



# Specialty Chemicals

Enabling pharmaceutical development  
and manufacturing



*Entegris is your partner in delivering innovative specialty chemicals to meet your pharmaceutical manufacturing milestones.*

We are a leader in the development of advanced materials for the pharmaceutical industry. Our knowledgeable team has unparalleled expertise, flexibility, and drive to provide customizable, complete, leading-edge solutions for your pharmaceutical development and manufacturing requirements.

We deliver best-in-class quality, reliability, service, and value to meet your global supply chain needs. We provide collaborative customer engagements and leverage global, state-of-the-art infrastructure and technology centers to work with you on your project objectives or quest for development solutions.

## COMMITMENT TO RESEARCH AND DEVELOPMENT

We have a global infrastructure that includes strategically placed manufacturing sites, R&D facilities, and customer support centers. With continuous investment in local R&D and support, our highly skilled team members, facilities, and resources are right where you need them to help you solve your most advanced technology challenges.

We have deep chemistry expertise and application knowledge. We are experts in air- and moisture-sensitive, high-quality and high-purity organophosphorus and organometallic development and production for biotech and pharmaceutical applications. We have over 40 years of expertise in custom and specialty reagents and precursors for complex synthesis including unique monomers and polymers, organosilicon and acrylate chemistries, and stable isotope labeling.



## PROVEN QUALITY AND PERFORMANCE

We have a relentless commitment to operational excellence. In our pursuit to be the best performing operational platform in our market, we have aligned our quality systems to pharmaceutical industry requirements and provide capabilities to meet/exceed customer expectations.

Our corporate Entegris Quality Operational System (EGOS), which exceeds most international standards, supports our specialty chemicals business and provides the following:

- Partnering ability to meet your change control needs
- Collaboration on completion of required documentation and information for the CMC section of regulatory filings including TSE, BSE and Country of Origin statements, and audit surveys
- Flexible and welcoming schedule for regulatory audits
- Commitment to continuous and safe operator training and adherence to standard operating procedures

## MANUFACTURING EXCELLENCE

Our broad solutions portfolio and ability to continually innovate new technologies is based on our commitment to manufacturing excellence and our deep knowledge of materials science and analytics, advanced materials, microcontamination control, and our understanding of our customers' processes and process challenges.



Our specialty chemicals manufacturing capabilities and certifications include:

- ISO9001 certifications at multiple facilities and ISO14001 certification at our Toronto site (International Standards for Quality and Environmental Management, respectively)
- Expertise in hazardous and air-, heat-, and moisture-sensitive chemistries
- Excellent track record on chemistry scale-up from R&D to multi-ton production
- Superior analytical competency and equipment including NMR, GC, GC-MS, KF, HPLC with chiral capabilities, ICP-MS

## BROAD, YET SPECIALIZED, PRODUCT PORTFOLIO

With broad capabilities unmatched by the competition, we are a proven, trusted partner. We are uniquely positioned to address precision, purity, integrity, and safety challenges. Our specially tailored formulated chemistries are expertly designed to meet the needs of oligonucleotide and small molecule drug manufacturing.

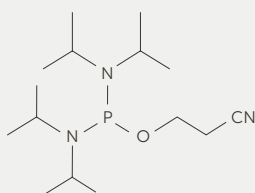
### OLIGONUCLEOTIDES

The usage quantity and level of interest in oligonucleotides for diagnostics, therapeutics, and vaccines is high and increasing numbers of oligonucleotide-based drugs are either being launched commercially or in late stages of clinical trials.

We have over 25 years of experience in manufacturing phosphitylating and phosphorylating agents as starting materials for the nucleoside phosphoramidites. One key phosphitylating agent manufactured in multi-metric ton scale is Phos-reagent, 2-cyanoethyl *N,N,N'*-tetraisopropylphosphorodiamidite, CAS# 102691-36-1, Product # CYA0269. Our phos-reagent is the global, gold standard phosphitylating agent used in the synthesis of DNA- and RNA- based therapeutics and is manufactured to the highest purity specifications using rigorous impurity profile control.

Our high-quality organophosphorus compounds offer:

- Unsurpassed control of critical reactive impurities
- ISO9001 certified production
- Long shelf life under the proper storage conditions
- Bulk packaging solutions
- Inventory typically available
- Ability to partner on custom specifications and developing novel phosphitylating and phosphorylating agents



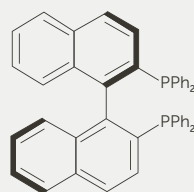
### SMALL MOLECULE

Specialty chemicals in our ligand and other product portfolios are critical for pharmaceutical applications since many small molecule drugs have multiple ring-shaped structures with functional groups and moieties at precise locations that can frequently be synthesized using our phosphine and organometallic ligands. In addition, many pharmaceutical Active Pharmaceutical Ingredients (APIs) are one chiral enantiomer or diastereomer that are frequently synthesized using our chiral ligands.

Our ligand and catalyst portfolio covers a wide range of chemical transformations including:

- Asymmetric hydrogenation
- Asymmetric isomerization
- Carbonylation
- Chiral cyclization
- Cross-coupling (C-N, C-O, C-C)
- Dynamic kinetic resolutions
- Hydroformylation and hydroamination
- Metathesis
- Selective hydrogenations
- Miscellaneous transformations including 1,4-addition, arylation and de-allylation

Our product portfolio extends to orthophosphates and related intermediates and reagents and phosphorylating and phosphitylating agents useful for synthesizing prodrugs.



## Learn More

Entegris offers creative and innovative [specialty chemical solutions](#) to propel your business forward and to meet critical milestones. Please [contact us](#) to discuss your chemical requirements including specifications, custom synthesis, and packaging and delivery logistics.

In addition to providing specialty chemicals used to deliver life-sustaining drugs and improved therapeutics, we proudly support rapidly growing and highly evolutionary biopharmaceutical and pharmaceutical companies. View our complete portfolio of [life sciences solutions](#) designed to help achieve optimal yields while mitigating risk and protecting pharmaceutical products.

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