

Desmet Ballestra

Science behind Technology



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www.desmetballestra.com

The Desmet Ballestra Group

The Desmet Ballestra Group is the world leader in developing, engineering and supplying technologies, processing plants and proprietary equipment for the following business areas:

FOOD & FEED

Oils & Fats

Rosedowns Pressing

Stolz Animal Feed & Agro Food

CHEMICALS FOR LIFE

Oleochemicals & Biodiesel

Detergents, Surfactants & Chemicals

Mazzoni LB Soap



The Desmet Ballestra Group resulted from the merger of best-in-class companies in their field:

- De Smet (Belgium), founded in 1946, the world specialist in oilseed preparation & extraction and edible oil & fats refining and modification plants, housing also the headquarters of the Desmet Ballestra's oleochemical & biodiesel activities that have met an outstanding success thanks to their reliability, versatility and performances
- Rosedowns (UK), the world leader in the field of oil seeds pressing, acquired in 1988
- Ballestra (Italy), the world leader in process plants for detergents and surfactants industries since its establishment. Since the 90's has become a reputable and well-known player within the inorganic chemicals (including sulphuric acid and phosphoric acid production plants) and fertilizers industry. Ballestra merged into Desmet in 2007.
- Stolz (France), specialised in animal feed & agro food plants with a wide expertise in storage and handling equipment. Joined the Group in 2007.
- Mazzoni LB (Italy), world leader in soap & glycerine processing plants and finishing lines. Joined the Group in 2017.

WE SHARE THE SAME VISION

Experience and Leadership	R&D and Innovation	Product Processing Expertise	Experienced Project Execution	Efficient Customer Service
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Desmet Ballestra is now an integrated operation enabling to coordinate its worldwide activities making the best use of the very important technical, technological and commercial synergies existing between its operations and to provide competitive services, plants and equipment globally sourced.

GROUP'S KEY FIGURES (2017)

Date of creation 1946	Employees 1,200	Annual Turnover 500 M €	Number of projects managed Over 25,000 plants/process sections
Research & Development Centers Belgium, Italy, France, United Kingdom		Worldwide Reputation and Presence 21 Fully owned offices close to you	



Oils & Fats

OILSEED PREPARATION

Magnetic Separation

Cleaning

Conditioning

- ▶ Plug Flow Tube Conditioner
- ▶ Plug Flow Plate Conditioner
- ▶ Plug Flow Plate & Tube Conditioner
- ▶ E-Comyser™ Heat recovery

Cracking

Impacting

Dehulling

Flaking

Cooking

- ▶ Rotary Steam Tube Cooker
- ▶ Stack Cooker

Expanding

Pressing

Cake Crisping

REFINING

Oil Pretreatment

- ▶ Acid Degumming
- ▶ Enzymatic Degumming
- ▶ Neutralising
- ▶ Nano Neutralising

Bleaching

- ▶ Continuous Sparbleach Bleaching
- ▶ Combiclean Bleaching Process
- ▶ Twinbleach Double Bleaching

Deodorising

- ▶ Continuous Qualistock™ Plus
- ▶ Semi-Continuous Multistock®
- ▶ Sublimax Ice Condensing

Winterising/Dewaxing

- ▶ Wintrend Winterising
- ▶ Winwax™ Winterising

EXTRACTION

Solvent extraction

- ▶ Reflex® Extractor
- ▶ LM™ Extractor
- ▶ LLL® Extractor

Dimax™ Desolventising Toasting

Drying Cooling

Miscella Distillation

Solvent Recovery

Mineral Oil System

Waste Water Steam Generation

Degumming

- ▶ Water Degumming
- ▶ Enzymatic Water Degumming

FAT MODIFICATION

Dry Fractionation

- ▶ iConFrac™ Continuous Dry Fractionation
- ▶ FlexiFrac™ Dry Fractionation
 - ▶ TX Crystallizer
 - ▶ Mobulizer™
 - ▶ Tubular Crystallizers
- ▶ Statoliser Palm Kernel Fractionation

Interesterification

- ▶ Interchem™ Chemical Interesterification
- ▶ Interzym™ Enzymatic Interesterification

Hydrotherm™ Hydrogenation

Based on Belgium's De Smet know-how as the world specialist in oilseed and edible oil processing plants, Desmet Ballestra delivers tailor-made engineering and procurement services covering each step of the industry, from oilseed preparation and extraction to oil processing plants including refining and fat modification processes.

Desmet Ballestra masters the processing of 40 raw materials, of which soybeans, palm oil, sunflower seed, rapeseed, groundnuts, and cottonseed are probably the most popular. The group has supplied small and large plants to some 1,700 oil millers in 150 countries, covering over 8,000 process sections.

Leading edge Oils & Fats Research & Development and privileged customer relationship are the key assets of Desmet Ballestra which is able to provide to the customers the best technologies through an international network of companies.

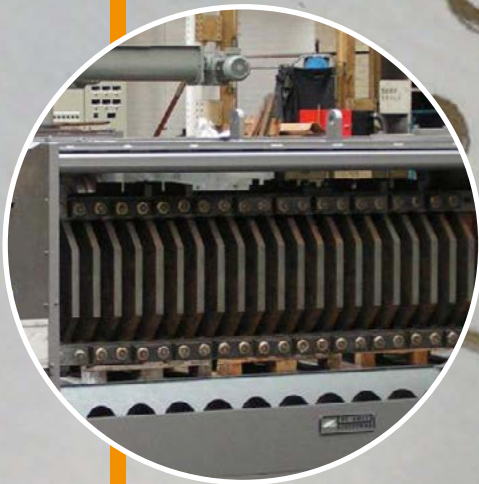
With its Oils & Fats Center of Excellence in Brussels, Desmet Ballestra is present in all major oils & fats market areas of the world through its integrated business units in Northern and Central America (USA, Mexico), South America (Argentina, Brazil, Colombia, Peru), Asia & Far East (PR China, Singapore, Malaysia, Indonesia), India and Europe (Belgium, Italy, UK, France, Spain, Turkey, Russia).

Desmet Ballestra has a dedicated After Sales Team to support customers operation worldwide. After Sales Services include supply of spare parts, technical assistance during planned maintenance, operators training, remote software support, diagnostics and troubleshooting.

Desmet Ballestra is held in high repute all over the world by its customers, and its name stands for experience, innovation, first class project management, customer service and environmental protection policy.



Rosedowns Pressing



Screw Pressing types

- ▶ Full Pressing
- ▶ Double Pressing
- ▶ Pre-Pressing

Sterling Series Screw Presses

- ▶ 100 Series
- ▶ 200 Series
- ▶ 400 Series
- ▶ 600 Series
- ▶ 800 Series
- ▶ 900 Series

Cake Breakers

Compress systems

Mini Presses

Oil screening tanks

Ewon Remote Assistance

7 2 5 / 3 6 0 7 3
ROSE DOWNS
6 2 2 / 2 0 1 3

Located in the city of Kingston Upon Hull, England and established since 1777, Rosedowns is a pioneer in its field. Having an unrivalled reputation around the world for supplying processing equipment and replacement parts to the vegetable oil and rendering industries, Rosedowns boasts references of its equipment in more than 100 countries.

Rosedowns are at the forefront of pressing technology and, with more than 3,500 presses supplied worldwide, Rosedowns can claim to be the world's leader in the design and manufacture of Screw Presses, continually setting new standards for design and performance. With a range of presses having capacities from 40kg/hr to 900 Tonnes/day (dependent upon feed material), Rosedowns has a press to suit your processing needs. In setting a high standard of quality and performance, Rosedowns Screw Presses are operated not only by all the multinational, but independent processors too, each time proving to be a highly successful and reliable investment.

The first choice for screw press wearing parts with an extensive range of Rosedowns presses in the market, we offer a complete replacement spare parts and after-sales service for our equipment.

Rosedowns extensive experience of spare parts design and manufacture allows us to utilise this expertise to improve the performance and extend the wear life of parts in all our machines, both old and new. This understanding also enables us to replicate, improve and manufacture wearing parts for presses manufactured by our competitors.

Our dedicated team of specialists and experienced engineers can provide both local and remote assistance, including Maintenance, Commissioning, Plant Audits, Plant Design, Press upgrades.



Stolz Animal Feed & Agro Food



Grain & Powders Cleaning

- ▶ Pre-cleaner without dust air separator
- ▶ Pre-cleaner with dust air separator
- ▶ Separator-cleaners

Sieving

- ▶ Turbo Sifters
- ▶ Planned Sifters
- ▶ Rotating Sifters

Mechanical Handling

- ▶ Chain conveyors
- ▶ Curved Chain conveyor
- ▶ Bucket elevators
- ▶ Belt conveyors
- ▶ Screw conveyors
- ▶ Chain reclaimers
- ▶ Pneumatic conveying

Dedusting

- ▶ Pads filters
- ▶ Sleeve filters
- ▶ Chain Reclaimers
- ▶ Centralised cleaning

Grinding

- ▶ Hammer Mill Feeder
- ▶ Hammer Mill
- ▶ Selfstanding Grid selector

Thermal Treatment

- ▶ Super Conditioner
- ▶ Counter Air-Flow Dryer-Cooler

Mixing

- ▶ Twin shafts paddle mixers
- ▶ Ribbon mixers
- ▶ Cryogenic mixers
- ▶ Mixing rotosphere
- ▶ Dosing

Thermal Treatment

- ▶ Thermal Conditioner
- ▶ Extruder Super Conditioner
- ▶ Counter air-flow dryer-cooler

Pelletizing

- ▶ Pellet Mill
- ▶ Standard Conditioner
- ▶ Long Residence time Conditioner

Drying/Cooling

- ▶ Horizontal cooler
- ▶ Vertical counter-flow dryer-cooler
- ▶ Horizontal Dryer

Coating

- ▶ Fat coaters
- ▶ Enzymers
- ▶ Vacuum coaters

Stolz is a designer of solutions for agribusiness specialized into the conception and manufacturing of installations dedicated to handling and processing of raw materials for animal feed and agro food.

With more than 6,000 international references and 65 years of know-how and experience, Stolz is a well known and respected leader in the fields of mechanical handling, animal feed equipment and agro food applications.

Thanks to a perfect knowledge of the process and a target of high quality, the company has developed even more efficient solutions in the fields of grinding, dosing, pelletizing, mixing, thermal treatment, dedusting and cleaning.

With such a significant involvement, Stolz has a perfect knowledge of the equipment and processes the company may be required to work on. It helps Stolz to integrate quickly technical developments, manufacture tailor-made equipment and comply with many regulatory constraints.

Thanks to a constant improving of the production tool, Stolz has successfully adapted its production to a complex target: to deliver industrial tailor-made solutions.

Automated laser cutting station, digital folding machine, welding robots,... all these tools adapted to Stolz fields of expertise and combined with its team's know-how enable Stolz to be competitive.

Stolz employs 220 persons including more than 50 qualified engineers in its design offices. Stolz has an important network of fully owned offices in France and overseas sales offices in Italy, Spain, Morocco, Malaysia, Singapore, China & Vietnam.



Oleochemicals & Biodiesel



BIODIESEL

Options to purify feedstock

- ▶ Acid Degumming
- ▶ Fatty Acid Stripping
- ▶ Nano Neutralisation

Options to utilize high FFA feedstocks

- ▶ Acid Esterification
- ▶ Glycerolysis
- ▶ Esterified Product Neutralization

Biodiesel Plant

- ▶ Oil Drying
- ▶ Transesterification
- ▶ Glycerine Separation
- ▶ Methyl Ester Washing
- ▶ Methyl Ester Drying
- ▶ Glycerine Purification
- ▶ Glycerine Concentration
- ▶ Methanol Rectification

Options to further enhance biodiesel quality

- ▶ Methyl Ester Prewashing
- ▶ Methyl Ester Clarification
- ▶ Methyl Ester Distillation

Option to further enhance glycerine quality

- ▶ Glycerine Distillation

OLEOCHEMICALS

Fatty Acid Processing Plant

- ▶ Fat Splitting
- ▶ Fatty Acid Distillation
- ▶ Fatty Acid Fractional Distillation
- ▶ Fatty acid Hydrogenation
- ▶ Fatty Acid Dry Fractionation
- ▶ Sweetwater Treatment
- ▶ Sweetwater Concentration
- ▶ Glycerine Distillation

Fatty Alcohols

(Johnson Matthey Davy Technologies)

- ▶ Fatty Acids Esterification
- ▶ Methyl Ester Hydrogenation
- ▶ Fatty Alcohol Refining
- ▶ Fatty Alcohol Post Hydrogenation
- ▶ Fatty Alcohol Fractional Distillation

Fatty Acids Methyl Ester Process Plants

- ▶ Methyl Ester Fractional Distillation
- ▶ Methyl Ester Hydrogenation

Desmet Ballestra's headquarters for the oleochemical & biodiesel activities are located in Brussels (Belgium). This is the product centre for the conception of high performance plants and components for:

- ▶ Biodiesel & Methyl Esters processes;
- ▶ Fatty acids processes;
- ▶ Glycerine processes for sweet water, spent lyes and methylesters;
- ▶ Fatty alcohol processes.

Since decades, Desmet Ballestra ventured into Oleo-chemicals and has an impressive track record...

Through various technology alliances, like with Johnson Matthey Davy Technologies for the fatty alcohols processes, combined with a strong product development: Desmet Ballestra became a major reference in this field.

In more than 40 years, Desmet Ballestra and its 15 affiliated companies have installed more than 400 oleochemical and biodiesel processes worldwide.

Desmet Ballestra added value:

- ▶ Proven process technology for high yields and low operating cost. Competitive sourcing of quality equipment using specialized workshops;
- ▶ Quality control by experienced project management teams. Total in-house expertise for new projects, plant expansions or upgrades;
- ▶ Possible sources of financing origination from countries where Desmet Ballestra companies operate;
- ▶ Global coverage to meet any local requirements and conditions.



Detergents, Surfactants & Chemicals



DETERGENTS

Powder Detergents

- ▶ **SABIZ** Spray Drying Tower Process
- ▶ **NTD** Non Tower/Agglomeration Process
- ▶ **COMBEX** Spray Drying and Agglomeration Process
- ▶ Auxiliary Units
- ▶ Specific Equipment

Liquid Detergents (LIDET)

- ▶ Batch Process
- ▶ Continuous Process

SURFACTANTS

Anionic Surfactants

- ▶ **SULPHUREX** Sulphonation/Sulphation
- ▶ **NEUTREX** Loop type or double step neutralization
- ▶ **VACUUM NEUTRALIZATION**
- ▶ **DRYEX** pure surfactants in dry form
- ▶ Exhaust gas treatment
- ▶ Special Sulphonates

Non Ionic Surfactants

- ▶ **ALKOXYLATION** (Ethoxylation/Propoxylation)
- ▶ Auxiliary Units, Specific Equipment

Amphoterics & Cationics

- ▶ Betaines
- ▶ Esterquats
- ▶ Amino oxides
- ▶ Alkanolamides

CHEMICALS

Sulphuric Acid Production Plants

- ▶ Permanent licensee of DuPont MECS
- ▶ Dry Route from Sulphur Burning, Offgas, Spent Acid Regeneration
- ▶ Double absorption with enhanced heat recovery system (HRS™)
- ▶ Wet Route
- ▶ Liquid SO₂ plants
- ▶ SO₃ production plants

Phosphoric Acid Production Plants

- ▶ Permanent licensee of Prayon for Phosphoric Acid Merchant Grade technology
- ▶ Merchant Grade through DH, DAHF, DH-HH process
- ▶ Phosphoric Acid Purification through Solvent Extraction

Gas Cleaning Applications

Fertilizers

- ▶ Single Super-Phosphates (SSP) Powder
- ▶ Triple Super-Phosphates (TSP) Powder
- ▶ Granulated SSP - TSP - NPK
- ▶ Potassium Sulphate
- ▶ MAP / DAP (granular and crystal / water soluble)

Components for the Detergents Industry

- ▶ Sodium Sulphate
- ▶ Sodium Silicate
- ▶ Zeolite
- ▶ Linear Alkylbenzene (LAB)



The Desmet Ballestra's head office for the Detergent, Surfactant and Chemical activities is in Milan (Italy). Desmet Ballestra has proprietary technologies in many areas of the organic and inorganic chemical industry. Its unique skills and experience in the design and supply of plants cover a wide range of requirements, such as:

- ▶ Production of formulated detergents, surfactants (Anionic, Non-ionic, Cationic and Amphoteric), auxiliaries, raw materials for the Detergent Industry (silicates, zeolites, LAB etc.), and several other specialty sulphonates (heavy alkylates, additives for lubricant oils, concrete plasticizers, etc.) and alkoxyates (Polyethers, polyols, PEGs, etc.).
- ▶ Production of Sulphuric acid (and products related to such technologies such as liquid SO_2), Phosphoric acid (both Merchant Grade and Purified), N-P-K granulated compounds, SSP, TSP, Potassium Sulphate and other phosphate-based fertilizers and chemical components.

Since the beginning of its operation in 1960 under the name of Ballestra, Desmet Ballestra has focused on the design and supply of modern, efficient and easy-to-operate production plants for sulphonation and detergents production. Alkoxylation technology based on Enhanced Loop Reactor is the most recent addition to Desmet Ballestra innovation in the surfactants field.

At the beginning of 2017 Desmet Ballestra acquired IIT. Founded in 1976, IIT is a qualified Italian manufacturer of proprietary equipment for the production of anionic surfactants applied to the detergent, cosmetic, leather, textile and chemical industries. The equipment of IIT is now available for integration in the Desmet Ballestra process. In particular:

- ▶ Innovative DEDIOX process for dioxane removal from SLES
- ▶ ESP Electrostatic Precipitators
- ▶ High efficiency Sulphur Burners and Steam Boilers
- ▶ High efficiency/high shear in line neutralization mixers



Through continuous technological development, supported by a dedicated R&D Team, Desmet Ballestra has built up and consolidated its leading position in the surfactants and detergents sector with 1,500 plants spread over 120 countries.

Additionally, since the 90's initially through leverage on its process technology know-how and permanent licensing agreement for world-class technologies, Desmet Ballestra has also become a key player in the field of Inorganic Chemicals and Fertilizers industry for the design and supply of specific industrial units: sulphuric acid production plants (DuPont MECS technology), phosphoric acid production plants (Prayon technology), sulphur and potassium based fertilizers (SOP) and other phosphoric based fertilizers (SSP, TSP, NPK fertilizers) production plants.

Desmet Ballestra has a dedicated After Sales Team to support Detergents, Surfactants & Chemicals customers operation worldwide. After Sales Services include supply of spare parts, technical assistance during planned maintenance, operators training, remote software support, diagnostics and troubleshooting.

Mazzoni LB Soap



Soap Process Plant

- ▶ Continuous Saponification Plants
- ▶ Vacuum Dryers
- ▶ Integrated Process Plants
- ▶ Oils & Fats Pre-treatment (Bleaching, Deodorizing,...)

Soap Finishing Lines

- ▶ Batch and Continuous Mixers/Amalgamators
- ▶ New Plodders generation for capacities up to 15 tph
- ▶ Clean Design hydraulic roll-mills
- ▶ Mechatronic Electronic Cutters in single and duplo
- ▶ New concept soap presses
- ▶ MRP Multi-refining Plodder

Flowpack

- ▶ Toilet/laundry soap flowpack up to 500 bpm

Syndet/Combo soap lines

- ▶ Syndet laundry bars
- ▶ Syndet toilet bars
- ▶ Combo toilet bars

Rim Blocks Lines

- ▶ Versatile lines for toilet water conditioning

Chemical Plants

- ▶ Bleach Water Process Plants
- ▶ Household and personal care chemicals plants
- ▶ Special esters plants
- ▶ Glycerine recovery plants

The Desmet Ballestra's head office for the Soap activities is Mazzoni LB located in Busto Arsizio (Italy). Founded in 1946, Mazzoni LB is an engineering and manufacturing company, world leader in the design and supply of plants and machines for the production of soap and glycerine with a market share exceeding 60% and over 6,000 soap plants and machineries installed in more than 100 countries. Mazzoni LB technologies and services allow to meet all the requirements of any toilet or laundry soap manufacturer, small or large, from oils & fats pre-treatment up to soap stamping.

Mazzoni LB is also a major world player in the chemical industry through its chemical department, specialized in the design and supply of complete plants for the production of rim blocks, household and personal care products, downstream oleochemicals and bleach water.

Mazzoni LB invests heavily in R&D to continue to guarantee its customers top of hedge technologies with a dedicated team of engineers and chemists. Mazzoni LB has over the past years strongly developed its facilities with the installation of a new fully equipped laboratory and pilot plant available both for its internal technological development as well as to cooperate with customers of specific joint projects.

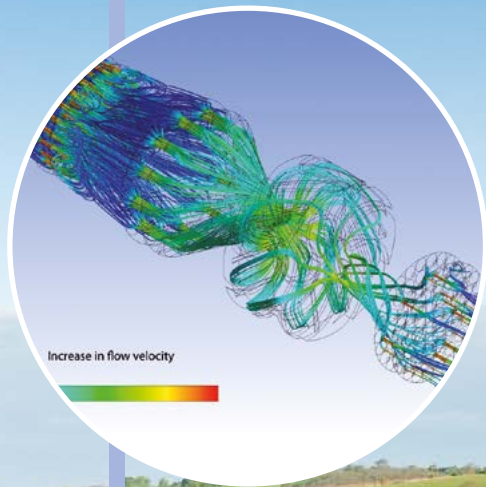
Price evolution and development of new raw materials requires Mazzoni LB and its customer base to be ready for any new opportunity to bring more cost efficient production, increase product quality, reduce environmental impact, develop new products or formulations.

Mazzoni LB has a unique team of chemical, mechanical and automation engineers & technicians capable to support our customer activities worldwide both from our headquarters or with the support of our local offices present in all continents. Contact us for any technical or product support you may require for troubleshooting assistance, maintenance, revamping studies, optimization projects,...

Mazzoni LB customer service and spare parts department is furthermore at customer's disposal to assist in offering replacement parts for all plants & machines supplied since its foundation in 1946 with many key parts on stock to guarantee fast and cost effective supply.



Research & Development



Desmet Ballestra benefits from a great worldwide reputation, thanks to over 70 years of unequalled experience, a strong R&D capacity and the most extensive customer base in the industry.

OUR RESEARCH & DEVELOPMENT

- ▶ Improvement of existing processes
- ▶ New applications
- ▶ Custom R&D
- ▶ Pilot plants
- ▶ Backup service
- ▶ Research & Development Centers in Belgium, Italy, France and United Kingdom

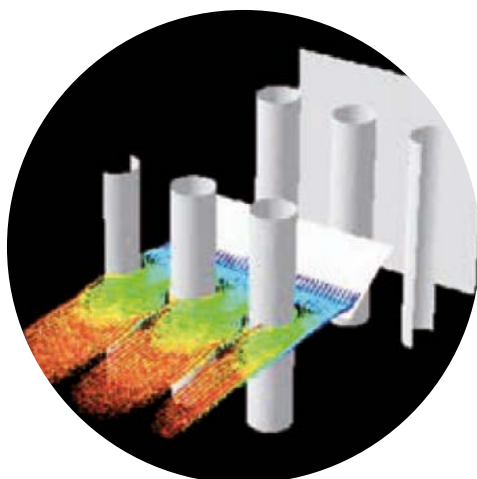
INNOVATION AT HEART

Desmet Ballestra's R&D Team is composed of professionals specialized in Oils & Fats, Pressing, Animal Feed & Agro Food as well as Oleochemical, Detergent & Surfactants, Chemical & Soap processes, using the most comprehensive set of technological resources and equipment. We have collaboration agreements with several universities (Europe, Asia, USA...)

- ▶ High level scientists
- ▶ Years of practical experience in the related industries
- ▶ Fully equipped analytical and research laboratories
- ▶ Flexible pilot units, including skid-mounted units available for testing at customer's facility

DESMET BALLESTRA R&D CENTERS

Through its full-fledge Research & Developments Centers, and a number of Fundamental Research programs in various Universities and Research Centers in the world, Desmet Ballestra is continuously improving its technologies and discovering new ways to cope with the market requirements.



Worldwide close to you



Technical innovation and privileged customer relationship are the keys of the strategy of the Desmet Ballestra Group that is able to provide to customers the latest technologies through a fully integrated international network of companies.



desmet ballestra



Hull
Wailly
Paris
Madrid
Brussels
Busto Arsizio
Milan
Rome
Moscow
Istanbul
Dubai
Nairobi
Bangalore
Singapore
Kuala Lumpur
Shanghai
Surabaya

Desmet Ballestra Group
France – Paris

FOOD & FEED

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Oils & Fats
Belgium – Brussels*

*Desmet Ballestra
Rosedowns
United Kingdom – Hull*

*Desmet Ballestra
Stolz
France – Wailly Beaucamp*

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