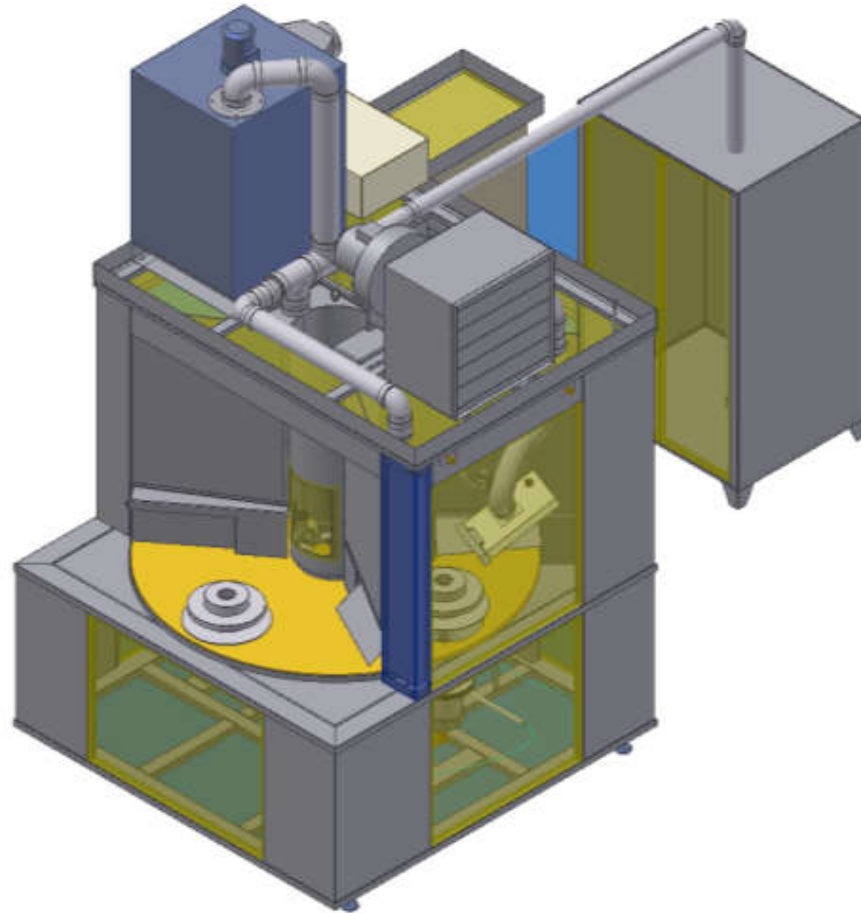
# BRAKE DISC PRODUCTION



Control Production – 100% on



# BRAKE DISC PRODUCTION



UV Coating



Alutherm® Coating





## LPR PRODUCTS

### BRAKE PADS



In 1996 LPR expanded its manufacturing base, with investment into friction technologies to provide customers with a range of friction products.

- ✓ 1727 Brake Pads
- ✓ 96% Car parc coverage



## LPR PRODUCTS

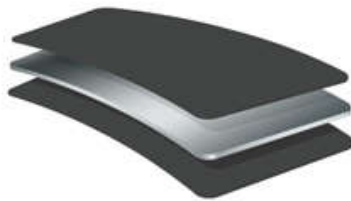
### BRAKE PADS SHIMS



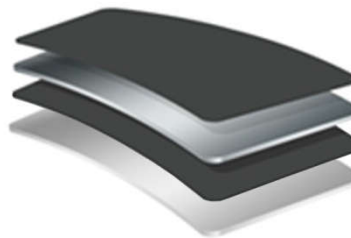
Since the beginning of 2012 LPR has been producing brake pads with multi-layer shims (Rubber-Steel-Rubber). This minimizes the noise and grant a better comfort. Anti-noise shims are produced in a high quality damping material to grant insulation, compressibility, and cold noise damping ability.

## LPR PRODUCTS

### BRAKE PADS SHIMS



**NBR**  
**STEEL**  
**NBR**



**RUBBER**  
**STEEL**  
**RUBBER**  
**ACRILYC ADHESIVE**



The backing plates can have different anti-noise systems:

- ✓ Rubber coating
- ✓ Metal shim: metal part made of harmonic iron.
- ✓ Multilayer shim: with lowering levels of rubber on both sides.

New generation articles with processes of positive molding and under-layer, high resistance to shear test, scorching and OES accessories version for most part of the production range, including the application of shims so as to improve the operational comfort of the final product.

# LPR PRODUCTS

## MAIN MATERIAL CONTROLS:

### OES:

- Test Krauss on every mix batch, for batch validation
- Density after molding
- Hardness after molding
- Shear test with specific requirements for each item defined in PPAP
- Bonding > 90%
- Dimensional control on critical dimensions, as defined in PPAP, in SPC (10 pcs)
- Defects Catalogue in agreement with Customer and defined in PPAP.
- Ping Test (hammer sound analysis for internal cracks checking)
- Paint thickness control ( $15 \div 40 \mu\text{m}$ )
- Cross-cut test (ISO 2409)
- Paint hardness (ISO 15184)
- Compressibility for each batch supplied

### MAIN MATERIAL CONTROLS:

#### AM:

- Test Krauss on every mix batch, for batch validation
- Density after molding
- Hardness after molding
- Shear test with same requirement for every items
- Bonding > 70%
- FEMFM Defects Catalogue for final visual check
- Paint thickness control ( $12 \div 50 \mu\text{m}$ )
- Dimensional control on maximal dimensions
- Compressibility one per year for each homologated item for CoP



# LPR PRODUCTS

## HOMOLOGATION ECE-R90

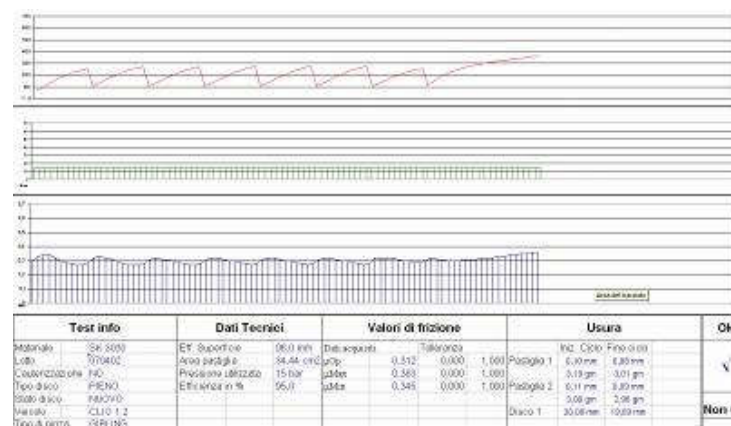
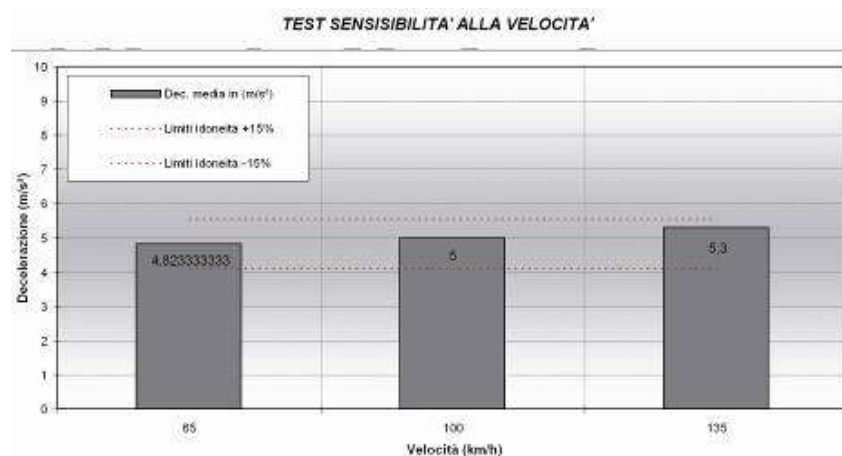
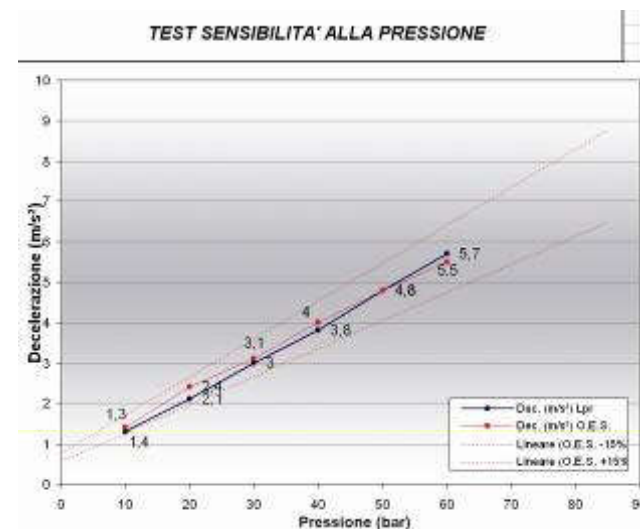
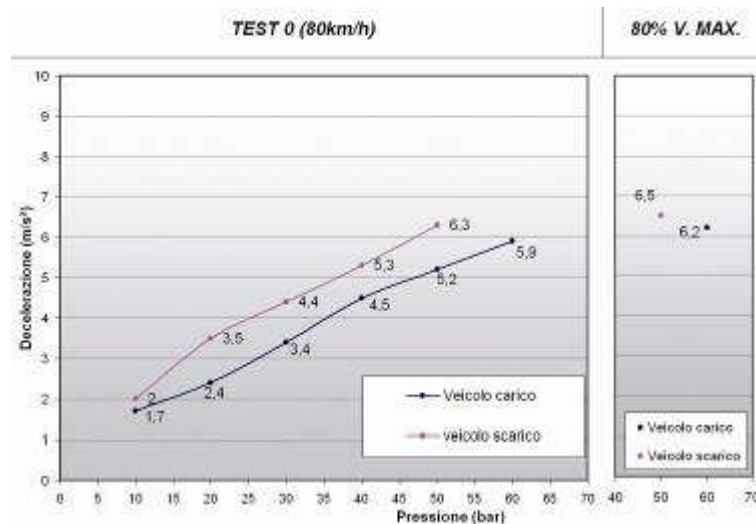


Tests for ECE-R90 homologation are carried out internally with TUV supervision



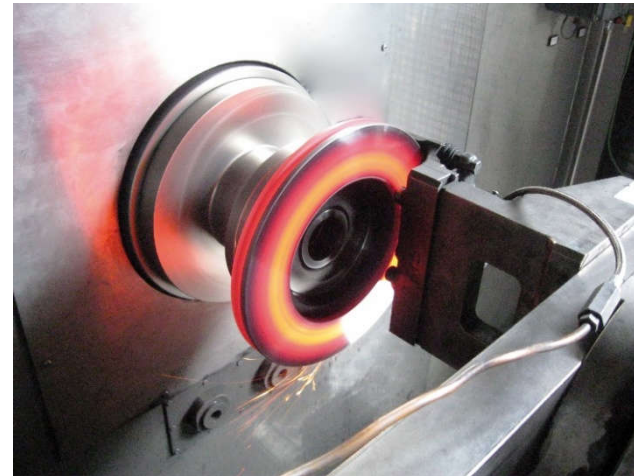
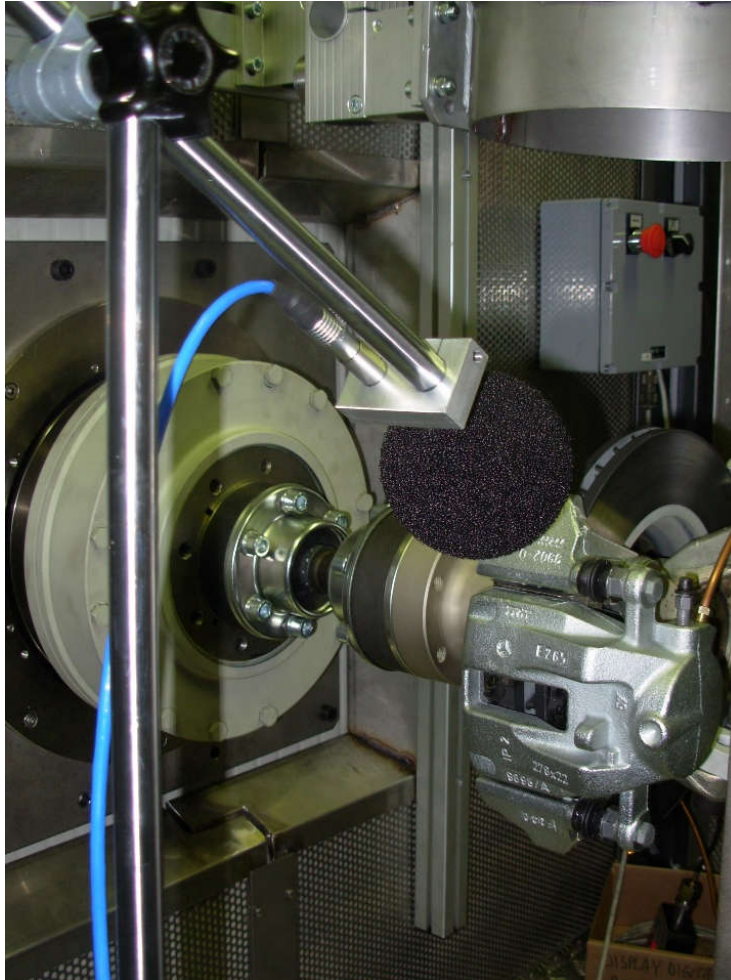
# LPR PRODUCTS

## HOMOLOGATION ECE-R90



# LPR PRODUCTS

## TEST: DYNAMOMETRIC BENCH





## BRAKE PADS PRODUCTION

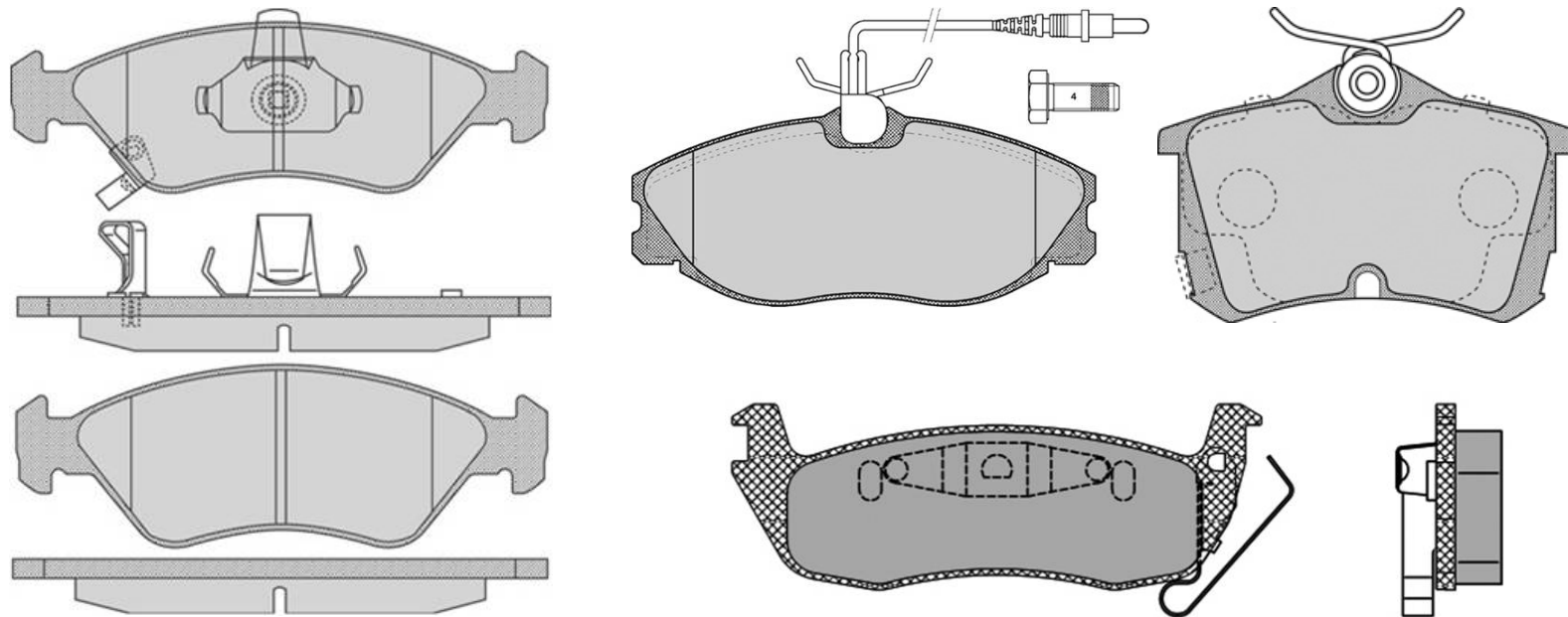


All the elements of the development and manufacturing process are 'in house' , in order to completely control the quality and the supply. This process starts with the formulation of the friction material and the stamping of the back plates right through to Krauss and Dynamometer testing and on vehicle proving, and inclusion into LPR's ECE R90 Program when necessary. Supply to OE brand customers started in 2002.



# FRICTIONS

## BRAKE PADS ACCESSORIES



1. Piston clips
2. Acoustic and electric wear indicators
3. Caliper slider shims
4. Chamfers to avoid noise
5. Slot to get rid of dust

The pictures show different springs. The type of spring depends on caliper design.

# FRICTIONS

## SANDBLASTING & ADHESIVE APPLICATION

Sandblasting



Coating



# FRICTIONS

## BRAKE PADS PRODUCTION (MOULDING)



Automatic Hot  
moulding (Gaudeni)



Leinweber automatic  
moulding



Cold Moulding





# FRICTIONS

## BRAKE PADS PRODUCTION (GRINDING)



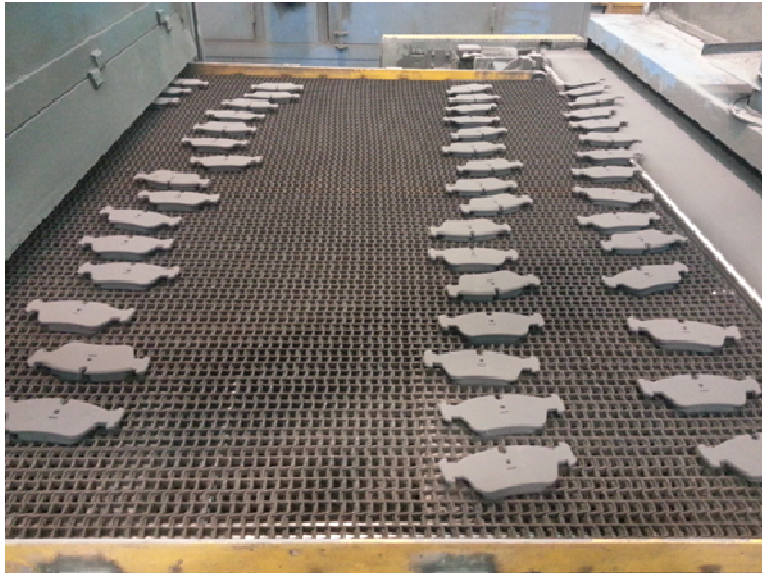
Specific for pads with chamfers





# FRICTIONS

## BRAKE PADS PRODUCTION (COATING & ACCESSORIES ASSEMBLY)



Coating

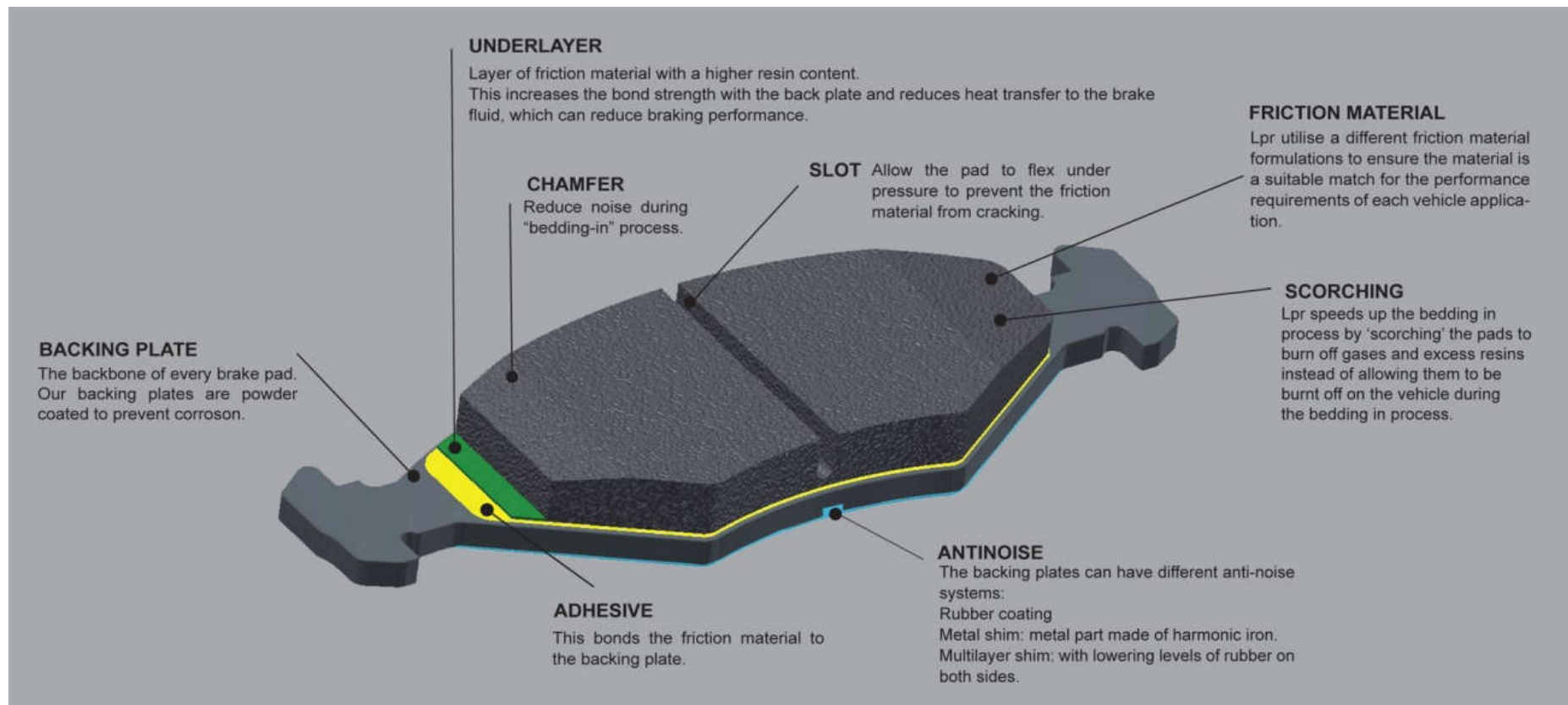


Accessories



# FRICTIONS

## BRAKE PADS PRODUCTION





## FRICTIONS

### BRAKE PADS MARKING & PACKAGING



Approval no.



Compound

Lpr ref

Batch code

## PACKAGING



**05P763**

Past.Freno ant/Frn. Brake Pads  
FIAT Stilo 1.2, 1.4, 1.6 16v  
Idea 1.2, 1.4, 1.4 16v, 1.3  
LANCIA Musa 1.3 MJ, 1.4  
(Adatt. WVA 23705/17.1)  
Made in Italy \* 4 PCS



07-02-14



**E11** 90R-01770/7211 SK3030

Boxes are sealed with  
a label as per ECE R90  
requirements



## LPR PRODUCTS

### BRAKE SHOES & EASY KIT

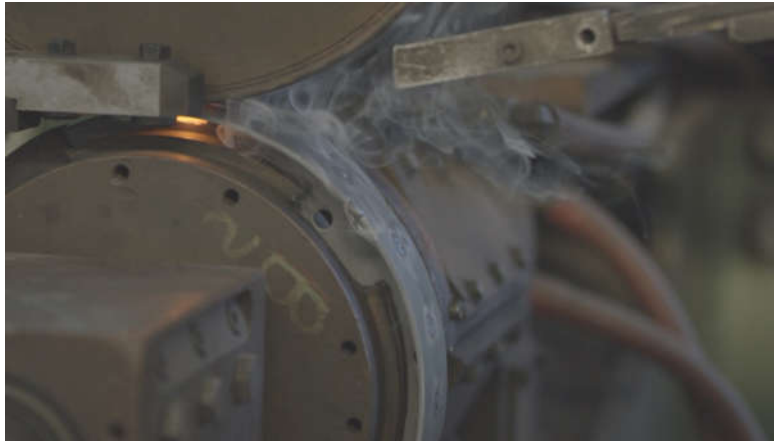


Thanks to a new commercial agreement LPR has become the new RENAULT OES supplier for preassembled brake shoe kits , brake shoes and brake wheel cylinders demonstrating again its products quality and reliability. RENAULT products are marked with LPR brand on brake wheel cylinders.

- ✓ 666 Brake Shoes
- ✓ 517 Not pre-assembled brake shoes kits
- ✓ 293 Pre-assembled brake shoes kits
- ✓ 95,5% Car parc coverage

# LPR PRODUCTS

## BRAKE SHOES



Brake shoes production



1



2



3



4

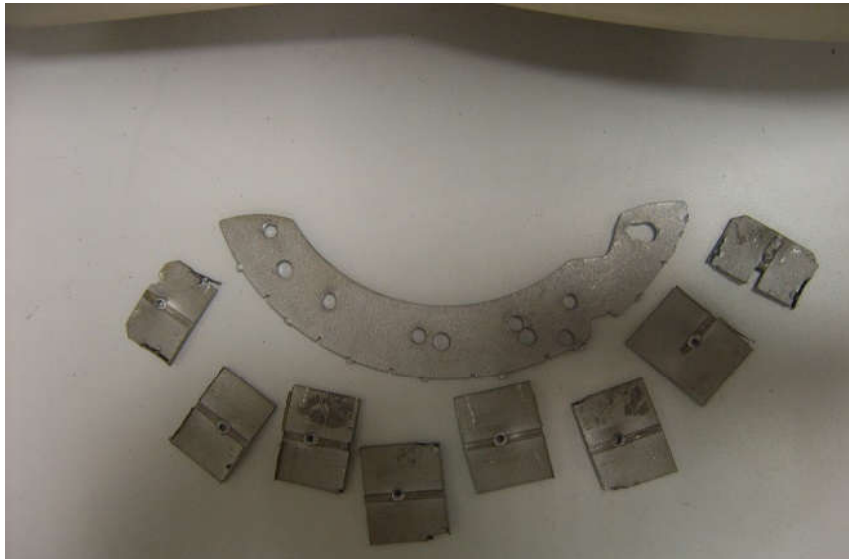


5

Brake shoes kits assembling

# LPR PRODUCTS

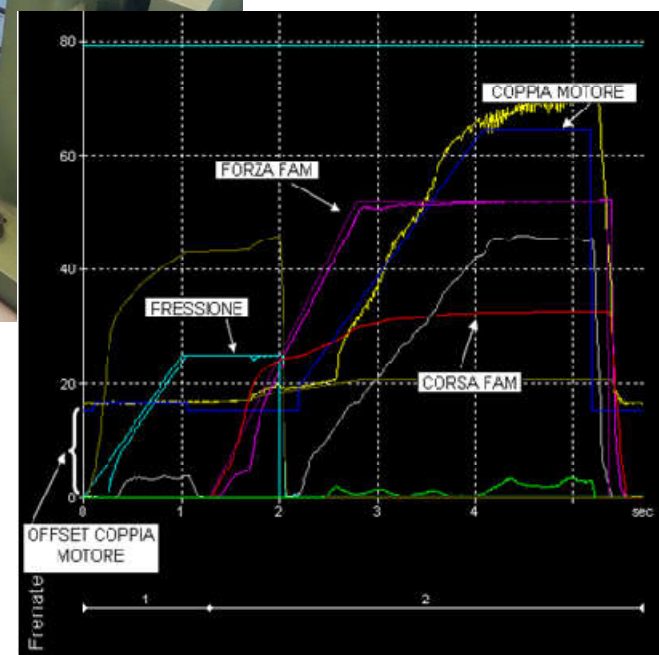
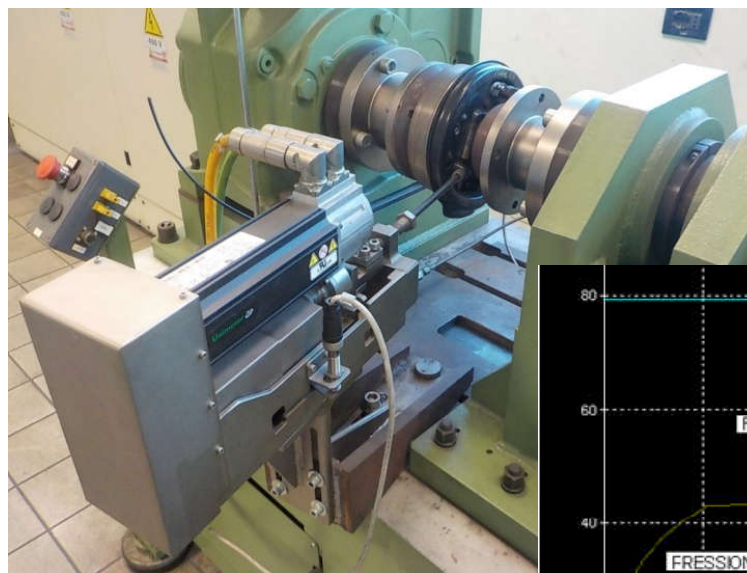
## WELDING POINTS VERIFICATION





# LPR PRODUCTS

## MECHANICAL FATIGUE TEST BENCH



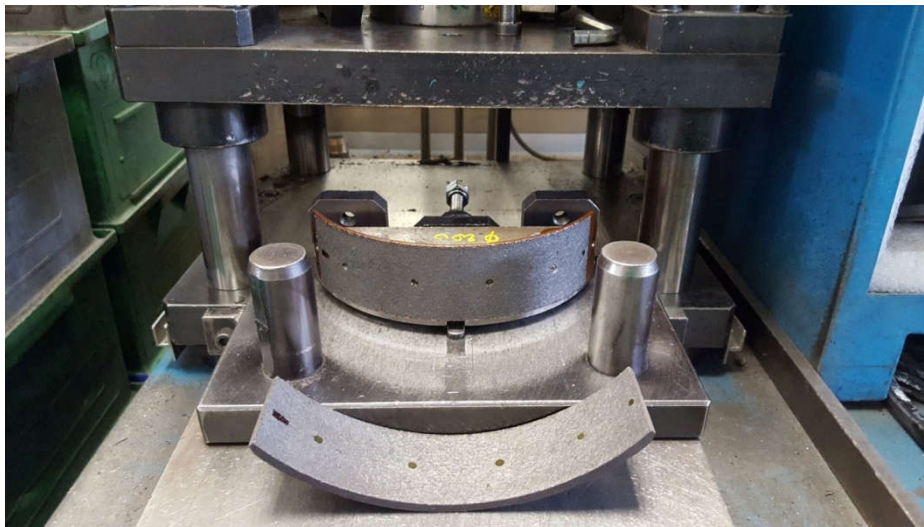
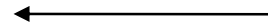


## LPR PRODUCTS

### BRAKE SHOES & EASY KIT



SHEAR STRENGTH AS PER OE  
REQUIREMENT



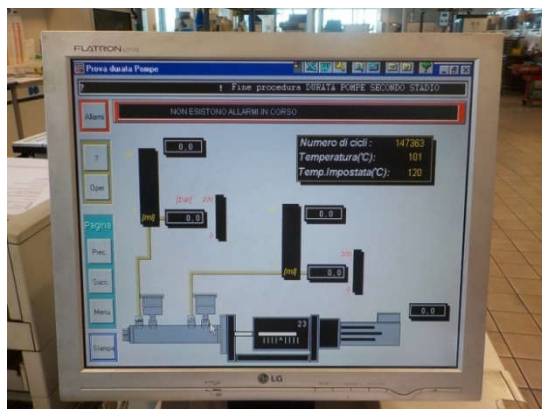
SHEAR STRENGTH AS PER AM  
REQUIREMENT





# LPR PRODUCTS

## CLIMATIC CHAMBERS



# LPR PRODUCTS

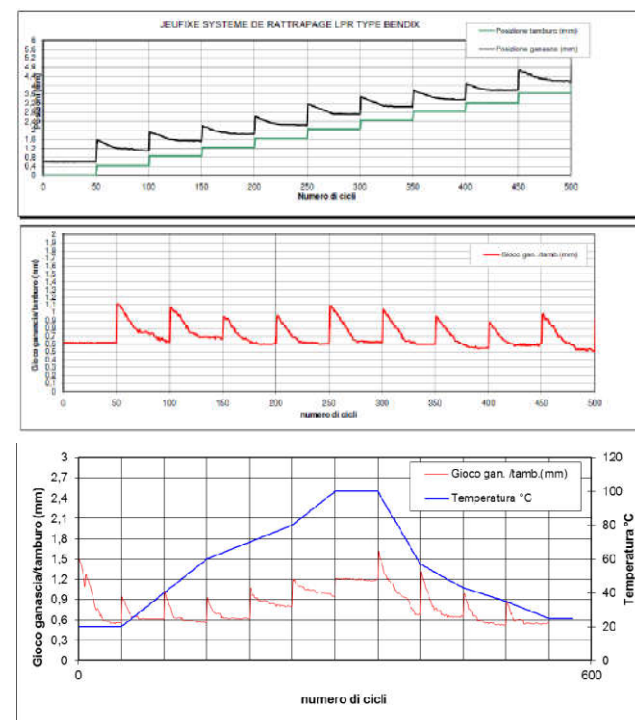
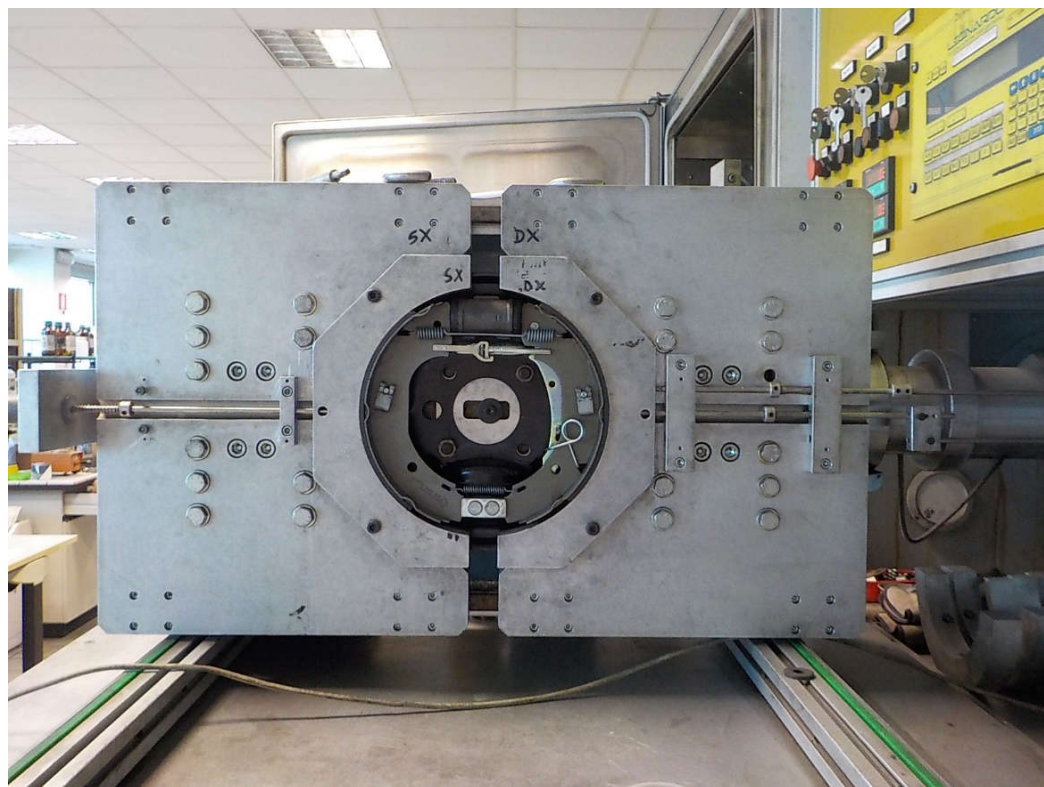
## SALT SPRAY CHAMBERS





# LPR PRODUCTS

## ADJUSTER CHARACTERIZATION



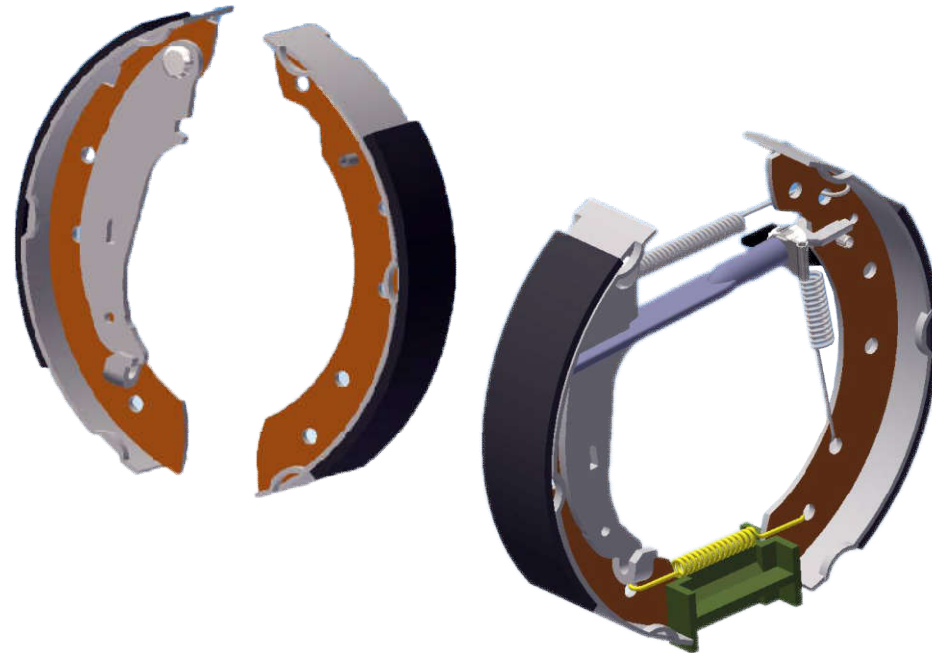
## LPR PRODUCTS

### BRAKE SHOES & KITS

**Range: 666 shoes and 293 kits**

**Coverage: 95,5% European car parc**

- ✓ Lpr brake shoes are ECE R90 approved where applicable
- ✓ The kit includes brake shoes, adjusting devices, wheel cylinders, grease, fitting instructions and cap and nut where applicable;
- ✓ The adjusting device fitted is the same as the OE
- ✓ All the components are manufactured in house
- ✓ It is 100% end of line tested
- ✓ Lining: flexible and rigid linings

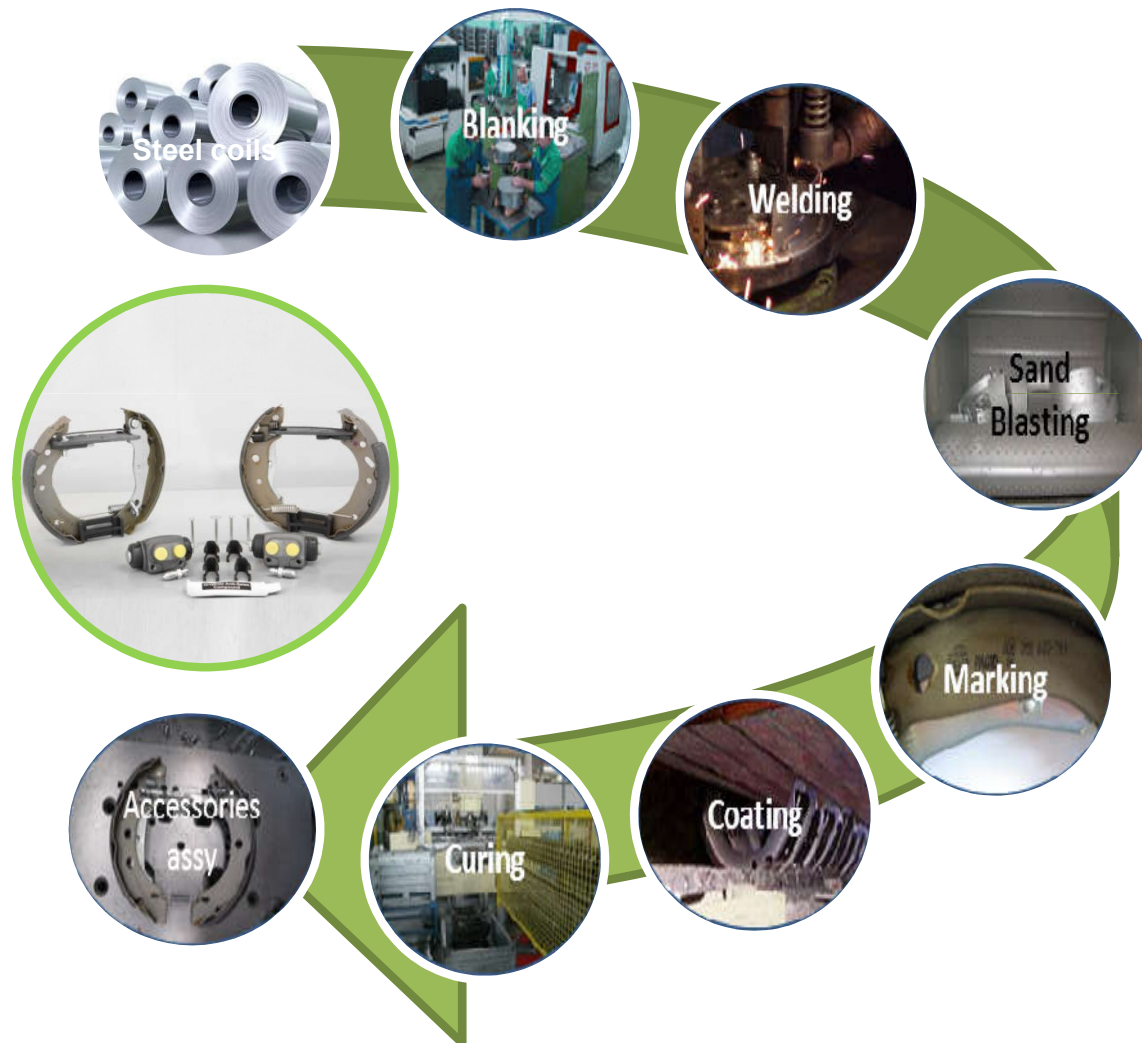


#### Benefits of pre-assembled kit

- ✓ You save up to 50% repair time
- ✓ You need to order one article only
- ✓ You avoid improper fitting
- ✓ You always use a new adjusting device

# LPR PRODUCTS

## BRAKE SHOES & KITS



- ➔ Blanking
- ➔ Welding
- ➔ Sandblasting
- ➔ Marking
- ➔ Coating
- ➔ Curing
- ➔ Accessories assembly



## LPR PRODUCTS

### RENAULT SUPPLIERS



Thanks to a new commercial agreement LPR has become the new RENAULT OES supplier for preassembled brake shoe kits, brake shoes and brake wheel cylinders demonstrating again its products quality and reliability. Renault products are marked with LPR brand on brake wheel cylinders.



# FRICITION

## R90 APPROVAL

All Lpr products are ECE R90 approved (where applicable)

Lpr approval authorities are VCA (E11), KBA (E1) and IDIADA (E9)

**VCA**  
VCA Headquarters  
1 The Langens (The Centre)  
Langens Road  
Bridges, ECU 100  
United Kingdom  
Data Request: +44 (0) 117 951 0101  
New Parts: +44 (0) 117 951 0102  
Email: [enquiries@vca.co.uk](mailto:enquiries@vca.co.uk)  
Web: [www.vca.co.uk](http://www.vca.co.uk)

**THE UNITED KINGDOM VEHICLE APPROVAL AUTHORITY**

**E11**

COMMUNICATION CONCERNING THE APPROVAL GRANTED OF A REPLACEMENT BRAKE LINING ASSEMBLY OR REPLACEMENT DRUM LINING PURSUANT TO ECE REGULATION NO. 90

Approval No: 08P-0175D 1212

1. Applicant's name and address:  
LPR S.r.l.  
Strada Pavesio 37  
20010 Agazzano Piacenza  
Italy

2. Manufacturer's name and address:  
LPR S.r.l.  
Strada Pavesio 37  
20010 Agazzano Piacenza  
Italy

3. Make and type of brake lining assembly: 08P 750

4. Make and type of brake lining

Type	Name of Brake	Make	Quality of Friction material
08P 750	08P 750 08P 750	LPR SAATCHI JCD	WOOD

Job Number: 08P000001

As executive agency of the Department for Transport

**21 May 09**

**Kraftfahrt-Bundesamt**  
Kraftfahrt-Bundesamt  
Kraftfahrt-Bundesamt  
Kraftfahrt-Bundesamt

**E1**

**MITTEILUNG**  
ausgegeben vom  
Kraftfahrt-Bundesamt

über die Genehmigung  
für eine Ersetzungsanordnung (ersetzt oder durch Ersatzanordnung  
ersetzt) nach der Regelung Nr. 90

**COMMUNICATION**  
issued by  
Kraftfahrt-Bundesamt

concerning approval granted  
replacement brake lining assembly or replacement drum brake lining  
pursuant to Regulation No. 90

Nummer der Genehmigung: 08P000001  
Approval No:

1. Name und Anschrift des Antragstellers  
Applicant's name and address:  
LPR S.r.l.  
Strada Pavesio 37  
20010 Agazzano Piacenza Italy

2. Name und Anschrift des Herstellers  
Manufacturer's name and address:  
LPR S.r.l.  
Strada Pavesio 37  
20010 Agazzano Piacenza Italy

3. Marke und Typ der Ersetzungsanordnung (ersetzt oder durch Ersatzanordnung  
ersetzt)  
Make and type of brake lining assembly (drum brake lining  
replaced)  
08P 750  
Ausführungsvarianten:  
08P 750, 08P 750, 08P 750

4. Marke und Typ des Ersetzungsbauteils  
Make and type of brake lining  
material

**IDIADA**  
IDIADA S.A.  
IDIADA S.A.  
IDIADA S.A.

**E9**

**Informe de Homologación**  
Informe de Homologación

1. Nombre y dirección del solicitante/  
Applicant's name and address:  
LPR S.r.l.  
Strada Pavesio 37  
20010 Agazzano Piacenza  
Italy

2. Nombre y dirección del fabricante/  
Manufacturer's name and address:  
LPR S.r.l.  
Strada Pavesio 37  
20010 Agazzano Piacenza  
Italy

3. Marca y tipo del producto de freno de disco o freno de tambor  
Make and type of brake lining assembly (drum brake lining  
replaced)  
08P 750

4. Marca y tipo del producto de freno de disco o freno de tambor  
Make and type of brake lining  
assembly (drum brake lining  
replaced)  
08P 750

5. Tipo de material de fricción  
Type of friction material  
WOOD

# FRICION

## R90 APPROVAL



CoP: Conformity of production is continuously secured through a testing process as per ECE R90 requirements.

- ✓ Friction coefficient (Krauss test)
- ✓ Hardness
- ✓ Shear strength
- ✓ Compressibility





# FRICTION TESTS



## DYNAMOMETRIC BENCH TEST

- ✓ Max inertia 200 Kmg<sup>2</sup>. The bench can test the braking systems of M1 N1 vehicles
- ✓ Max speed: 300 km/h
- ✓ Acquisition of 5 different temperature channels
- ✓ Possibility of performing tests at constant pressure, constant torque and constant deceleration (useful to check wear)
- ✓ Sophisticated and advanced software to check noise



## MECHANICAL FATIGUE BENCH

This bench allow us to study and we improved the hand brake function.

We can test the handbrake simulating different slopes (usually 20% or 30%)

# FRICION

## PERFORMANCE TESTS



- ✓ **AK Master**

It is the most important European Standard for the evaluation of friction material behaviour under different conditions of :

Pressure (pressure sensitivity)

Temperature (fade sections)

Speed (speed sensitivity)

- ✓ **AK Noise**

It is the most important European standard for the noise evaluation

- ✓ **PSTP1** – internal Lpr spec for performance evaluation

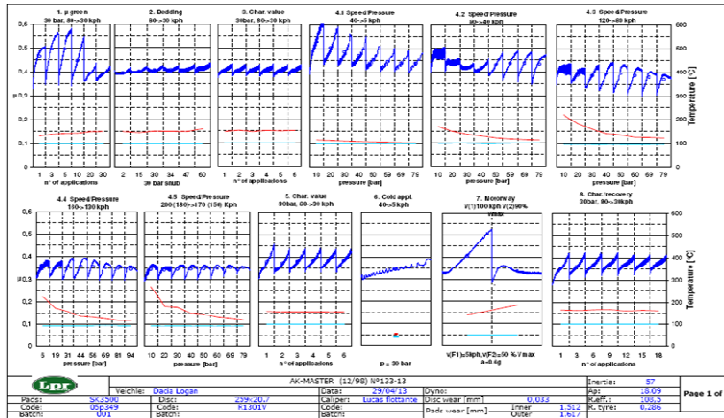
Same as AK Master, but at constant torque

- ✓ **PSTP3** – internal Lpr spec for wear evaluation

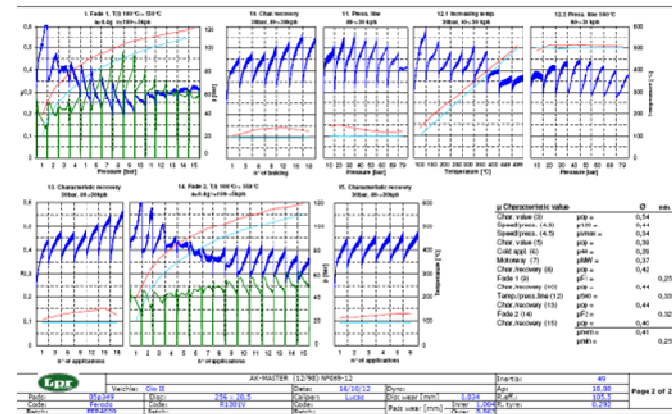
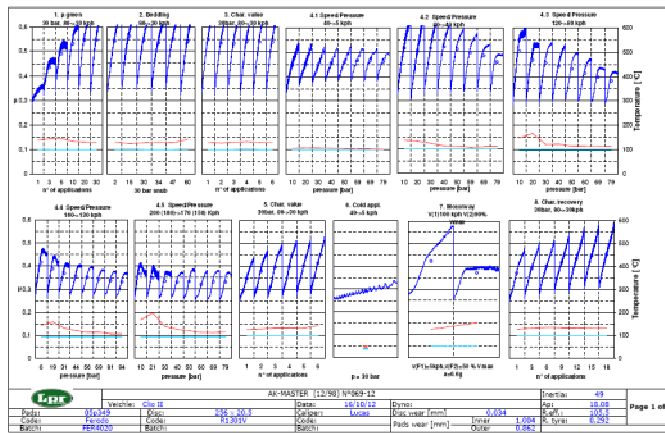
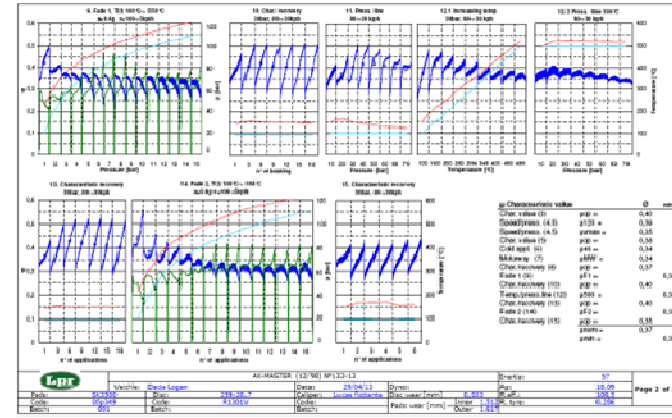
- ✓ **Road test** as per ECE R90 requirements



# FRICTION PERFORMANCE TESTS



SK3500 – AK MASTER



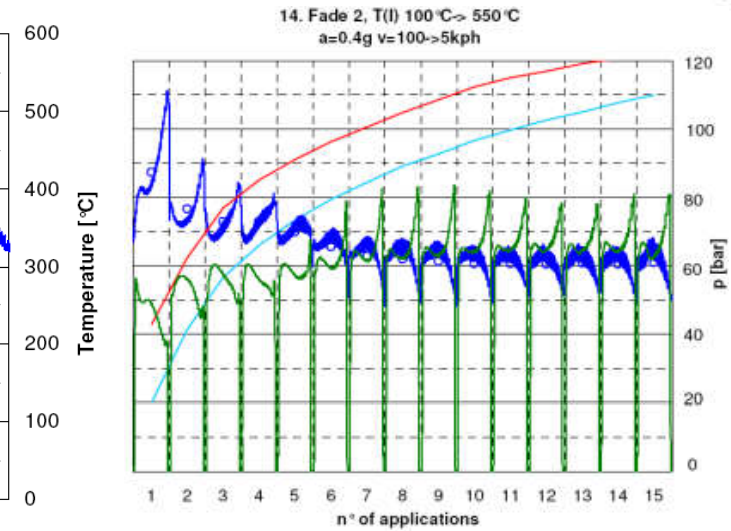
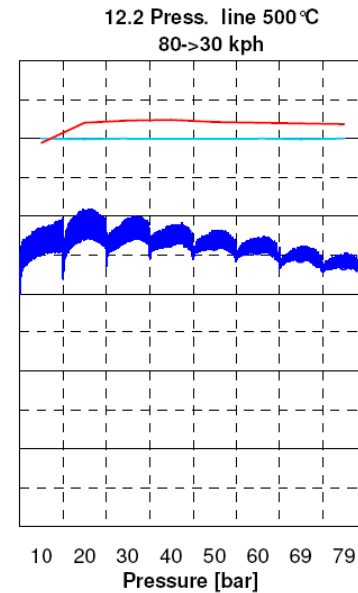
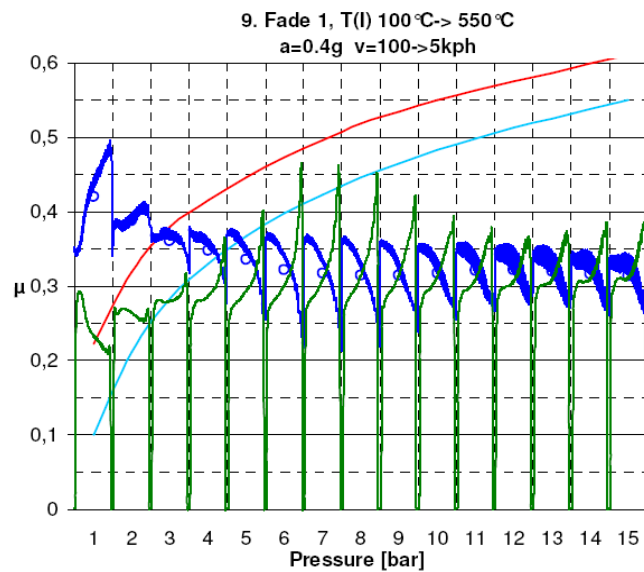
Premium – AK MASTER





88

# FRICTION PERFORMANCE TESTS



SK3500 – Hot Performances



# FRICION

## PERFORMANCE TESTS

Lpr vs Premium comparison of results

**SK3500**

	Ø	min.
$\mu_{op} =$	0,40	
$\mu_{120} =$	0,39	
$\mu_{vmax} =$	0,35	
$\mu_{op} =$	0,38	
$\mu_{40} =$	0,34	
$\mu_{MW} =$	0,34	
$\mu_{op} =$	0,37	
$\mu_{F1} =$		0,30
$\mu_{op} =$	0,40	
$\mu_{500} =$		0,34
$\mu_{op} =$	0,40	
$\mu_{F2} =$		0,31
$\mu_{op} =$	0,35	
$\mu_{nom} =$	0,37	
$\mu_{min} =$		0,30

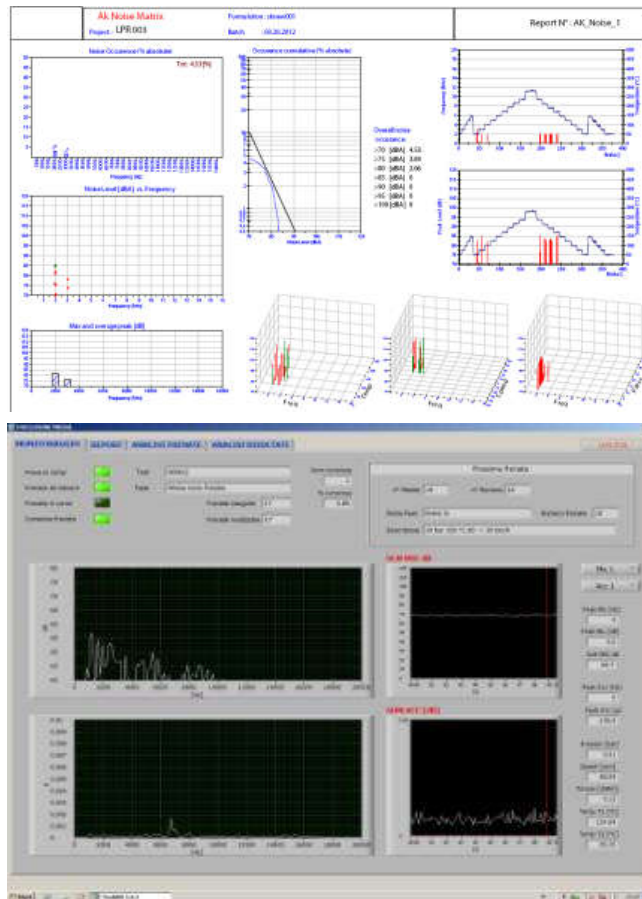
**Premium**

	Ø	min.
$\mu_{op} =$	0,54	
$\mu_{120} =$	0,44	
$\mu_{vmax} =$	0,34	
$\mu_{op} =$	0,39	
$\mu_{40} =$	0,29	
$\mu_{MW} =$	0,37	
$\mu_{op} =$	0,42	
$\mu_{F1} =$		0,25
$\mu_{op} =$	0,44	
$\mu_{500} =$		0,33
$\mu_{op} =$	0,44	
$\mu_{F2} =$		0,32
$\mu_{op} =$	0,40	
$\mu_{nom} =$	0,41	
$\mu_{min} =$		0,25

# FRICTION

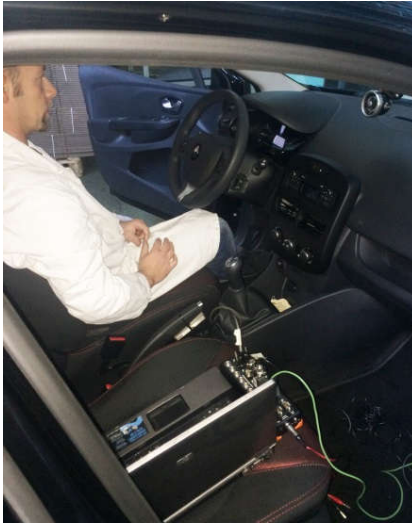
## PERFORMANCE & COMFORT

Dynamometric bench has been recently improved with Noise Acquisition System





## FRICTION ROAD TESTS



ECE R90 approval is made  
inside our own plant upon  
TUV authorization.



# LPR PRODUCTS

## DRIVESHAFTS

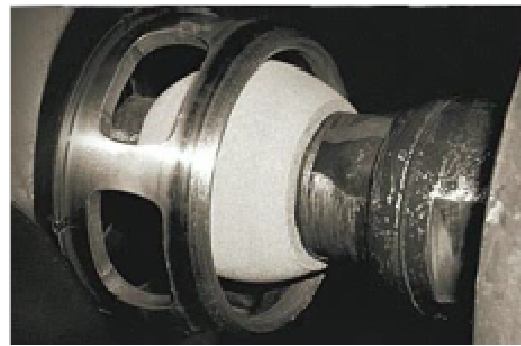


A range of:

- ✓ 648 C.V. Joints
- ✓ 1245 Driveshafts
- ✓ 97% Car parc coverage

# C.V. JOINTS & DRIVESHAFTS

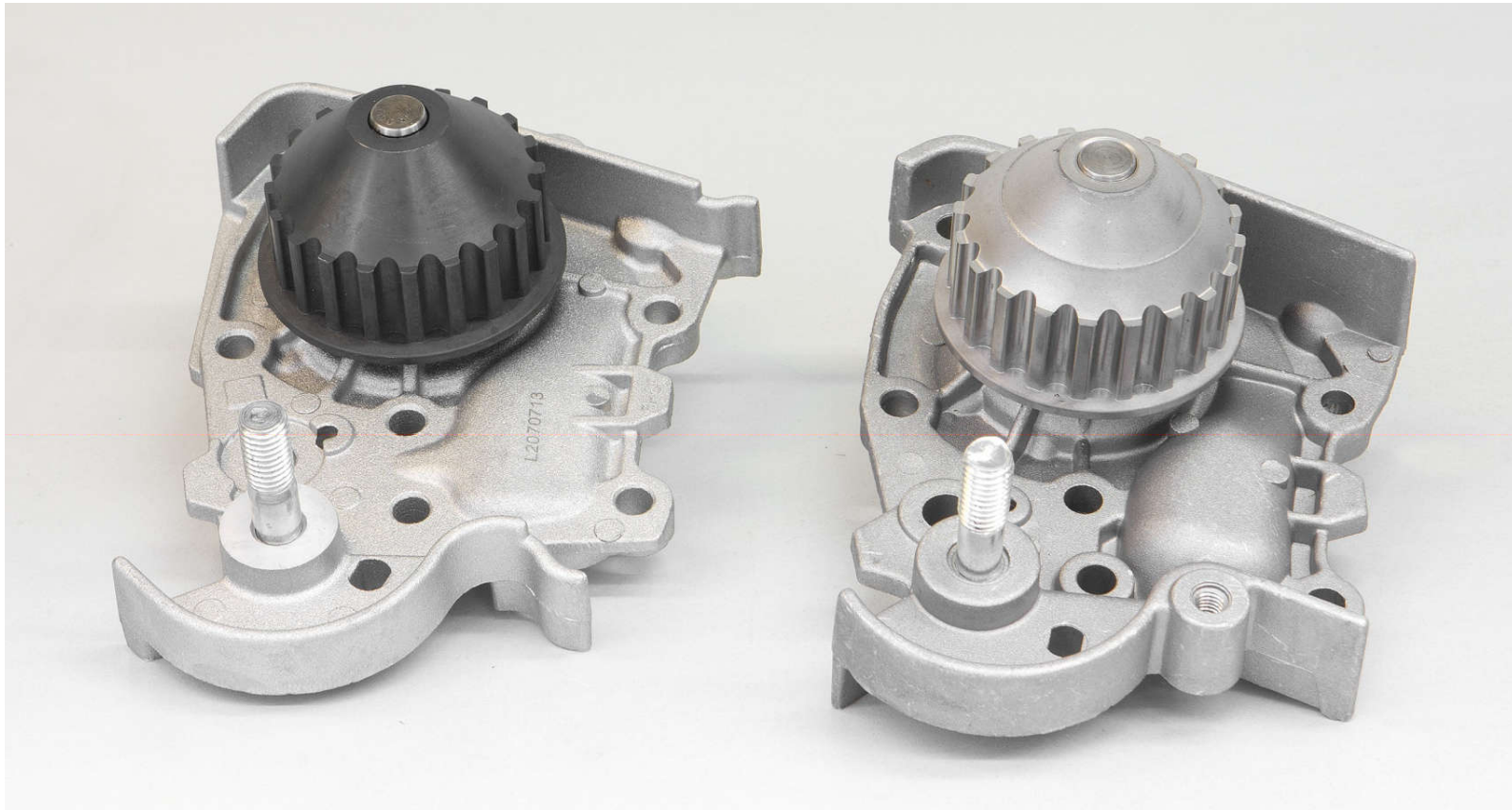
## PRODUCTION





# LPR PRODUCTS

## WATER PUMPS



A range of:

- ✓ 706 Water Pumps
- ✓ 89% Car parc coverage





# LPR PRODUCTS

## WATER PUMPS



# LPR PRODUCTS

## WATER PUMPS



Production



Assembly



Laboratory Test



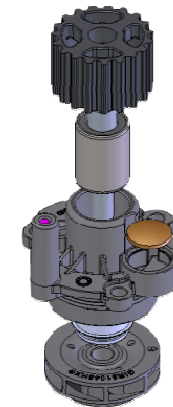
# LPR PRODUCTS

## DESIGN

Without the customer drawings, the design of an *aftermarket* product follows the form, fit & function principle.

Through the *reverse engineering* of the original sample, we build the tridimensional model of the pump: in this way, we guarantee dimensional equivalency and interchangeability. Performance equivalency is verified by comparison of the characteristic curves, detected on the test bench in our laboratory, and by all the tests forecasted by Fiat Auto specifications (9.02320/01).

The different phases of the product and process design, from the feasibility analysis up to the final validation, are planned and monitored through the APQP, periodically reviewed by the multidisciplinary team with respect to the activities proceeding and timing.





# LPR PRODUCTS

## PRODUCT VALIDATION

At the end of the design planning, product validation is carried out according to Fiat Auto specifications (9.02320/01).

Static leak test at room temperature

- Static leak test at -20°C
- Dynamic leak test at 90°C
- Performance test at room temperature
- Performance test at 90°C



- Life test
- Check of impeller-hub adhesion
- Thermal cycles
- Forced thermal aging





## LPR PRODUCTS

### MACHINING

n. 2 CNC working centers CHIRON FZ18W

- 4 controlled axis (x,y,z + rotating table)
- automatic pallet change
- productivity up to 100 pcs/h

n. 1 CNC working center TRAUB TVC350P

- 3 controlled axis
- automatic pallet change

n. 2 CNC vertical turning machines DOOSAN PUMA V400

- 2 controlled axis
- auto centering diameter up to 300 mm
- productivity up to 100 pcs/h

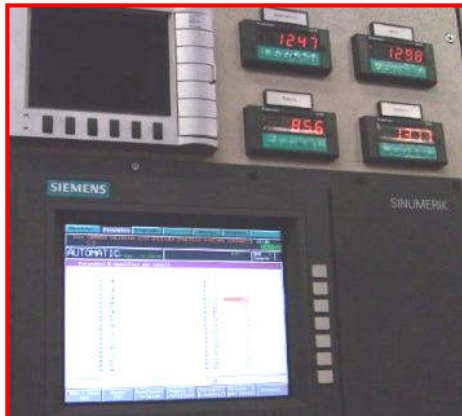


# LPR PRODUCTS

## ASSEMBLY

n. 1 semi-automatic assembly machine

- 2 presses with controlled axis for fitting bearing/mechanical seal and flange/impeller
- automatic control of the fitting load of bearing, mechanical seal, flange and impeller
- productivity up to **100 pcs/h**



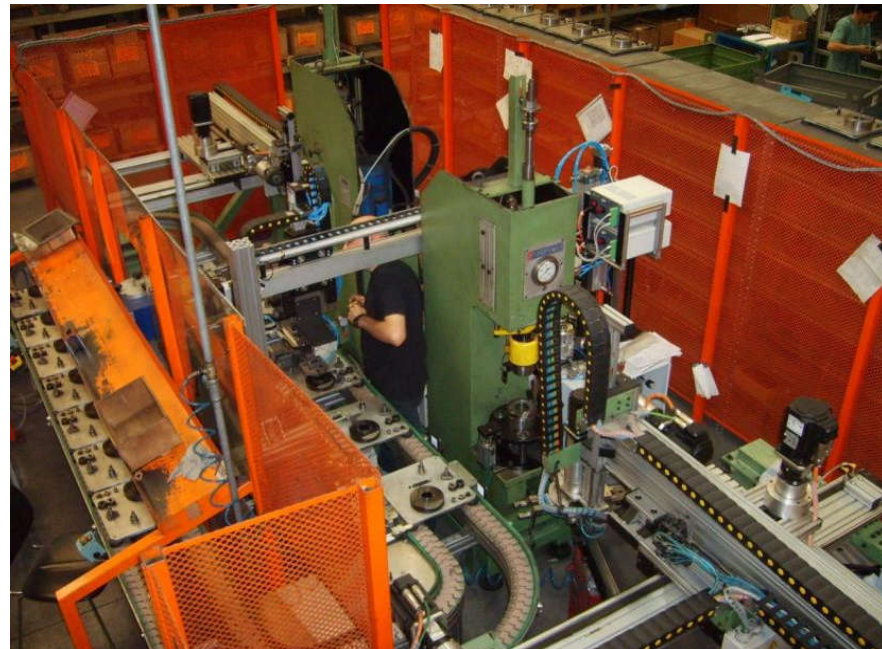
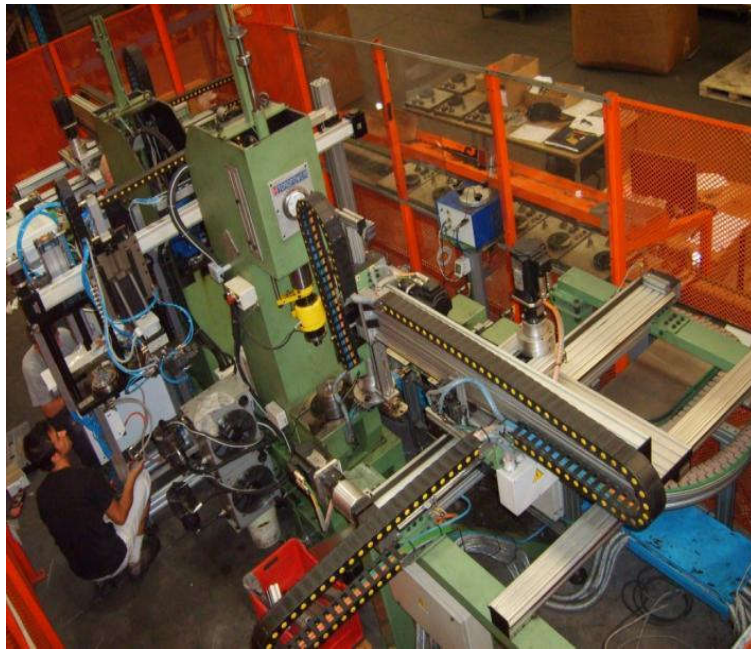


# LPR PRODUCTS

## ASSEMBLY

n. 1 automatic assembly machine

- 2 presses with controlled axis for fitting bearing/mechanical seal and flange/impeller
- in-line static leak test with automatic scrap of discrepant parts
- automatic control of the fitting load of bearing, mechanical seal, flange and impeller
- productivity up to **200 pcs/h**





# LPR PRODUCTS

## LEAK TEST



After assembly pumps are 100% leak-tested with a special machine for testing the absence of leaks.

An automated control will detect discrepant parts and automatically lock them in station to prevent further processing; test success is shown by a green spot on the body pump.



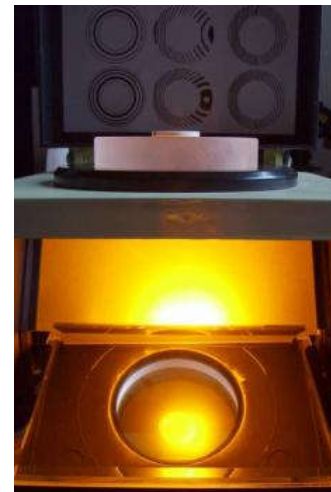
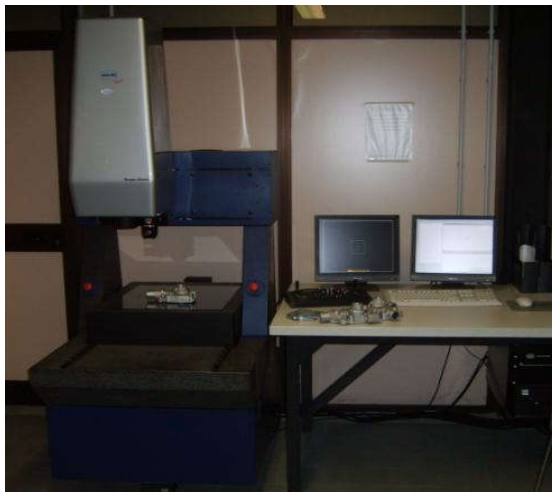


# LPR PRODUCTS

## METROLOGY LAB

### MEASUREMENT CAPABILITY OF THE LABORATORY:

- 3D coordinates measuring machine WERTH SCOPE-CHECK
- Roundness, concentricity, radial runout
- Hardness Rockwell A, B, C
- Roughness
- Coating thickness
- Vibrations (integral shaft bearings)
- Flatness of lapped surfaces
- Precision balance





# LPR PRODUCTS

## CALIPERS, PULLEYS AND BELT TENSIONERS



A range of:

- ✓ 1485 Brake Calipers
- ✓ 515 Pulley & Belt Tensioners
- ✓ 97% Car parc coverage

# LPR PRODUCTS

## BRAKE CALIPERS RECONDITIONING

All duly checked throughout the whole production process, in order to have a safe and high quality product.



Before regeneration



After regeneration





# LPR PRODUCTS

## CALIPERS

Washing machine



- Total dis-assemble of old cores
- Total degrease with our washing machine

# CALIPERS

## RECONDITIONING



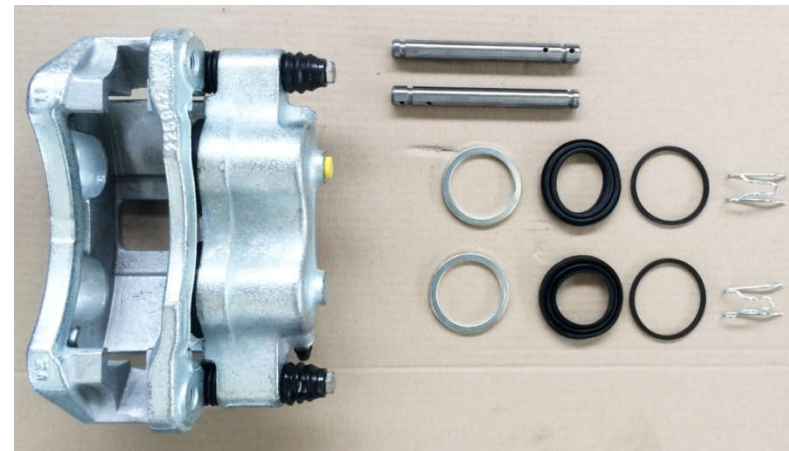
Sandblasting



Zinc plating



Replacement of all rubber components



Refurbishment with all the accessories required included

# CALIPERS TEST

All the brake calipers reconditioned are tested at 100%

## Pressure test:



OK



KO

## TRACEABILITY CODE



After testing, calipers are marked with month and year as traceability code (batch number) and guarantee only one recondition process for each old cores.

## OTHER TESTS:

- Residual torque absorption verification
- Complete sliding pressure of the caliper
- Burst test
- Salt spray





# LPR PRODUCTS

## CONTROL CABLES AND WEAR INDICATOR



A range of:

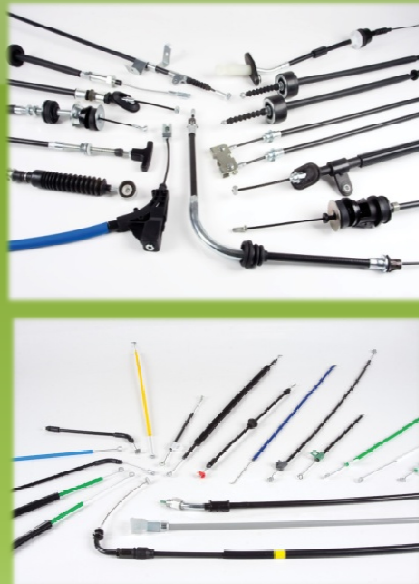
- ✓ 255 Brake Pads Wear Indicator
- ✓ 2599 Brake, Clutch and Accelerator Cables
- ✓ 97% Car parc coverage

# LPR PRODUCTS

## CONTROL CABLES TODAY:

### After Market Division

- Brake Cables
- Clutch Cables
- Speedometer Cables
- Bonet Cables
- 
- Private label
- Delivery time guarantee
- More them 4.000 items



### OEM Division

- Bowden
- Brake cables
- Push-Pull cables
- Gear control cables
- Levers
- Complete system
- 
- Co Engineering
- Zero PPM
- 
- Cars & Trucks application
- Motorcycle
- Tractors





## LPR PRODUCTS

### CONTROL CABLES OE DIVISION

**DENSO**

DENSO THERMAL SYSTEMS S.p.A.





# LPR PRODUCTS

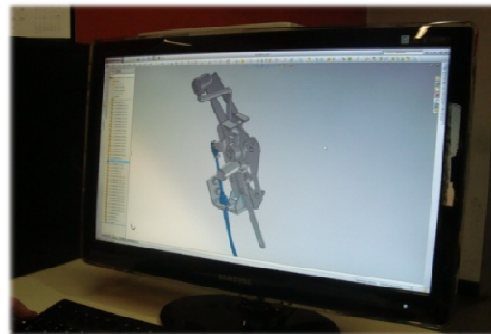
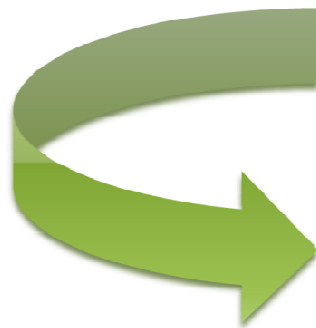
## ENGINEERING SUPPORT

### After Market Division

- New to range every 6 months
- Support for warranty troubles
- Supply drawings

### OEM Division

- Co Engineering
- Reverse Engineering
- Quality support
- Time test & report
- 3D projects





## LPR PRODUCTS CONTROL CABLES



- 12.000 covered square mts
- Time test room
- Warehouse
- Automation lines



# LPR PRODUCTS

## PRODUCTS

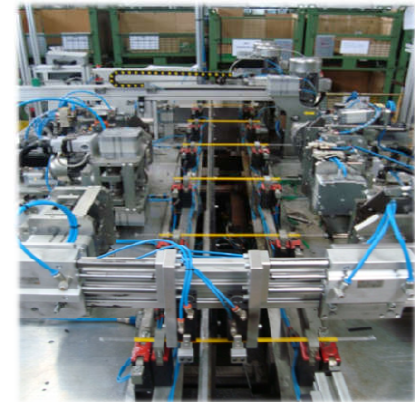
- The production of a quality cable starts from two basics components:



**WIRE**

A diagram consisting of two blue rounded rectangular boxes, one labeled "WIRE" and one labeled "SHEATH". Two blue arrows originate from a single point above the space between the two boxes and point downwards to the top center of each box.

**SHEATH**





# LPR PRODUCTS

## BENCH TEST

- Each item is tested by comparison with the correspondent OEM
- A special bench is used for testing: it surveys both the traction load on the lever and the load on the wheel
- The ratio has never to be lower than Oem values.



# LPR PRODUCTS

## TEST



- VOLUMETRIC EXPANSION TEST
- SALT SPRAY

- TENSILE TEST



- COLD BEND TEST



Test start



TT Set 1 start

- OZONE TEST



# LPR CUSTOMERS

## O.E.M AND AFTERMARKET



### OEM/OES Clients

FERRARI

FIAT

MASERATI

PIAGGIO

OM-IVECO

RENAULT

IRAN KODRO

LADA



### AFTERMARKET CLIENTS:

HONEYWELL BENDIX

MOTRIO

AFFINIA GROUP

FEDERAL MOGUL

FEBI

BENDIX USA

FORD-MOTORCRAFT

ATR GROUP

BREMBO

MIDAS

NORAUTO

GM

PSA PEUGEOT CITROEN

DELPHI LOCKHEED

ADI

PAGID

BOSCH

FERODO

MINTEX

TEXTAR

RENAULT MOTRIO

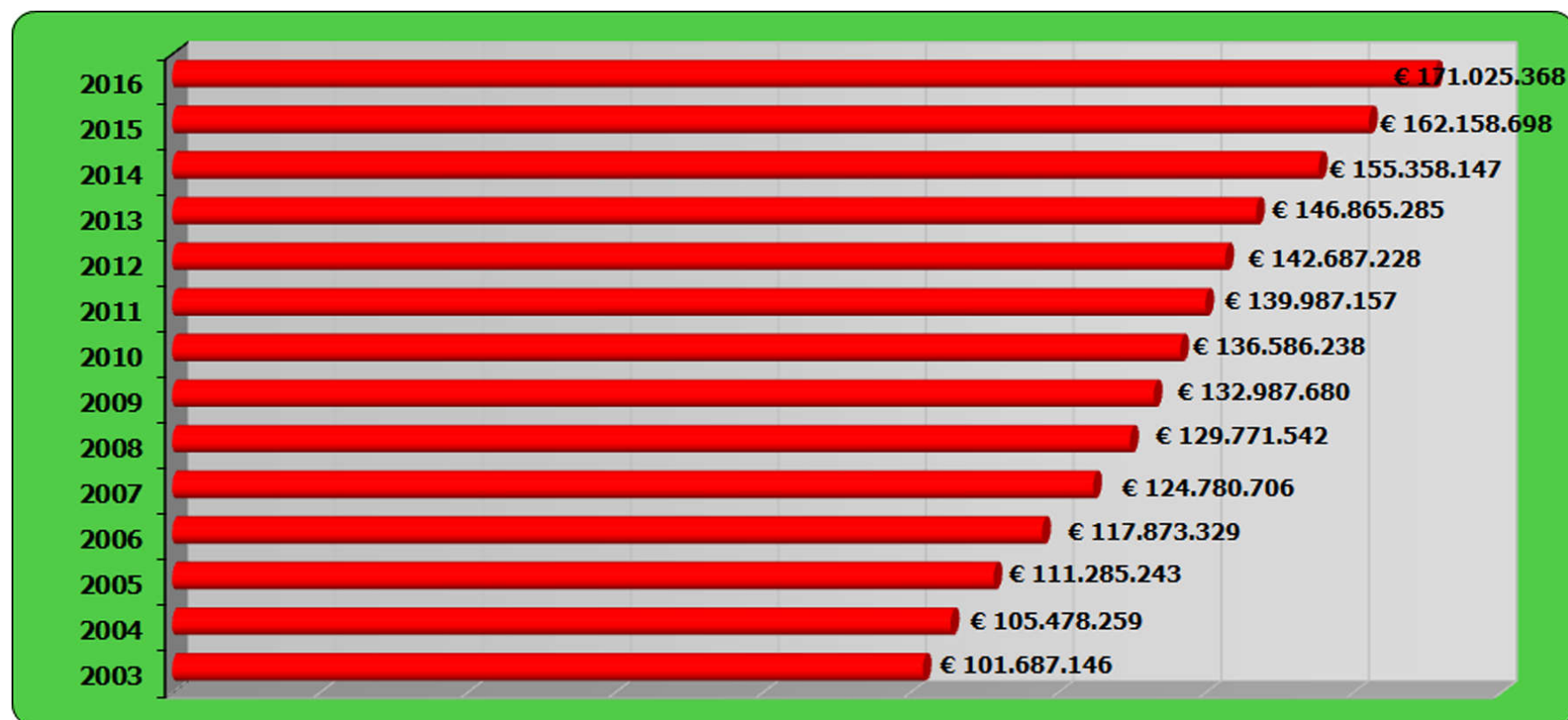
MAGNETI MARELLI

ZF



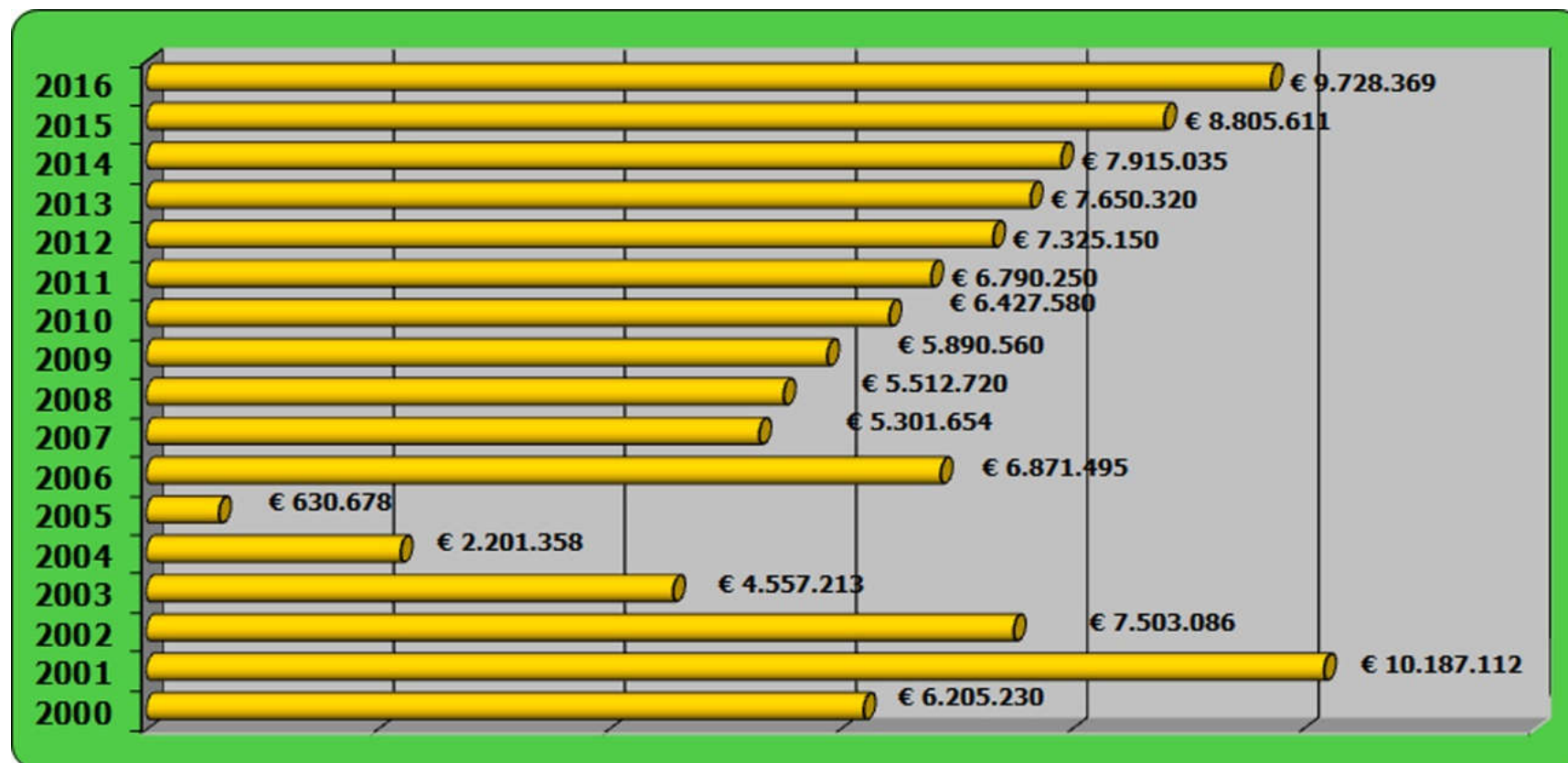


# TURNOVER GROWTH



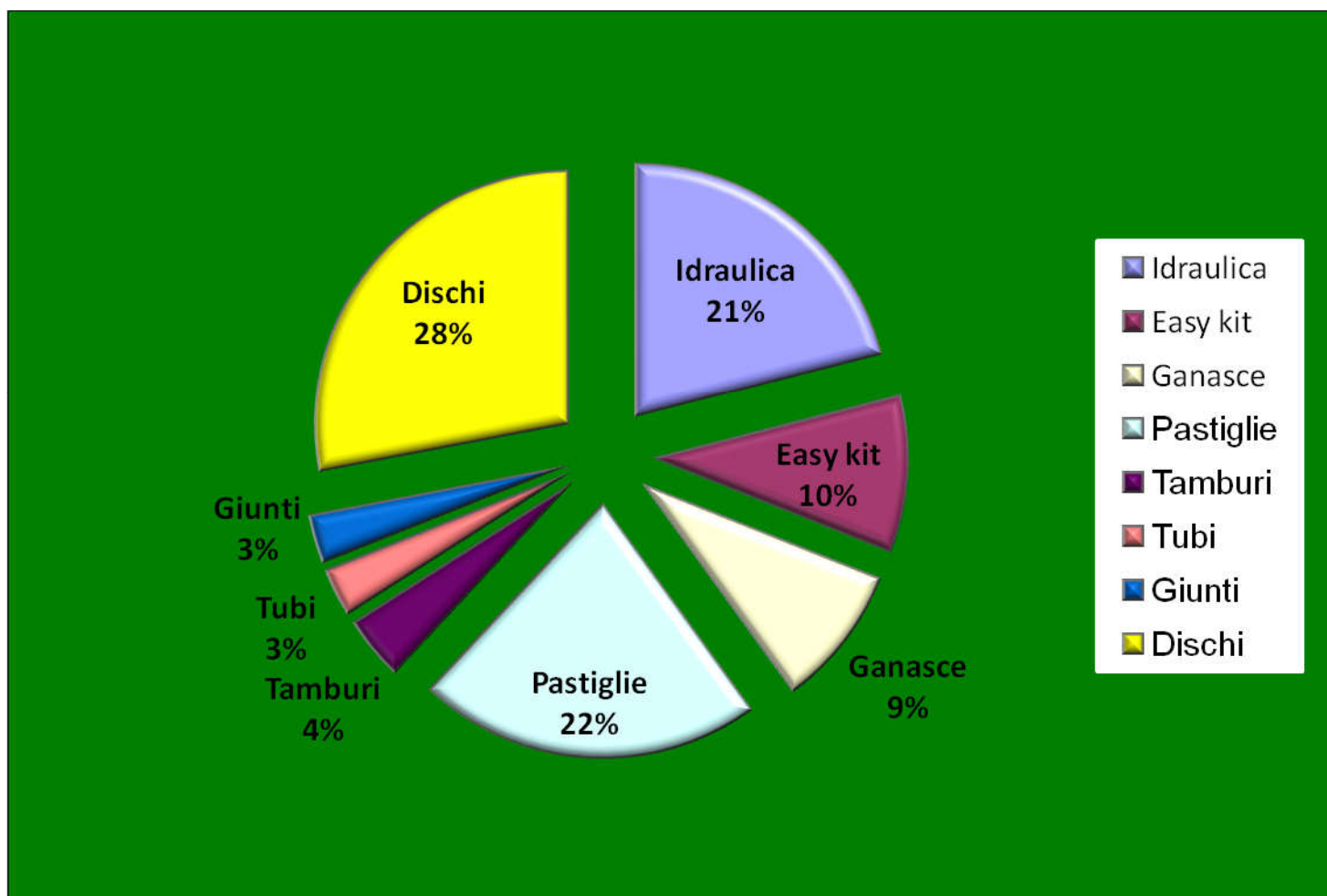
# INVESTMENTS

## INNOVATION AND QUALITY



# INVESTMENTS

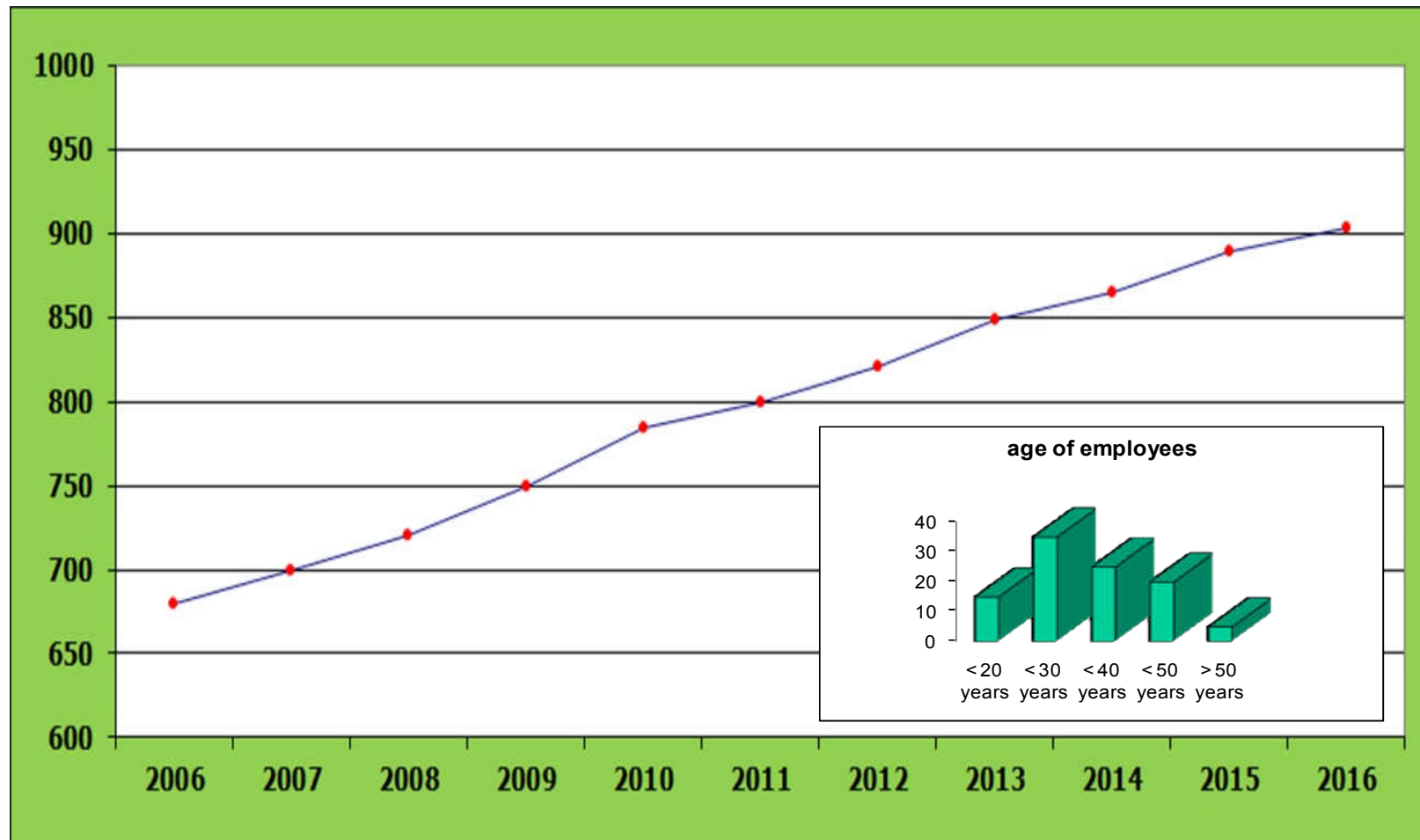
## INNOVATION AND QUALITY





# EMPLOYEES

## MANY SKILLED EMPLOYEES FOR EACH CLIENT



## INVESTMENTS ENVIRONMENT FRIENDLY



**Sostenibilità  
Ambientale**

The three new photovoltaic installations, introduced in 2012, enabled LPR to reduce environmental pollution significantly, by reducing electricity consumption from ordinary sources.



## LPR PRODUCTS

### FINAL CHECK

Prior to despatch every order is checked to make sure everything is correct:

- ✓ Article
- ✓ Accessories
- ✓ Marking
- ✓ Packaging
- ✓ Label



Once approved by Quality dept. the goods are picked up and shipped



## SPONSORING MERCHANDISING





# SPONSORING

## WINNING CHOICES...NOT ONLY ON THE MARKETS

LPR as official sponsor PSA (Peugeot / Citroen) Rally team.



Volley Piacenza



European rally championship



# SPONSORING

## WINNING CHOICES...NOT ONLY ON THE MARKETS

