



Ravago Material Solutions for Cosmetic and Pharmaceutical Packaging

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July 2016

History

A Small introduction

When Raf Van Gorp founded Ravago in 1961, he was given the opportunity to buy the premises of a dynamite company in Arendonk, Belgium. This enabled him to work out the luminous idea he had: **recycling production** waste from the plastics producing petrochemical companies.

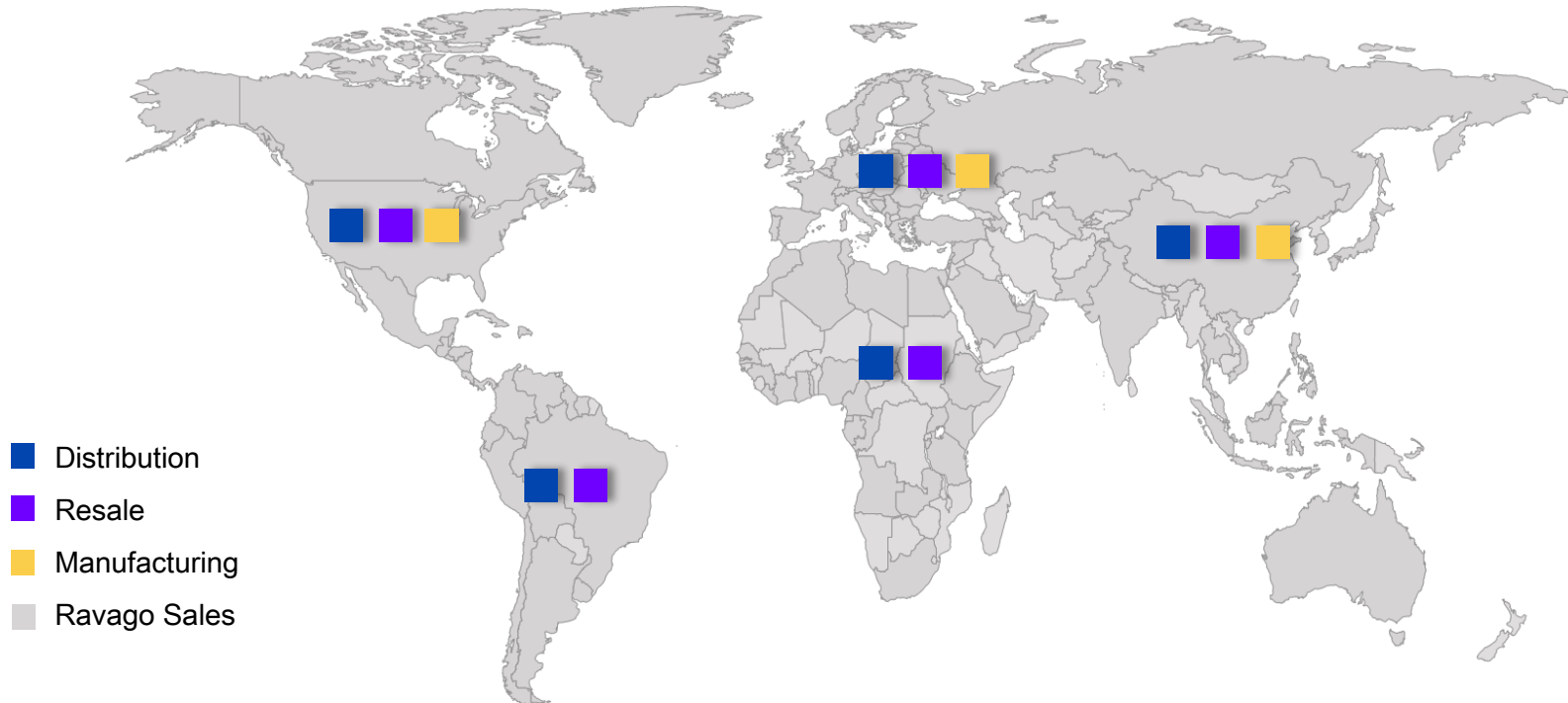
From there, the company grew into a successful service provider to the petrochemical industry as a **distributor and reseller** of plastic resins. **Diversification towards production and distribution** of building products guaranteed a second revenue line in Europe.

Today, the Ravago Group is the number one service provider in the global market of plastics, rubber and chemicals.



Global coverage

Ravago, your global partner



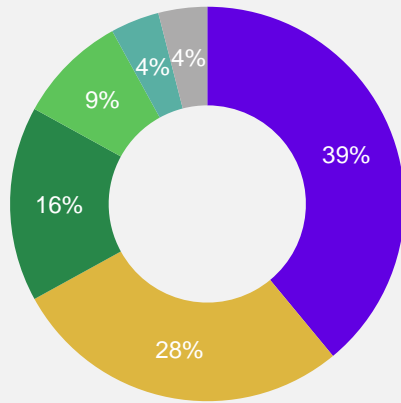
Facts and figures

Our worldwide knowledge

FY 2014 Revenues

6.6 bln EUR / 7,2 bln USD

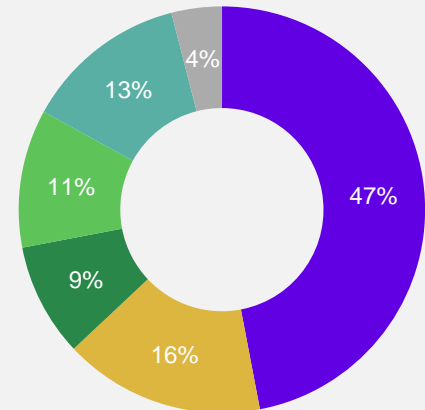
■ US & Canada	39%
■ Europe	28%
■ Latin America	16%
■ Turkey	9%
■ Asia - Pacific	4%
■ Middle East - Africa	4%



FY 2014 Volume

4 Mio MT / 8.96 bln Lbs

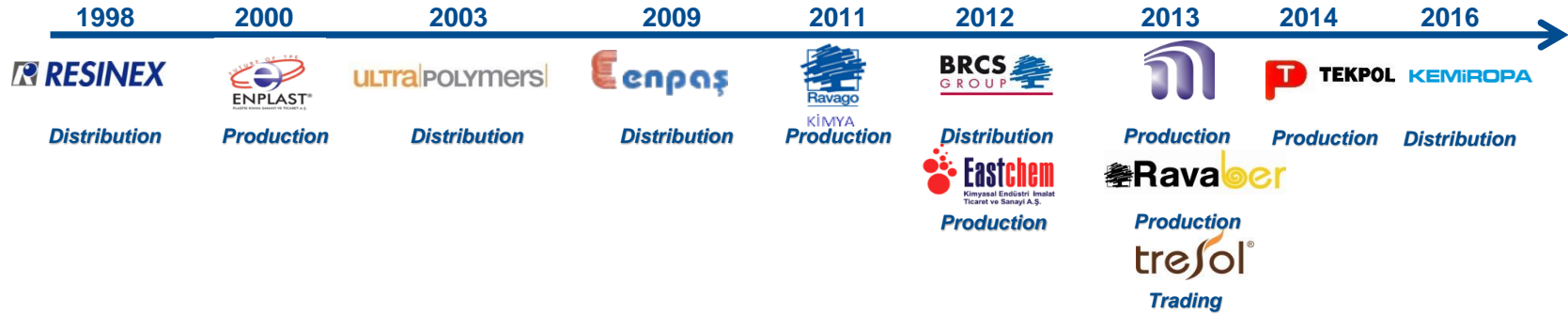
■ PE	47%
■ PP	16%
■ PS	9%
■ Others	11%
■ Eng. Plastics	13%
■ Rubbers	4%



Ravago Turkey Plastics History



A journey that started in 1998 with Resinex BMY.



- Ravago Turkey operates with 11 companies; 4 in production of own branded products, and 6 in sales & distribution of global petrochemical suppliers and a logistics company providing shared services to Ravago Turkey Group Companies. Ravago has a turnover exceeding 800M Euro with three group companies listed in ISO 500. There are over 800 employees working for Ravago Turkey.

RAVAGO TURKEY-DISTRIBUTION



Your local solution partners



- **Resinex-BMY**
 - Started 1998, Employees : 72
 - 2014 sales 145.000 MT; 250 million € turnover
 - Distribution partners: LG, Dow, Rhodia, Total, Ravago, Ampacet, Arkema, Asahi



- **Ultrapolymers**
 - Started 2003, Employees : 40
 - 2014 sales 65.000 MT; 100 million € turnover
 - Distribution partners: Basf, Basell, Borealis, Sukano, Teijin, Romira, Mepol, Politec



- **Enpaş**
 - Started 1978; Ravago acquisition 2008, Employees : 25
 - 2014 sales 21.000 MT; 45 million € turnover
 - Distribution partners: Sabic IP, Elastogran, Aquafil, Exxon Mobil

Ravago Petrokimya-Turkey



	Gebze Plant	TAYSAD Plant	Aliaga Plant
Production	TPE Engineering Plastics Silicones	TPU PU Systems	EPS
Total Capacity	40.000 MT TPE 15.000 MT EP	10.000MT TPU 60.000MT PU Systems	130.000 MT

Global Mega Trends

Nature and Environment



- **Scarcity of Resources/More from Less**

- Water

Better preservation of products

- Food

Barrier Technologies

- Energy

Thermal and impact management

- **Environmental Issues**

- Tighter regulations (FDA, ROHS, REACH, ELV..)

- Reduction of CO₂ and VOC

Higher purity raw materials

- Green Plastics (Recycled/Sustainable/Biodegradable)

Sustainable packaging

Global Megatrends

Technology and Social Aspects



- **I World**

- Industry 4.0/Internet of things
- Virtual reality
- Increased connectivity

- **On the move**

- Urbanization and Megacities
- Mobility and Miniaturization

- **Changing Demography**

- Generation Grand Pa
- West to East, North to South
- Personalized and Demanding

Intelligent packaging QR, NFC, RFID,
Bluetooth LE enabled packaging
Counterfeiting measures

Smaller, Portable and single use
packages (blister uni-dose vials)
Transparent packaging or
Clear/informative labeling

Ergonomic and Soft Touch
Special Products and packages for Asian and
African Consumers
Digital Printing/personalized packaging

Cosmetic and Pharmaceutical Packaging goes Flexible and Sustainable

- Stand up Pouches are Standing out
- Resealable Packages/Refillable Dispensers
- Smaller/Single use Packages
- Multi Layer Barrier Packages



RPU

RavaNat

Solutions for Flexible and Barrier Applications



- Akulon® LOPA (Low Oligomer Polyamide) for multilayer packaging
- DSM Akulon / Novamid for medical packaging, as barrier material/mechanical protection in e.g. **sterilization bags**



Sterilization bags

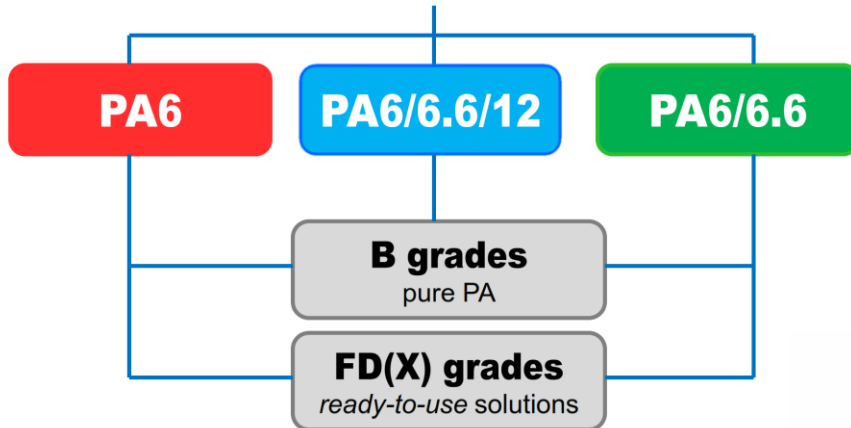


Infusion
bags

Solutions for Flexible and Barrier Applications

UBE NYLON

EXTRUSION APPLICATION



Transparent Shrink film



Thermoforming



Solutions for Flexible, Resealable and Soft Touch Packages



ULtraPOLymers
a Spirit of Partnership

- **Koattro Plastomers**

Benefits of Koattro

- Elasticity
- Softness
- Impact resistance or toughness
- Sealing properties
- Hot Tack properties
- Breathability
- Good tensile properties
- Low flexural modulus
- Tackiness
- Transparency
- High PP compatibility

Potential Application

- Food packaging (transparency, breathability, sealing properties, hot tack)
- Industrial film (Impact resistance, elasticity, tensile properties, tackiness)
- Cap & Closures (elasticity, PP compatibility, transparency, flexibility, impact resistance)
- Gaskets (elasticity, softness)
- Adhesive (tackiness, flexibility elasticity)



Solutions for Biodegradable and Disposable Packaging Applications



- Very transparent and glossy
- Good printability
- Excellent aroma, fat & oil barrier
- Good dead fold
- Food approved
- Heat-sealable
- Low processing temperatures
- High stiffness
- Moderate oxygen and water vapor barrier
- Heat-resistance is limited to 45°C



Film & Cards



Solutions for Rigid or Flexible Sustainable Packages



RPU

- Ravatech and Ravanat
- Natural Fiber reinforced compounds
- Bio Polymer Based Compounds
- Compounds based on recycled polymers



Green Elastomeric and Soft Touch TPE Solutions



- **Arnitel® and Arnitel ECO®**
Thermoplastic elastomers are polymeric materials that combine the following properties:
 - The polymer is process able like typical thermoplastics
 - processes like injection moulding, extrusion and blow moulding are possible
 - recycling is possible
 - The mechanical properties are comparable to rubbers
 - flexibility
 - elasticity



Elastomeric and soft touch TPE solutions



RPU

- Brodest range of TPE portfolio in the European market covering TPE-S, TPE-O, TPE-V, TPE polar and TPU
- Premium softer touch feel when is over moulded onto plastic
- Soft feel with metallic effect
- Resistance to fatty fluid, acid or basic liquids
- Transparent, translucent and opaque materials
- Light weight/low density or high density formulation

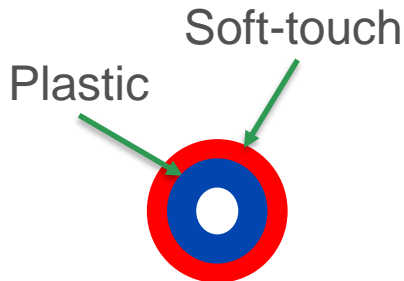
Elastomeric and soft touch solutions for 2K applications: Ravatech



RPU

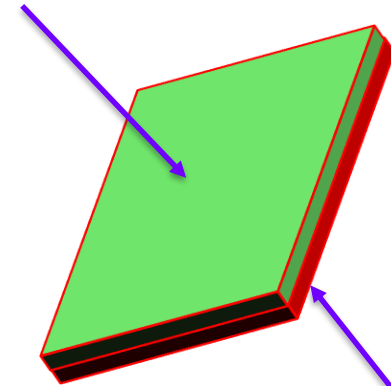
- Our TPE's can be over moulded onto or co-extruded with a broad range of materials including Polyolefin, Polycarbonate, Polymethyl methacrylate, PVC, ABS, Polyamide,...

Over moulding example



Soft-touch
With high grip

Co-extrusion example
Soft touch



Soft or rigid

Transparent And Visual Packaging

There is a significant slow down in glass and PC use in pharmaceutical and cosmetic packaging.

- Traditional Transparent materials are facing challenges

- Glass: Weight, Safety
- PC: Bisphenol A
- PMMA: Cost

- New Challengers are

- MABS
- SMMA
- MMBS
- High Clarity PPR



LG Chem

Transparent and Lightweight Solutions for Rigid Packaging



ULtraPOLYMERS
a Spirit of Partnership

- NAS® SMMA
- Lower cost and lower density alternative to PMMA
- Crystal clear appearance
- Easy processing of thick-walled parts
- Premium look-and-feel
- Sound design
- Acoustic damping performance
- Good colorability
- Gamma & ETO sterilizable
- Meets USP XXIII specifications for Class VI plastics



Transparent and Lightweight Solutions for Rigid Packaging



ULtraPOLYMERS
a Spirit of Partnership

- Zylar MBS
- Crystal clear appearance
- Easy processing
- FDA compliant
- USP Class VI compliant
- Biocompatibility Testing
- Good bonding to soft PVC / silicone
- Superior resistance to alcohols
- TPE Bonding 2K
- Excellent color stability after γ -ray or ETO sterilization



Transparent and Light weight solutions for rigid and Flexible Packaging



ULTRAPOLYMERS
a Spirit of Partnership

- Purell PP and PE
- High Clarity
- Sterilizable
- Lowest density in transparent materials
- Excellent performance/price ratio
- FDA approved.

