

Investor Handout

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**2001 Workshop on Bayer's  
Polymers/Chemicals Business  
Segments**



# Polymers/Chemicals workshop

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## Representing the business groups :

Dr. Hagen Noerenberg, Head of Plastics BG

Dr. Jürgen Ick, Head of Rubber BG

Dr. Hans-Joachim Kaiser, Head of Polyurethanes BG

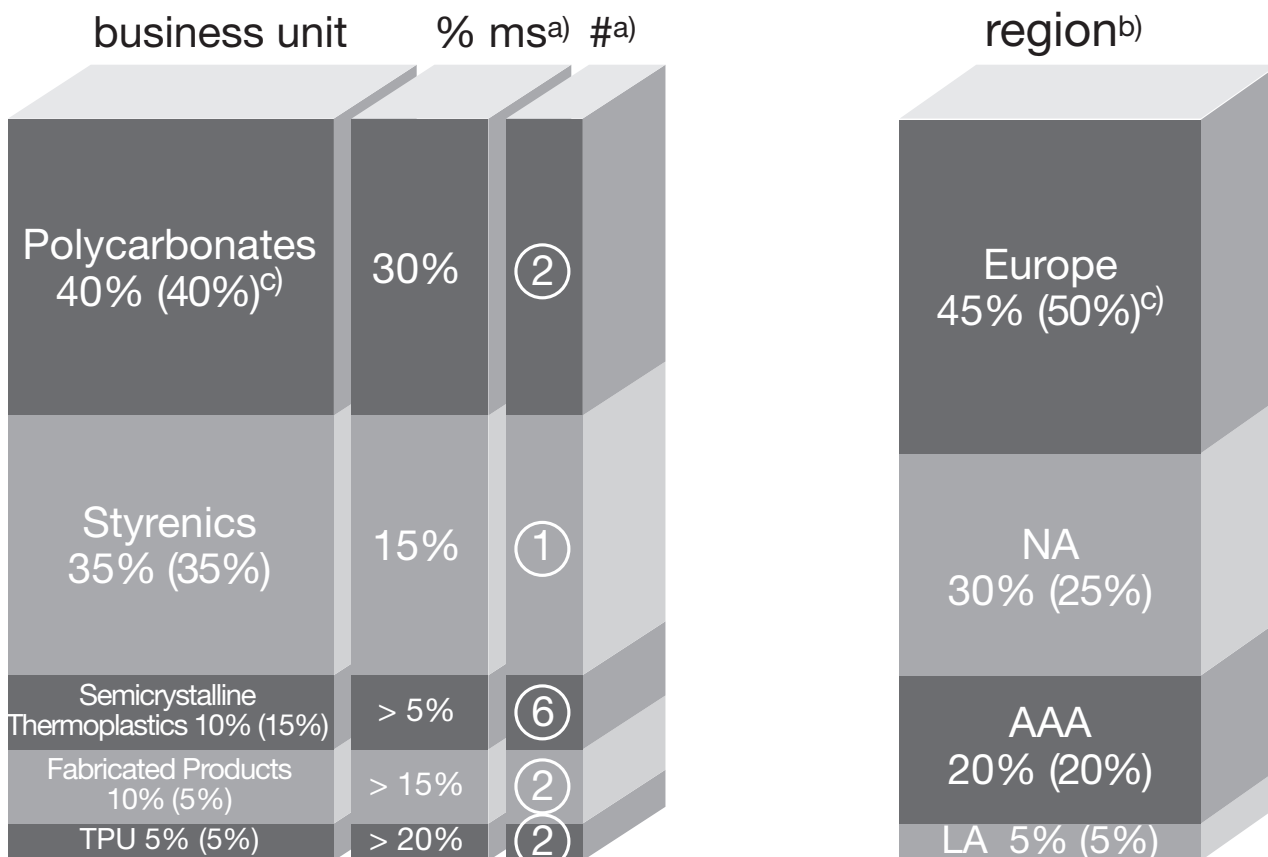
Dr. Ulrich Koemm, Head of Coatings & Colorants BG

Dr. Martin Wienkenhöver, Head of Basic and Fine Chemicals BG

Dr. Richard Pott, Head of Specialty Products BG

# Significant top line improvement based on higher selling prices and volumes

Total 2000 sales: € 3,520 million + 27 %  
by



- a) world
- b) by market
- c) previous year ( )



# Major products: New applications drive PC capacity expansion

Major products	Capacities in 1,000 t p.a.		Applications / customer industries
	2000	2003 e	
Polycarbonates (Makrolon™)	650	1,080	automotive, construction, optical media, medical, information technology
Styrenics (Novodur™, Lustran™, Bayblend™)	750	850	automotive, information technology, household, toy industry, medical sector
Polyamide (Durethan™)	100	130	automotive, electrical/electronics, tools, household
PBT <sup>a)</sup> (Pocan™)	30	> 40	automotive, electrical/electronics, tools
TPU <sup>b)</sup> (Desmopan™, Texin™)	50	> 50	shoe, electrical, construction, automotive
Sheet & film (Makrolon™)	70	105	construction, communication (signage)

a) PBT: Polybutylene terephthalate

b) TPU: Thermoplastic polyurethane



# Business characteristics: Information and communication technology as area of most rapid growth

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## Market profile:

- Engineering thermoplastics market is a global one, characterized by constant pressure on margins and growing price competition
- Except for PC, the main leverage of competition for plastics in general is price, followed by global supply capability, quality and technical service
- Due to extensive product and process know-how, experience and financial strength to expand capacities, our plastics business is growing well above market rate ( $\approx$  4-6% p. a.)

## Bayer Plastics specifics:

- Polycarbonate business benefits from new technologies e.g. melt polycarbonat, and application fields driven especially by high-tech electronics industry, i.e. Digital Versatile Disc (DVD)
- Leading position in styrenics (ABS, SAN, Bayblend) yields competitive advantage in terms of production costs, marketing synergies and product know-how
- Increased raw material costs were passed on to the market
- Raw material procurement from third parties under long-term “as-if-producer” contracts
- Automotive, electronics and electrical industries account for 60% of Bayer's plastics business

# Strategy: Extension of production and marketing presence in key regions and markets

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- Realization of cost synergy potential for styrenics business (production site consolidation and implementation of process efficiency program) to improve profitability
- Ongoing portfolio management (shift to high-margin/high-growth products)
- Supply chain management
- Aggressive growth of our PC business (focus: Far East)
- Active strategic alliances and M&A activities:
  - Aquisition of Sewon (Korea) to strengthen PC sheet business (2000)
  - JV (Bayer majority) with Röhm to align and strengthen PC sheet activities in Europe (2000)
  - JV (50/50) with Imsatec (Mexico) to strengthen PC sheet business (2000)
  - JV (50/50) with DIC to build up an Asian position for TPU (2000)
  - JV (50/50) with DuPont for the manufacturing of PBT based resins world scale facility, to be established Q 2, 2001
  - JV (Bayer majority) Shanghai Chlor Alkali Chemicals, PC business Q2, 2001
- R&D expenditures of  $\approx 2.5\%$  with focus on applications (i.e. scratch-resistant surfaces, optical media, plastics/metal hybrid materials for automotive applications) and key processes (e.g. Bayer melt PC process)

# Outlook 2001:

## Growth above market and improving margins

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- Double digit sales growth based on
  - volume growth through PC
  - 7 new products, i.e. surface-modified Makrolon (automotive construction), melt polycarbonate (optical/ophthalmic lenses), Bayblend FR 3000 series (business machines/information technology)
  - new applications
  - new markets (segment and geographical)
  - branding, i.e. Makrolon
  - e-business initiatives, i.e. Omnexus
- Optimization of cost and capital employed
  - world-scale facilities
  - improvement of technology leadership in products and processes
  - supply chain management (logistics, e-commerce)
- Raw material prices slightly decreasing from high level
- €500 million investments in PC plant

# Strong volume growth and selling price increases boosted sales

Total 2000 sales: € 2,296 million + 24 %

by



- a) market share by volume sold
- b) 50:50 JV with Degussa AG
- c) fragmented market with small players
- d) by market
- e) previous year ( )



# Major Products: Complete range of solid rubber as competitive advantage

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## Products and capacities

- Solid Rubber: 1.16 million t p.a.  $\triangleq$  13% of ww capacity
  - General purpose: BR, SBR  
650,000 t p.a.
  - Special purpose: (X) IIR; CR, NBR, EPDM  
505,000 t p.a.
  - Specialties: Therban, EVM  
6,600 t p.a.
- Rubber chemicals:
  - Antioxidants  
Vulkanox® 45,000 t p.a.
  - Accelerators Vulkacit®: 24,000 t p.a.
- PolymerLatex:
  - X-SBR Latex, SBR Latex
  - Special Latices: CR, NBR, P-SBR, SA
- Rhein Chemie:
  - predispersed chemicals and special products

## Applications

tires and plastics industry

(halogenated) butyl rubber for “Innerliners” in tires; automotive, electrical and mechanical engineering, construction

heavy duty, heat resistant parts

tires, automotive, electrical, shoe, construction, chemical industries

paper, carpets, construction, shoes, tire cords

tires, automotive, electrical, construction industries

# Business characteristics: Leading position in more than two thirds of our rubber business

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- Clear # 1 position in the synthetic rubber market :  
8 producers  $\Rightarrow$  55% market share
- Replacement tires ( $\underline{\Delta}$  2/3 of tire market) buffer fluctuating automotive demand
- Bayer's regional solid rubber sales split does not, as yet, reflect the global demand pattern
- Rubber benefits from Bayer's good backward integration with most chemical raw materials
- Due to commodity character of many rubber business, cost leadership is crucial  
 $\Rightarrow$  efficient world scale plants

# Strategy:

## Investment focus on high value-added products and realizing efficiency potential

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- Solid Rubber
  - capacity expansion for halogenated butyl rubber in Sarnia, Canada and Antwerp, Belgium in 2001 to 255,000 t p.a.
  - capital expenditure of more than €100 million to increase the capacity of its EPDM production units at Orange, Texas and Marl, Germany by 70,000 t p.a. to 185,000 t p.a.
- Rubber Chemicals
  - strengthening of global # 2 position with our new world scale plant for Vulkanox® HS (15,000 t p.a.) in Brunsbüttel, Germany
- PolymerLatex
  - cost reduction program in acrylic latices
  - improvement of our styrene raw material procurement
- Rhein Chemie
  - successful integration of Elastochem Inc. has improved our position in North America

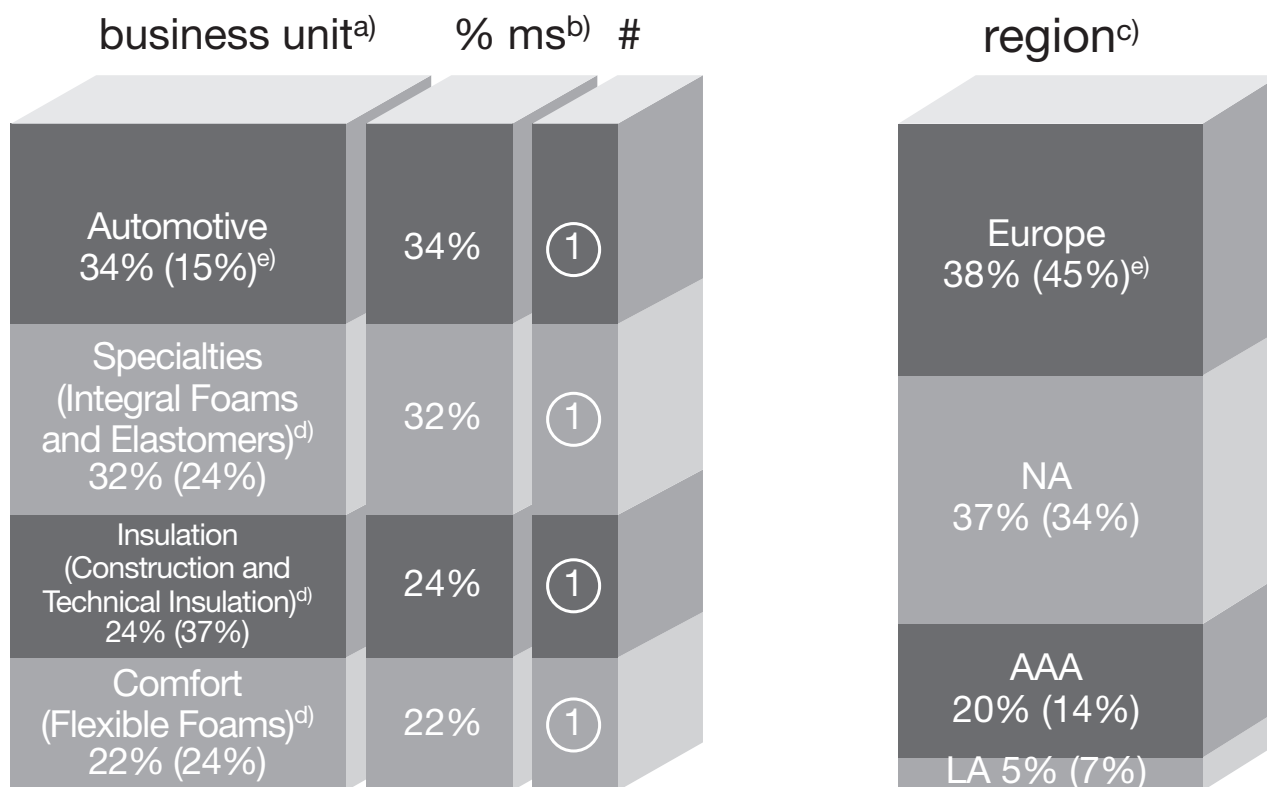
# Outlook 2001: Further growth in sales and profitability

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- Global rubber consumption + 2%
- Weakness of the North American automotive industry does impact our business in this region, whereas global automobile production is stagnant
- Continuing of business growth in Asia to + 4% p.a.
- Further selling price and volume increases
- Implementation of cost cutting project with cost savings of €100 million p. a.
- New developments:
  - Introducing new rubber chemical Vulcuren™, → reduces production costs of our customers due to more efficient machinery usage
  - Start of European Therban™ production site in Leverkusen, which nearly doubles our world-wide capacity for this specialty elastomer
  - Launch of three new grades of Therban™ for new fields of application

# Lyondell polyols acquisition expanded PU's leading position and balanced EU and NA sales

Total 2000 sales: € 3,131 million + 44 % (incl. Lyondell) by



a) Since July 2000 reorganization of business units following Lyondell integration

b) market share based on volume

c) by market

d) previous business unit names

e) previous year ( )



## Major Products: With $\approx 35\%$ of world capacities for both TDI and MDI, Bayer is no.1 supplier in isocyanates and holds position 2 in polyols

- capacities:

raw material	in 1,000 t <sup>a)</sup>	application, customer industry
TDI	<b>Total</b> 420	mainly for flexible foam production furniture, mattresses, elastomers, automotive
MDI	<b>Total</b> 800	construction, automotive, technical insulation (i.e. refrigerators), appliance industry, wood binders
Polyols	<b>Total</b> 1,265	reaction partner for MDI, TDI and other diisocyanates for the production of polyurethanes  <b>Polyols largely influence the properties of finished PU</b>

- volume distribution according to applications:

Specialties	Automotive	Comfort	Insulation
21%	16%	36%	27%

a) as per end 2001

b) including new TDI plant in Baytown, Texas, U.S.



# Business characteristics: Market leader in polyurethanes and well positioned for long-term growth

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- **PU** complies with **critical success factors**:
  - ▶ one-stop supplier
  - ▶ balanced raw material portfolio ( $\approx 50\%$  polyols :  $\approx 50\%$  isocyanates)
  - ▶ production know-how and application technology
    - customer-tailored PU products/systems (combination of raw materials plus application know how)
    - competitive costs of the finished part and physical performance
  - ▶ worldwide production and R & D presence
  
- **Market** with fast **growth in volume<sup>a)</sup>** at relatively stable market prices:

raw material	TDI	MDI	Polyols		PU total
	4%	8%	5%		
regions	NAFTA	EU	AAA	LA	5%
	4%	4%	8%	3%	

- ▶ regional price structure
- ▶ high market entry barriers for new raw material producers
- ▶ customer globalization and concentration, i.e. purchasing groups
- ▶ main competitors: DOW, BASF and Huntsman

<sup>a)</sup> p.a. in % through 2010

## Strategy:

# Improving profitability through operational efficiency, expansion and innovation

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- TDI & MDI – defend #1 position globally
  - reduction of production costs through world scale production units and site consolidations
- Polyols – site and product consolidations
  - implementation of IMPACT technology to complement own cost-efficient technologies
- Cooperation with Lyondell in PO production (PO 11/Rotterdam)
- Global product management and improved logistics, supply-chain management
- Establish business in growing markets and new applications through strong local partners and regional system houses
- R&D: new technologies and innovative products, i.e. PU with enhanced material properties (better flame resistance, improved thermal insulation, part weight reduction etc.)



# Outlook 2001: Acceleration of underlying growth rate

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- Double-digit sales growth<sup>a)</sup>
- OPE will be impacted by Lyondell integration costs of approx. €40 million (vs. €60 million in 2000)
- Recovery in Asia, continuation on high level in Latin America as well as stable development in Europe, stagnation in NAFTA
- Selling price increases to take effect before mid-year
- Consolidation of polyether polyol portfolio
- Cost-cutting program launched

<sup>a)</sup> in 2000 only 9 months sales contribution from Lyondell  
→ base effect in Q1, 2001

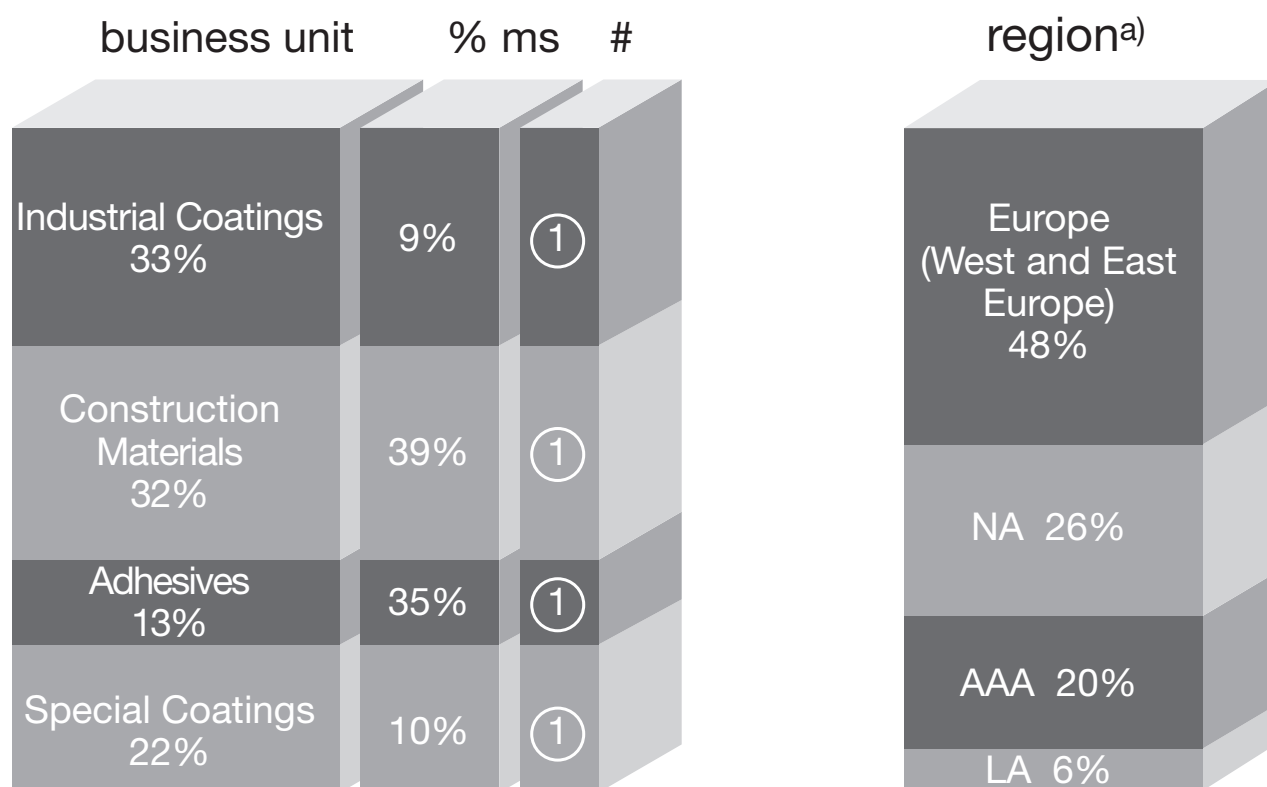
**Bayer** 

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# Strengthening of leading position through solid growth in all regions

Total 2000 sales: € 1,946 million + 13 %  
by



a) by market

## Major Products:

Broad spectrum of products with the top 10 accounting for > 50% of sales

Products/ Product families	2000 sales in € million	Δ%	Applications/ Principal Users
<b>Industrial Coatings</b>			
● Desmodur N	285	(+ 8%)	PU systems for automotive OEM and refinishing, plastic coating
● org. Pigments	152	(+ 3%)	automotive effect-coating plastic coloration
<b>Construction Materials</b>			
● Iron oxides	347	(+ 11%)	colors and coatings coloration of mortar and concrete
<b>Adhesives</b>			
● Desmocoll / Dispercoll	168	(+ 11%)	PU system for adhesives; shoe manufacturing, automotives, furniture
<b>Special Coatings &amp; Colorants</b>			
● Impranil / Impraperm / Desmoderm	49	(+ 18%)	textile coatings
● Desmodur W	78	(+ 10%)	PU dispersions

# Business characteristics:

## Growth drivers are innovative products with high margins and superior quality

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- With Ruco / Sybron acquisition of a no. 1 position in powder coatings raw material in the US and a no. 3 position globally
- Leading position in a competitive and **heterogeneous market**
  - Oligopolistic (HDI, aliphatic polyisocyanates)
  - Fragmental (coreactants for polyisocyanates, waterborne resins)
- Above market ( $\approx 3\%$  p.a.) **growth of  $> 10\%$  p.a.** due to new product lines with focus on innovative technologies (high solids, waterborne resins, powder coatings)
- Total revenue is not subject to seasonality over the course of a typical year
- Compliance with the major critical success factors:
  - ▶ **Technology leadership** with strategic systems, which solve our customer needs (aliphatic polyisocyanates, PU raw materials for adhesives, iron oxides)
  - ▶ **Technical marketing:** extensive technological expertise organized in market-oriented competence centers
  - ▶ **Large-scale production at best cost and quality** of key intermediates (i.e. HDI, aromatic isocyanates)
  - ▶ **Globally focused sales organisation**
  - ▶ **Sourcing:** no dependence on any single raw material or raw material supplier
- All operations based on standardized feedstock available worldwide
- System solutions strengthen long-term customer relationships

# Strategy:

## Profitable business expansion with improved product mix

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- Maintain technology leadership via innovative solutions; i.e. new plastic coatings upgrade plastic characteristics
- Capital expenditure of around 5% p.a. to
  - expand market share with focus on Asia; new production units, i.e. polyisocyanate plant in China
- R&D expenditure: 3% p.a.
- Benefiting from e-commerce as a portal for key accounts and additional distribution system
- Intensified focus on global key account management (currently > 50% of sales)
- Strengthening leading position via operational excellence and active portfolio management

# Outlook 2001: Increasing business dynamic

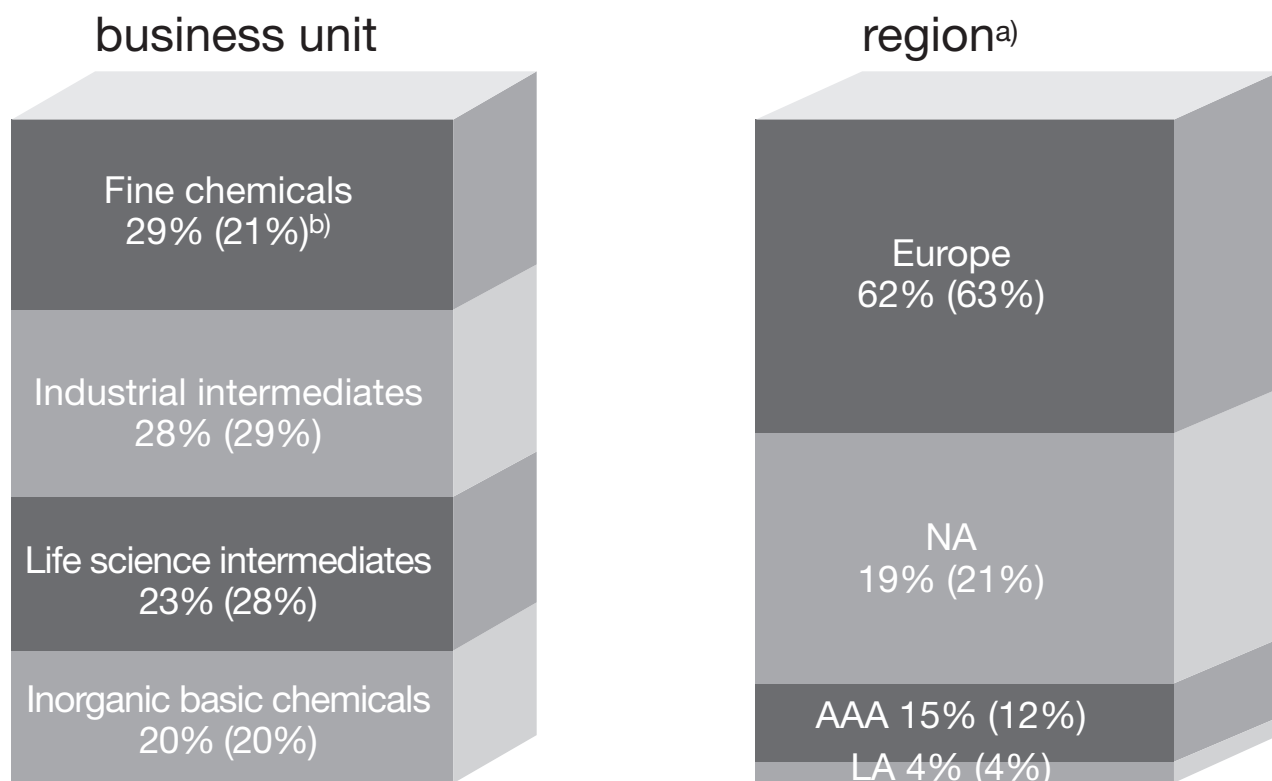
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- Expected **double digit growth in sales and OPE**
  - Price and volume increases
  - Through Sybron/Ruco acquisition, significant new position in powder coating system
  - Lyondell products complement portfolio in Construction Materials and Adhesive Materials applications
  - Stable economic environment in Europe and Asia; facing slowdown in NAFTA
  - Incremental business due to successful introduction of key account organization
- **Capital expenditures** of  $\approx$  €100 million mainly for new capacities
  - ▶ of HDI (additional 30,000 t p.a. plant under construction, to go on stream 2002)
  - ▶ of polyisocyanates (new plant in China, 11,500 t p.a.)
  - ▶ of polyurethane dispersions (new plant in NA of 5,000 t p.a. on stream 2001 and in Asia)
- Ongoing **price pressure** in NA
- Expected **decrease in raw material prices**
- **Research focus on**
  - waterborne resins, high-performance powder systems, new organic dyes and pigments, new continuous-production technology for organic pigments, solvent-free PU coating systems and PU adhesive raw materials

# Turnaround in sales development due to strong Fine Chemicals

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Total 2000 sales: € 1,006 million + 14 %  
by



a) by market

b) previous year ( )

## Major products:

# Business reengineering from pure chemical synthesis to integrated customer service

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### Business drivers:

- **Life science intermediates:** increase due to custom synthesis in the field of pharmaceuticals and new contracts with agrochemical companies
- **Focus on customer services** based on a wide range of technology and resources as a key success factor for stable growth in the future
- **Biodegradable products:** polyamino acids, chelating agents, i.e. for detergents. Double digit growth of new development products in new applications
- **Electronic chemicals:** strong demand especially for chips in the electronic industry

### Weak points:

- **Dyestuff intermediates:** strong competition caused by increasing Asian capacities



# Business characteristics: High integration level of chemistry and a broad application field

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- Stable growth in agro, life science and consumer care intermediates due to various applications, i.e. fungicides, insecticides, repellents  
Growth of life science intermediates for pharmaceuticals depends on our customers' products market success
- Electronic chemicals: low volume, high-value products (i.e. Baytron™)
- Functional polymers: Baypure™ as an ecologically safe substitute of polyacrylates
- Inorganic basic chemicals: upward price trend;  
key industries: chemicals, construction and paper
- Organic basic chemicals are highly dependent on raw material prices (i.e. toluene, benzene)
- core competencies:
  - in research, process development, pilotation and manufacturing of fine chemicals (scale-up from a few kg to multi-ton quantities)
  - technology leadership and economies of scale in the area of basic chemicals as advantage against Asian competition; experience in managing isomers produced within the “aromatics network”

# Strategy:

## Concentration on organic growth

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- Ongoing **portfolio management** and focus on core activities oriented around customer demand:
  - focus on growing markets (i.e. life science intermediates) with R&D investments and new assets
  - services: key account management, custom synthesis
  - products: dyestuff intermediates are non-core
- **Globalization** strengthens our position in the fast growing markets (NA and Asia)
- **Technology and R&D focus**
  - Synthesis of chiral compounds (i.e. biotechnology, chiral chromatography)
  - Synthesis by organometallic reactions i.e. hydride reductions
  - Investment in multi purpose facilities with high quality standards up to cGMP
  - Chlorine production with oxygen-depolarized cathodes

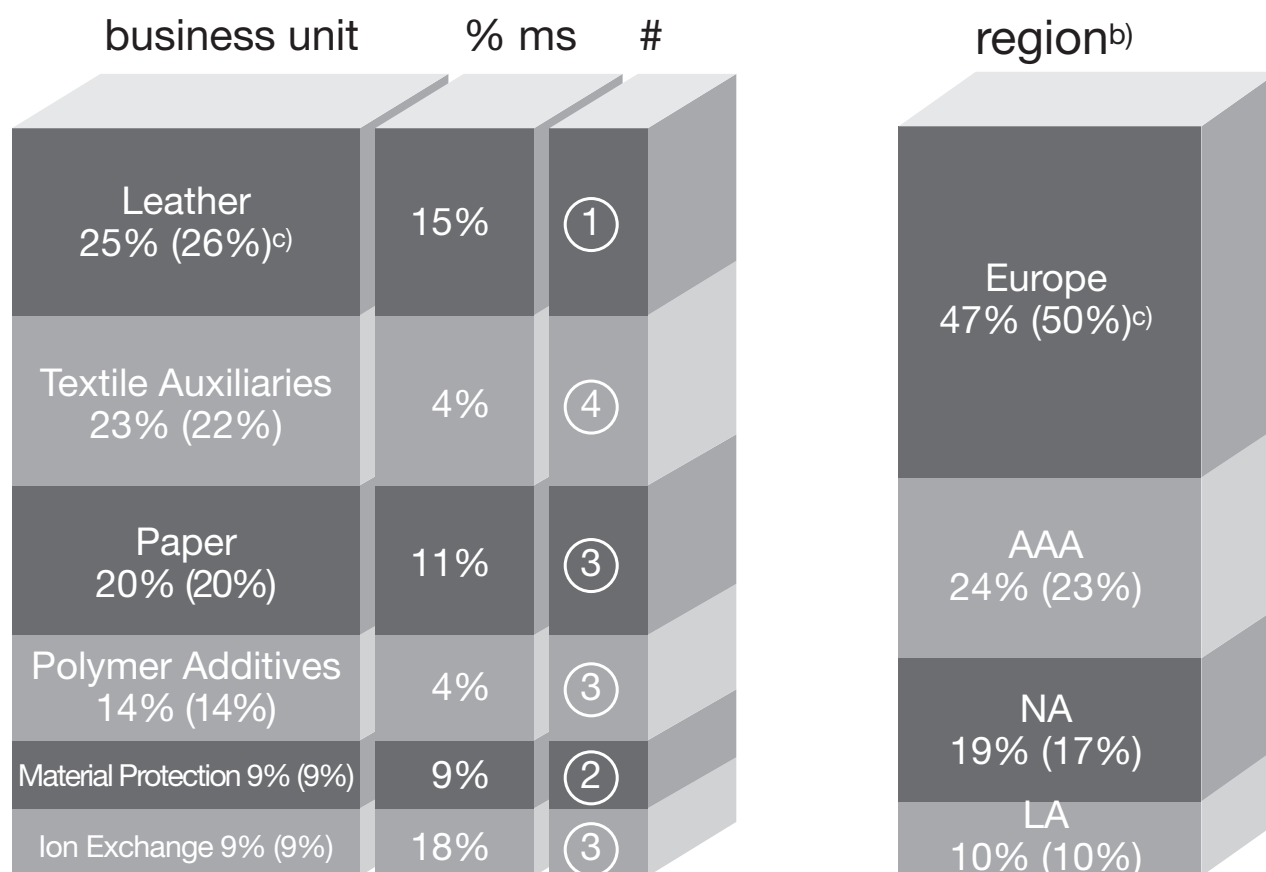
# Outlook 2001: New organizational structure supports value growth even more

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- Customer-oriented organization implemented in February 2001
  - expansion of key account management, in the field of custom services
- Broadened e-commerce activities through
  - ChemMatch
  - ChemConnect
  - ELEMICA
- Portfoliomanagement to ensure the optimum strategic direction of the business group and its business units
- Business expectations:
  - ongoing sales growth in the relevant markets
  - ongoing price pressure for commodity products
  - high impact of raw material cost

# Sales driven by solid volume growth in a highly competitive environment

Total 2000 sales: € 1,312 million <sup>a)</sup> + 14 % <sup>a)</sup>  
by



a) including 2 month sales contribution of Cytec and Sybron acquisitions

b) by market

c) previous year ( )



# Major Products: Product portfolio benefits from broad application spectrum

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## Major product families

- optical brighteners
- tanning salts and tanning agents
- leather chemicals
- textile processing chemicals
- ion exchange resins
  
- plasticizers
- flame retardants
- biocides

## Applications/customer industries

paper, textiles

leather

leather

textiles

water treatment, consumer, chemicals and environmental protection

polymers

polymers, textiles

wood protection, personal care, industrial preservation

# Business characteristics: SP business structure reflects the complex market environment

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## Specialty chemicals market profile:

- heterogeneous customer structure
  - textile, leather markets fragmented
  - paper market highly concentrated, oligopolistic
- ongoing concentration process among customers and competitors
- continuous price pressure long-term feature
- business growth shift from NA, Europe towards Asia
- market growth of 1–3% annually

## SP specifics:

- diversified product portfolio and broad application field
- high degree of customized products and solutions
- business less vulnerable to single-customer industry cycles
- major part of raw materials is sourced inhouse

## Strategy:

In line with the diversified nature of our SP-activities, each business unit pursues an individual strategy

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Growth is predominantly based on exploitation of internal potential:

- **leather** → defend leading global supplier position by offering a complete product range
- **textile auxiliaries** → focus on value-added, ecologically products following the market shift to Asia
- **paper** → gain market share in paper chemicals following Cytec acquisition, strengthen market position in Asia
- **polymer additives** → strengthen market positions in NA and Asia
- **material protection** → globalize the business towards Asia and America by establishing regional service centers
- **ion exchange** → improvement of NA position through integration of Sybron
- redirection of resources towards prospective regions (East Europe and Asia)
- optimization of capacity utilization at multi-purpose plants
- further concentration on key accounts
- R&D of around 2.5% p.a. with mid-term focus on
  - innovative process technology
  - new dyes for inkjet printing
  - enzyme-based textile auxiliaries and flame protectants for textiles
  - bactericides for industrial preservation

# Outlook 2001:

## Another year of improving profitability

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- Underlying sales growth slightly above market average, driven by volume increase
- OPE growing faster than sales
- New business opportunities through e-commerce projects
- Risks:
  - ongoing price pressure due to strong competition
  - further raw material price increases

### **Significant changes 2001 versus 2000:**

- acquisition of Sybron textile processing chemicals (sales US\$120 million ) and ion exchange business (sales US\$30 million ) → strengthening of European and US market position
- acquisition of Cytec paper processing chemicals business (sales US\$100 million ) → strengthening the US market position and enlargement of product portfolio



Further information about our BG's is available on the following websites:

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**Rubber:** [www.bayerrubber.com](http://www.bayerrubber.com)

**Polyurethanes:** [www.pu.bayer.com](http://www.pu.bayer.com)

**Coatings & Colorants:** [www.bayer-ls.com](http://www.bayer-ls.com)

**Plastics:** [www.plastics.bayer.com](http://www.plastics.bayer.com)

**Basic & Fine Chemicals:** [www.chemicals.bayer.com](http://www.chemicals.bayer.com)

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