Aspen API. **More than just an API**

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aspenapi.com

Aspen API

More than just an API

Our CEO

Every single day, I am proud to be part of Aspen API. It is truly inspiring to see my experienced and skilled colleagues being proactive, compliant and always striving to improve. All of us being focused on providing high quality active pharmaceutical ingredients that are used to improve patients' lives worldwide. Apart from our current portfolio, we develop and manufacture new APIs, in collaboration with our partners and clients. Together, we continuously strive to improve and provide the ultimate solution, which is why Aspen API is your personal partner.

Dirk Van Leemput

About us

At Aspen API, we provide high quality active pharmaceutical ingredients (API) that are used to improve patients' lives worldwide. Meanwhile we protect our employees, the environment and our products. With quality, compliance and collaboration at the core of our DNA, we continuously strive to improve and provide the ultimate solutions for our customers.

Power of our People

Our proactive quality and safety culture is firmly rooted in our people: a workforce of over 1200 employees who are energetic, committed and enthusiastic. We understand your needs and contribute proactively in discussing more efficient and green alternatives. Our people form a powerful basis for every new, sustainable development and in our continuous drive for unprecedented and unique solutions.

Power of Reliability

Our inexhaustible, deep-rooted foundation for complex, powerful APIs is built on 100 years of history. We are known as a reliable API provider. This is confirmed time and time again by our customers, as well as by international health authorities, including the US FDA, EDQM, Dutch Health authorities and PMDA. Weekly we welcome (virtual) inspection teams to our sites, and take pride in successfully completed inspections.

Power of Collaboration

We strongly believe in the chemistry of collaboration in all stages. Whether your project is for a new chemical entity (NCE), or a process for (re-)designing your (intermediate) API, we will be your partner from the development phase to the commercial implementation. We are with you every step of your journey. Through personal interaction, co-creation and tailor-made solutions, we have the power to make your project a success.

Power of Innovation

Our development team commits itself to incorporate innovation and green technology into your projects. Being proactive and energetic, we embrace state-of-the-art knowledge and innovation. Our close contacts to educational institutes (MSc and BSc) and companies in for example the Health Valley Netherlands, the biggest Dutch Life Sciences & Health innovation network, enable us to keep up with the latest developments and to innovate.

Power of Improvement

Tomorrow we'll be better than today is not just a quote. It is a way of being, living, working. We embrace Lean Six Sigma and we continuously strive to improve. Together with our Yellow, Green and Black Belts we make projects and processes smarter, more efficient, and more sustainable.

Power to the Planet

Sustainability is a pillar in the development of our activities at Aspen API. In our effort to preserve this world for generations to come, we act to minimize our carbon footprint. We practice what we preach: we use green technology and solvents in our chemical processes where possible and we strive for more environmentally friendly alternatives. Sustainability is extremely important to us at Aspen API

Contract development and manufacturing

We have a proud, century-long history in development, up-scaling and commercially manufacturing complex high potency APIs (HPAPIs), steroids as well as narcotics and other established APIs. At Aspen API your C(D)MO project is in excellent hands. With our competencies we can add value to your project and collaborate with you to ensure success.

Aspen API adds expertise, innovation, compliance, registration and partnership to your project. You will be working with a high-quality partner who offers skills and well-equipped pilot laboratories, pilot plants and cGMP facilities to enable development, efficient technology transfer and scale up of your API. Our facilities are successfully inspected and approved by regulatory authorities such as the US FDA, EDQM, PMDA, and others. On top of that we simply love molecules, and we are driven to guide you to effectively scale up from lab to plant.

Our experience with complex chemical reactions enables us to develop the most efficient processes. Supported by a robust quality system, we ensure that a high quality product is manufactured in compliance with cGMP, ICH and SHE regulations. Aspen API assures you of flexibility and delivery reliability to meet your project needs.

Our services

- ✓ Direct contact with our Subject Matter Experts
- ✓ Professional project management
- ✓ Route selection
- ✓ Process development and optimization
- ✓ Analytical development and validation
- ✓ ICH stability studies
- ✓ Reliable supplier network

Our API development equipment

- ✓ HPLC, UPLC, LC-MS, High resolution HPLC-MS
- ✓ ES-MS, Orbitrap
- ✓ 500MHz NMR, IR, NIR
- ✓ High-resolution proton and carbon-13 spectrometry facilities for state-of-the-art correlation spectroscopy such as COSY and HETCOR
- ✓ SEM and X-ray powder diffraction studies

Aspen API

Development Solutions

Process development & optimization

At Aspen API we understand what you need. We advise you on green and efficient alternatives and provide the ultimate solution. We ensure an ultimate collaboration at every step of your journey. We are proactive, energetic, transparent and we continuously striving to improve and optimize our methods. Expertise and compliance are in our DNA. With our skills we can add significant value to your project. Aspen API, your personal partner in process development and optimization.

We believe in partnership. Your project requires teamwork, know-how and experience to fulfill your specific needs. We are with you every step of your journey. We meet and communicate on a regular basis and in an open, transparent way. We are committed to collaborate with you to provide the ultimate solution.

Knowledge and innovation
Being proactive and energetic, we embrace state-of-the-art knowledge and innovation. Our close contacts to educational institutes (MSc and BSc) and companies in, for example, the Health Valley of the Netherlands, which is the most advanced Dutch health innovation network, enable us at Aspen API to stay informed about the latest developments and to innovate.

Analytical Development

Our Analytical Development laboratories, filled with state-of-the-art equipment, enables us to rapidly solve complex analytical challenges.

Our analytical laboratories are equipped with world class equipment, including a HRMS, several LC-MS(MS) systems, a variety of LC and GC systems and a 500 MHz NMR. Our highly skilled and enthusiastic team, who thrive on analytical challenges, has extensive years of relevant experience which can be used to benefit your needs.

Responsible for a variety of key activities
- Analytical method development and subsequent validation/ verification and method transfer activities
- Analytical activities in support of Regulatory and Quality compliance
- Implementation of the Stability program and reference standard program
- Implementation of the cleaning validation and continuous monitoring program
- Laboratory equipment procurement, maintenance and compliance.

Structure elucidation and impurity characterization
One of the main applications of the available equipment is rapid structure elucidation, which is regularly applied during trouble shooting events. For example, the identification of unknown impurities can be extremely valuable for root cause finding and solving the problem for future batches. The (LC-) HRMS is specifically valuable for these cases since it can determine the elemental composition of an impurity directly from small peak in the HPLC chromatogram (~0.1 a/a%). If this approach is unfeasible, or when more extensive knowledge on the impurity is required, we can isolate the unknown peak to enable structure determination with (2D)-NMR.

Low level quantification
The LC-MS equipment is also frequently used for low level quantification of small molecules. We routinely use tandem-MS analyses to enable detection limits at the low ppb range. In addition, we have applications for larger molecules such as proteins in qualitative or quantitative analyses

NMR release testing of API and intermediates
Besides offering support in trouble shooting, we also use our NMR system for release testing of API and intermediates. We specifically use this system for 1H-NMR, 13C-NMR and solid state NMR release testing.

Other equipment includes state-of-the-art gas and liquid chromatography systems, Ion mobility Scan systems, Laser Particle Size Analysers and Thermogravimetric instruments.

Manufacturing capabilities

Aspen API has a heritage of serving a stable customer portfolio comprising, among others, multinationals, generic manufacturers and innovative new tech start-up companies. We have established expertise and capability to develop, scale-up and commercially manufacture complex APIs. These competencies ensure that when you engage with Aspen API, you will be working with a reliable high quality partner.

API chemical and peptide manufacturing capabilities

Aspen API specializes in complex chemical reactions and is able to combine this with developing the most efficient processes. Moreover, we have built extensive experience and a strong reputation in producing cGMP peptides. Supported by a robust quality system, we ensure a high quality product that is manufactured in compliance with cGMP, ICH and SHE regulations and standards. Through our global Aspen API network, we ensure flexibility and delivery reliability.

Expertise with HPAPIs

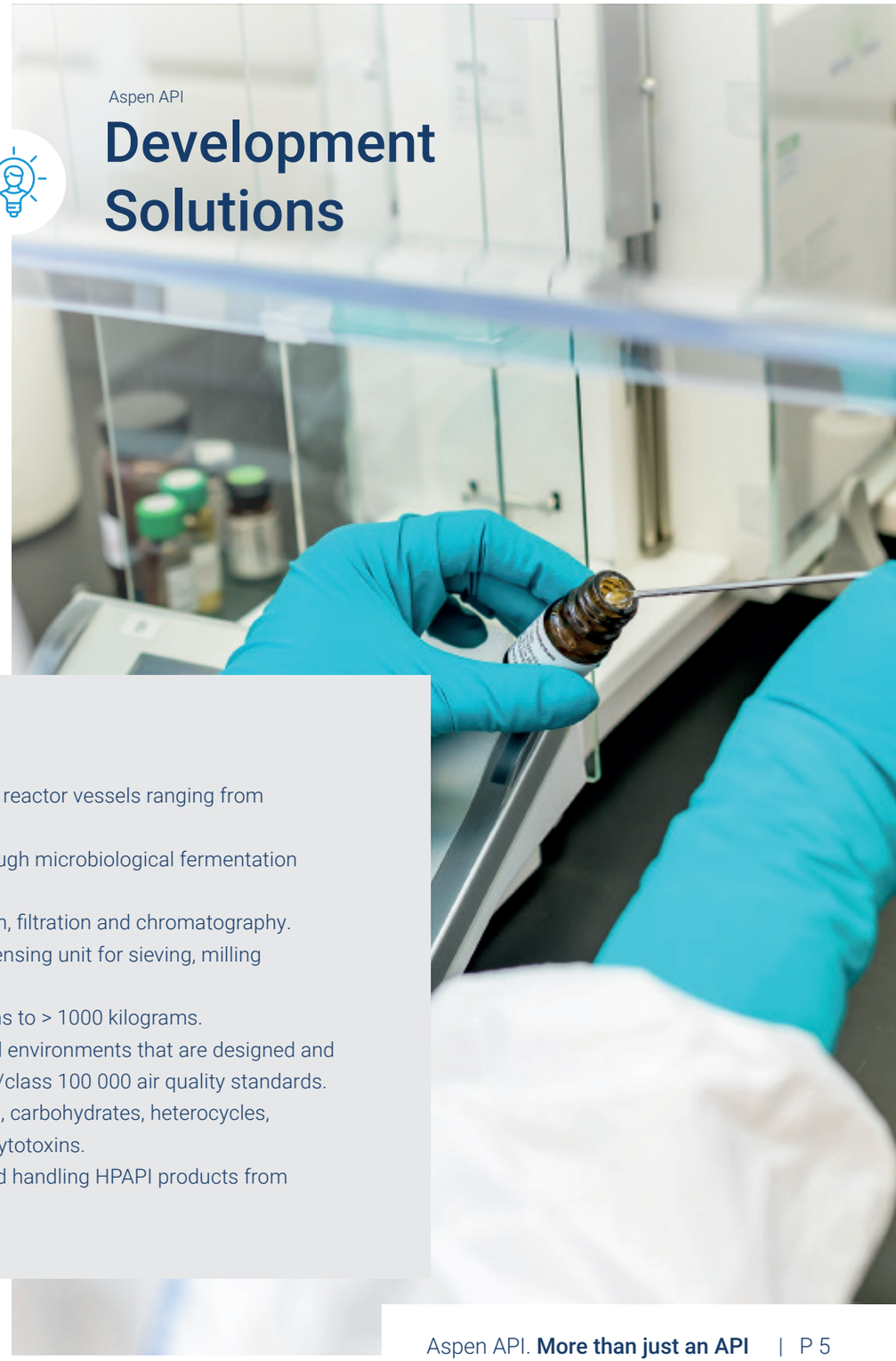
At Aspen API, one of our strengths lies in manufacturing APIs at various production scales with a specialization in HPAPIs. Our HPAPIs are produced in units with OEB 4 and 5 classifications. We have a longstanding history of working with OEL levels as low as 0.01 µg/m3. Our heritage of manufacturing complex HPAPIs has enabled us to establish world class systems and procedures for the safe handling of these compounds.

Manufacturing facilities

Our cGMP production facilities are able to produce products from gram to kilo quantities to support clinical and commercial demands. All our facilities have been successfully inspected and approved by international health authorities, including the US FDA, EDQM, the Dutch Health authorities and PMDA, as well as by our customers.

Our chemical capabilities

- ✓ More than 100 stainless steel and glass-lined reactor vessels ranging from 100 liters to 10,000 liters.
- ✓ Conversion of steroidal starting material through microbiological fermentation and/or enzymes.
- ✓ Large scale purification through crystallization, filtration and chromatography.
- ✓ State-of-the-art Powder Processing and Dispensing unit for sieving, milling and micronization.
- ✓ Batches are manufactured varying from grams to > 1000 kilograms.
- ✓ All finished products are handled in controlled environments that are designed and qualified by independent contractors to ISO 8/class 100 000 air quality standards.
- ✓ Manufacturing of peptides, alkaloids, steroids, carbohydrates, heterocycles, narcotics, anti-coagulation compounds and cytotoxins.
- ✓ Containment capability for manufacturing and handling HPAPI products from OEL 1 ug/m³ to 50 ng/m³.



Aspen API

Development Solutions

Our green answer to peptide synthesis

Green Continuous Liquid Phase Peptide Synthesis
Combining the advantages of LPPS and SPPS

Scan the QR
Our peptide products
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Project management

Our project managers understand your needs. They are highly qualified PhD scientists and experts in this field, who will advise you on green and efficient alternatives and provide you with an ultimate solution. This is achieved through a proactive, energetic and collaborative approach. Our reputation speaks to our expertise and compliance, which is firmly rooted in our DNA.

Power promise
Our Aspen API team is passionate about molecules and we offer the power of expertise, innovation, compliance, registration and partnership to your project. With a heritage of nearly 100 years, we promise what we do and do what we promise.

Solutions to fulfill your needs
Your project requires teamwork, know-how and experience to fulfill your specific needs. That is why we believe in partnership. Our dedicated and highly qualified project managers support you every step of your journey. We meet and communicate on a regular basis and in an open, transparent way. We are committed to collaborating and providing the ultimate solution within the scope of your project.

Technology platform

Aspen API has a proud history in developing and manufacturing complex APIs. With our competencies and technology platform, we can add powerful value to your product or goals. We are able to carry out a wide variety of (complex) chemical reactions. Below you will find a selection of our technology platform.

- ✓ Bromination
- ✓ Catalytic hydrogenation
- ✓ Chlorination
- ✓ Ethynylation
- ✓ Grignard
- ✓ Heteroatom acylation
- ✓ Heteroatom and carbon alkylation
- ✓ Hofmann degradation
- ✓ Hydride reduction
- ✓ Liquid ammonia reduction
- ✓ Lithium aluminum hydride & sodium borohydride reduction
- ✓ Oxidation
- ✓ Oxidation (Jones, Oppenauer)
- ✓ Phase transfer reactions
- ✓ Peptide synthesis (SPPS, LPPS and our green method GC-LPPS)

Established API Portfolio

More than 65 high-quality APIs are available. They range from high potency, oncology, peptides, steroids, narcotics, analgesic, botanical extraction to biochemical. Several new APIs are under development.

High potency & oncology APIs

At both Aspen Oss and Fine Chemicals Corporation our HPAPIs are produced in units with OEB 4 and 5 classifications. Aspen API has a long history in working with OEL levels going as low as 0.01 µg/m³. Our heritage in manufacturing complex HPAPIs has enabled Aspen API to establish world class systems and procedures for safe handling of these compounds. At Fine Chemicals Corporation, cytotoxic product manufacturing is carried out in a dedicated purpose-built facility. Oncology products such as Vinblastine Sulfate and Vincristine Sulfate are manufactured from plant source by unique in-house methods using chromatography.

Peptides

For synthesis manufacturing we have stainless steel and glass-lined reactors ranging from 100 to 1500 liters with a capability to extend to 10,000 liters. We have extensive know-how and experience in both LPPS & SPPS. Next to that we have a patented method for large-scale manufacturing in solution, named Green Continuous Liquid Phase Peptide Synthesis (GC-LPPS). For purification we use ion exchange chromatography and reverse-phase preparative HPLC columns up to 45 cm in diameter. Final isolation is achieved using tray lyophilizers with a capacity up to 100 liters.

Narcotics & analgesic APIs

Fine Chemicals Corporation is one of the few UN INCB recognized narcotic manufacturers. We manufacture a wide range of both plant source and synthetic opioid products for pain management and analgesic purposes under strict quality and security control.

Botanical extraction APIs

Cytotoxic product manufacturing is carried out in a facility fully dedicated to purpose. Oncology products Vinblastine Sulfate and Vincristine Sulfate are manufactured from plant source by unique in-house methods using chromatography.
Anti-spasmodic, motion sickness and nausea treatment products Scopolamine N-butyl bromide and Scopolamine base are manufactured from plant source using unique high efficiency synthetic chemistry

Biochemical APIs

Thanks to our long-lasting experience in the sourcing of raw materials from several continents, we have ensured full quality oversight, control and traceability. Our manufacturing processes include validated and approved viral and prion reduction steps. Through our in-house developed and validated real time PCR analysis technique, we certify the absence of bovine, ovine and caprine material in our heparin sodium.
Continuously monitoring of and involvement in changing governmental regulations throughout the complete value chain.

APIs under development

At Aspen API, we carefully select new candidates for our portfolio that fit well with our core competencies and expertise. We also welcome ideas from our customers to add new APIs to our portfolio.

Scan the QR
Our full API Catalogue
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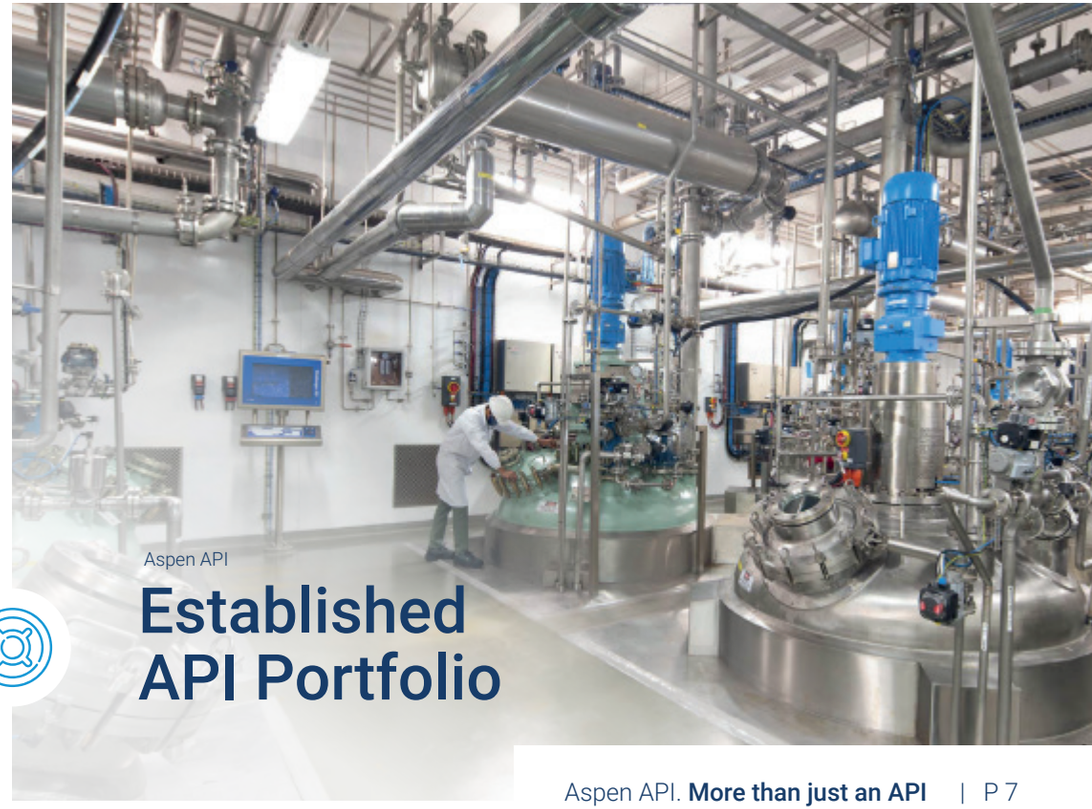


Our sustainability

At Aspen API, the protection of our employees, the environment and our products is highly valuated. We are committed to ensure a proactive safety culture and consider Safety, Health and Environment (SHE) awareness and compliance as an imperative. We manage SHE as an integral part of our business and we are an ISO 14001 and ISO 45001 certified company. Our API sites were awarded a silver and golden medal by EcoVadis for responsible conduct in environment, labor and human rights practices, ethics and sustainable procurement.

In our effort to preserve this world for generations to come, we act to minimize our carbon footprint. We prevent environmental pollution (soil, water, air) and nuisance (odour, noise) and limit environmental impact (energy, water and raw material consumption, and waste production). We do this by employing appropriate processes, working practices, materials and products. Application of Best Available Techniques is our starting point. Specifically, we focus on reducing greenhouse gas emissions. We use green technology and solvents in our chemical processes as much as possible and strive for more environmentally friendly alternatives.

Sustainability. More than just a word.

It is our commitment to protect our employees, our products and our planet.

Our Quality & Regulatory Support

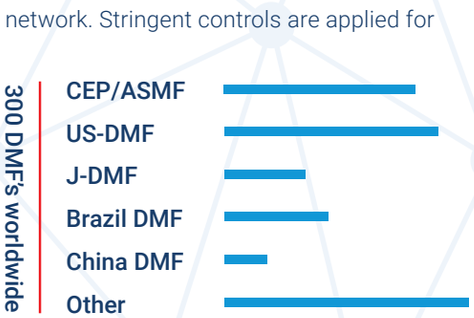
At Aspen API, we work from a deeply rooted and proactive quality culture. Our high quality products are manufactured in compliance with cGMP, ICH and SHE regulations and standards. Teamwork by highly motivated, experienced and skilled experts is one of our key success factors. We all contribute as quality is at the heart of what we do.

Extremely high standards

Our compliance standards are extremely high. It is in our DNA to offer high quality APIs used for finished dosage forms that contribute to improving patients' lives worldwide, meanwhile protecting our employees, the environment and our products. Our Quality Control Laboratories comply with ICH guidelines – particularly cGMP's & ALCOA principles – and are capable of performing all testing in support of the product range.

Stringent controls

Our Quality Control Laboratories form an integral part of our cGMP manufacturing network. Stringent controls are applied for chemical starting materials, in-process controls and the extensive characterization of final products. We ensure quality APIs are manufactured in compliance with the relevant regulations and regulatory dossier such as US FDA DMF, CEP, J-DMF and Brazilian DMF.



GMP, ICH and SHE regulations

US FDA, EDQM, PMDA and others

US-DMF, CEP, J-DMF and others

Successful audits

Our facilities are successfully inspected and approved by our customers and regulatory authorities such as the US FDA, EDQM, Dutch Health Authorities and PMDA. Authorities and customers compliment us for excellence in implementing data integrity in the organization.

Sales and Support Team

At Aspen API, a leading supplier of API solutions, we speak your language. We understand your needs, advise you on green and efficient alternatives and provide the ultimate solution. We collaborate every step of your journey. We are committed to a proactive, energetic and transparent approach and we continuously strive towards improvement and optimization. We are committed to make your project a success.

For many years now, we have been serving a stable customer portfolio comprising multinationals, generic manufacturers and innovative new tech start-ups. We believe in closely aligned partnerships and we collaborate to deliver your projects with excellence. We work from a deeply rooted and proactive quality culture and we are committed to delivering high quality APIs.

Our sales managers passionately work together with you and share their extensive product and practical business experience. With a transparant communication and a professional relation you will collaborate with a reliable quality partner.

Our locations

Location Sioux City, Iowa, USA

In our facility in Sioux City (Iowa, USA), we collect porcine mucosa and produce a crude heparin, that is then transported to our facilities in Oss for final purification and product release. Having this Sioux City based facility in an important livestock area in the USA, provides close access to many large slaughterhouses, and thus to large mucosa quantities. Large-scale mucosa collection is indispensable to be able to continuously serve the world market needs for heparin sodium.

Inspection approvals: US FDA

Location Moleneind, Oss, The Netherlands

The Moleneind site is located in the heart of Oss. Numerous activities are performed on site, including peptide manufacturing, biochemical manufacturing and small-scale chemical manufacturing. Also our Process and Analytical Development, our stability chambers, Quality Control and Quality Assurance departments are located at Moleneind.

Inspection approvals: ANVISA, Dutch HA, KFDA, PMDA, Russian HA, Turkish HA, US FDA.

Through our global Aspen API network, we ensure flexibility and delivery reliability.

Location De Geer, Oss, The Netherlands

The Diosite ('De Geer') facility is dedicated to chemical manufacturing and contains a modern, computer-directed, multi-purpose factory used for larger production campaigns with reaction vessels up to a volume of 10,000 liters. Also located at this site are the sieving, milling and micronisation of the APIs, as well as the central warehousing and distribution operations.

Inspection approvals: ANVISA, Dutch HA, KFDA, PMDA, Russian HA, Turkish HA, US FDA.

Location Boxtel, The Netherlands

Aspen API runs a biochemical operation in Boxtel. In this dedicated facility, urine from pregnant women is collected and further processed into the final API Chorionic Gonadotrophin (HCG). In 2018 this facility has undergone a major renovation including building a modern purification suite and the introduction of a virus filtration step, thereby meeting worldwide regulatory requirements.

Inspection approvals: Dutch HA, PMDA, Russian HA, Turkish HA, US FDA.

Fine Chemicals Corporation, Cape Town, South Africa

Fine Chemicals Corporation, a wholly owned Aspen subsidiary, is located in Cape Town, South Africa. The production facilities at FCC are divided into ten production buildings and the total production processing area under roof inclusive of mezzanines amounts to 6965 m2. The raw materials and finished goods stores comprise a further 3388 m2. The total site area in 2,7 ha / 27000 m2.

Inspection approvals: US FDA, PMDA, TGA, SAHPRA, EDQM/ANSM

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