

Stopford Projects Ltd is a highly flexible Engineering Design, Project Management and Consultancy company. Formed in 1982, we have become established as a leading force in providing a full range of complementary services to industry from conceptual process analysis through to Design and Build. We will undertake Projects ranging from Minor Plant Modifications to Major Capital Investments. These can either be carried out at our Chester or Wilton offices or at client sites. All our work is carried out in accordance with the Stopford Quality System and to our ISO 9001:2000 certification.

Contracts can range from Fixed Price, Reimbursable to Turnkey.



The Group can offer:

- Consultancy Services
- Preparation of Feasibility Studies.
- Design of Discreet Engineering packages of work including Process, Mechanical, Piping, Civil, Structural, Electrical and Instrumentation.
- Total Project Management, including Design Procurement and Construction.
- Manufacture of skid mounted process equipment.
- Plant commissioning and handover.





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The Gordon Manley Building
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Lancaster University
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We have adopted a Key Account Management approach to each of our Customers. We interact closely with our Customers, in order to optimise opportunities, resulting in real Added Value and benefits to all.

Some of our Key Accounts:

- | | |
|---------------------------|----------------|
| Air Products | Ineos Chlor |
| Anglo American | Kemira |
| Avecia | Lilly |
| BASF | Mitie |
| Bhp Billiton | Norbrook |
| BNFL | Novartis |
| Biofuels Corporation | Octel |
| Buxton Lime Industries | Saffil |
| British Petroleum | Seal Sands |
| British Gas | Shell |
| British Sugar | Syngenta |
| Brunner Mond & Co | Total |
| Cargill | Unilever |
| Ciba Speciality Chemicals | Urenco |
| Falmouth Oil Services | Warwick |
| GE | William Blythe |
| Great Lakes Europe | |
| Glaxosmith Kline | |
| Huntsman | |
| Holset | |
| ICI | |





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We have many years of experience over a diverse range of Industries:

- Biotechnology
- Effluent Treatment
- Fine Chemicals
- Food
- General Chemicals
- Nuclear
- Oil and Gas
- Paper
- Petrochemicals
- Pharmaceutical
- Power/Energy
- Research & Development
- Water and Waste
- Cement





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We offer a complete design service at the leading edge of Process Technology. Our Chemical Process Engineers are experienced in all aspects of Process Engineering, the Pharmaceutical, Fine Chemical, Petrochemical and related industries enabling us to offer a unique service to all of our customers. All work is carried out in accordance with the Stopford quality system in compliance with our ISO 9001:2000 certification.

- Preliminary Design Studies
- Process Engineering Calculations
- Flowsheet Development
- Equipment Design Specification and Selection
- Hazard and Operability Studies
- Commissioning Services
- Plant Support and Troubleshooting
- Relief Stream Design & Verification
- Environmental Design & Evaluation
- Process Development



As a broad based professional company, we are able to offer the full range of services necessary to handle all aspects of Project Engineering from feasibility studies through to Turnkey multi-discipline projects. We tailor our methods and teams to suit your business and project goals. Our core team of high quality consultants and engineers have the skills, knowledge, drive and ability to ensure that we provide the level of expertise and effort necessary to meet your requirements. All work is carried out in accordance with the Stopford quality system in compliance with our ISO 9001:2000 certification. Below is a sample of some of the services available.



Front End Design

- Feasibility Studies
- Conceptual Design
- Programming and Planning
- Technology Evaluations
- Scope Definition

Management

- Cost Estimating
- Total Project Management
- Quality Assurance
- Scheduling Management of Procurement and Material Control
- Integrated Cost Control, Management and Reporting
- Management of Commissioning and Handover
- Validation Management

Detail Engineering

- Mechanical Design and Engineering
- Piping Design and Engineering
- Vessel Design and Engineering
- Structural Design and Engineering
- Civil Design and Engineering
- Electrical Design and Engineering
- Control & Instrument Design and Engineering (including SCADA)
- Procurement Expediting and Inspection
- Planning
- Estimating and Cost Control
- Construction Supervision
- 2D and 3D Design



The Stopford Civil and Structural team is an integral part of the Stopford engineering capability, consisting of highly skilled, qualified and experienced personnel. The team has a proven track record in all aspects of civil and structural design, both in stand-alone projects and as part of a multi-discipline team on larger projects. All work is carried out in accordance with the Stopford quality system in compliance with our ISO 9001:2000 certification.

Some of the services available:

- Site Surveys
- Conceptual Design of Structures and Layouts
- Engineering Design and Detailing of Reinforced Concrete, Structural Steel, Timber and Masonry
- Engineering Design and Detailing of Roads and Drainage
- Structural Layouts 2D and 3D
- Pipebridge Inspections
- Preparation of Civil Asset Schedules and subsequent Planned Inspections
- Planning Supervisor Services
- Technical Support
- Construction Support



Stopford have extensive experience of carrying out pipebridge inspections for a wide client base.

Recommended Frequency for the inspection of registered and unregistered structures

All structural inspections, whether of registered or unregistered structures, are carried out by a qualified structural engineer, or a person nominated by the engineer and deemed to have the necessary level of competence.

Registered structures and pipebridges should be inspected at a maximum interval of twelve months

Unregistered structures should be inspected at least every 2 years.

The above timescales may vary at the request of The Client, the HSE, or if it is considered that conditions on site warrant more frequent inspections, i.e. in particularly hazardous areas or in an extremely corrosive environment.

Recommended Procedure for the inspection of registered and unregistered structures

All inspections are carried out in accordance with agreed, standardised procedures devised as a result of consultation with the client.

A full, written report is submitted by the inspector stating the general, overall condition of the structure and highlighting areas of concern. Where appropriate, photographs and sketches accompany the report, together with details of any perceived hazard and a recommended timescale for remedial or replacement work to be carried out.

Our inspection documentation is standardised for simplicity with 'user friendly' records and reports for ease of subsequent inspections and trace ability of reporting.



The Stopford mechanical engineering team is made up of highly skilled, qualified and experienced personnel with a proven track record in the delivery of all aspects of Mechanical and Pipework Design. The team has experience in handling small-scale stand-alone Mechanical engineering activities through to operating as part of a multi-discipline project team on larger, more complex projects. All work is carried out within the framework of the Stopford quality system in compliance with our ISO 9001:2000 certification.

Some of the services available are:

- Site Survey and Investigation
- Plant Layouts
- Ergonomics Studies
- Mechanical Equipment Layout - 2D and 3D
- Mechanical Equipment Design
- Vessel and Equipment Design
- Material Handling Design
- HVAC Design, Layout and Detailing
- Design and Detailing of General and Specialist Fabrications
- Modular Critical Vessels and Equipment Assessment Design
- Test Rigs Design
- Skid Unit Design
- Ships Engine Room Layout and Pipework Design
- Animation of 3D Design
- As Built Records Draughting
- Technical Analysis and Evaluation
- Procurement
- Technical Support
- Construction Support
- Training





- Site Survey and Investigation
- Piping and Instrument Diagrams
- Pipework Feasibility Studies and Line Shoots
- Pipework Design and Layout – 2D and 3D
- Fabrication Isometrics
- Systems Isometrics
- Materials Take-offs
- Critical Pipework Assessment and Registration
- Relief Stream Verification
- Pipe Supports Design
- Pipework Stress Analysis
- As Built Records Draughting
- Technical Analysis and Evaluation
- Procurement
- Technical Support
- Construction Support
- Training



The Stopford team is comprised of highly skilled, qualified and experienced personnel capable of providing all aspects of Electrical, Control and Instrumentation design. The team is able to operate on individual discipline projects and as part of a multi-discipline team on complex Process projects. All work is carried out in compliance with ISO 9001:2000 certification.

Some of the Services available are:

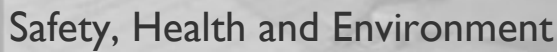
- Site Surveys
- Plant Load Studies
- Calculations
- Low Voltage Distribution
- Plant Services including Lighting, Earthing/Lightning Protection, Electric Surface Heating
- Switchroom Layouts including Motor Control Centres
- Cable Routing Layout
- Control Data Sheets
- Process Parameter Measurement, Control and Data Acquisition
- Safety Shutdown Systems
- Control and Interface Room Layouts
- Installation Schedules including Material Take Off
- Installation Drawings including Loop and Schematic Diagrams
- Hazardous Area Installation Schedules
- Equipment Specification including Technical Appraisal and Recommendations
- Procurement
- Functional Tests including Test Method Instruction Sheet
- Technical Support
- As Built Document Records
- Software Engineering



Stopford Projects Ltd has considerable experience in Safety, Health and Environment and is able to offer cost effective tailored solutions. All work is carried out in accordance with the Stopford quality system in compliance with our ISO 9001:2000 certification.

We are experienced in:

- Auditing
- Expert Witness
- Risk Assessment
- Hazard Studies for new plant
- Process Hazard Review for existing plant
- ATEX/DSEAR
- IEC 61508, SIL analysis
- Pressure Systems (PED)
- COMAH Safety Reports
- Consequence Analysis
- CDM (Construction Design Management)
- Chemical and Waste Management Technology
- Life Cycle Assessment
- Environmental consultancy
- Environmental Impact Assessments
- Dispersion Calculations
- Training

A graphic with the text "Safety, Health and Environment" overlaid on a background of technical drawings and a pencil.

Stopford provide a complete pressure relief design and verification service. From a review of existing pressure relief systems, through development of relief philosophies, to design and verification of new pressure relief streams, the Stopford service is tailored to meet the needs of our individual clients.

Stopford's approach to pressure relief design and verification is based on the classification of relief streams by the nature of their duty and the hazard, which would occur should they fail to work.

Relief Streams are classified as **CRITICAL**, **REGISTERED** or **UNREGISTERED**

This approach identifies the high-risk streams allowing the available resources to be focussed appropriately.

This ensures:

- Relief Streams are designed to a standard appropriate to their duty
- Appropriate levels of verification documentation
- Fitness For Purpose
- Efficient use of resources
- Cost Efficiency





Relief streams are registered for inspection either because of Statutory Requirements or because the consequences of failure to operate correctly would pose unacceptable risk.

Classification of relief streams ensures high-risk areas are identified. Design and installation standards to ensure the system meets the required duties can be used, ensuring fitness for purpose and cost efficiency.

Critical Relief Streams

These are relief streams, which require special expertise in design because the consequence of failure is very severe.

For Example

- Reactions/ Physical Changes
- COMAH Installations systems containing listed materials
- Interconnected Systems
- Special cases from HAZOP or Relief Stream Review

Registered Relief Streams

These are relief streams, which are not classified, as critical but are required by legislation to be listed and inspected.

For Example

- Fire Protection
- Chemical Duties with no reaction
- Breathing Duties
- Engineering Services
- Hazardous Liquid Relief
- Overpressure caused by Inflow/ Outflow

Unregistered Relief Streams

These are relief streams where formal inspection is not required. Failure to operate correctly would not cause unacceptable risk or where failure cannot be realistically envisaged

For Example

- Liquid Relief
- Vents and Overflows on tanks not subject to blockage
- Many Mechanical Seal Relief Streams are registered for inspection either Pressurisation Units



All Pressure Relief Streams will be classified as registered, including vents which are the protective device on a system unless:

- They have been classified as CRITICAL

Or

- Failure of the relief stream to operate as designed would not involve an unacceptable risk.

Stopford's Design Experience

Stopford employs Process Engineers experienced in the design of pressure relief systems, from the formulation of pressure relief philosophy and the design of new pressure relief streams through to the verification of existing designs and reviews of existing pressure relief systems.

The pressure relief support given to our clients has covered relief streams in all of the classifications above, across the market sectors below:

- Pharmaceuticals
- Colours and Dyestuffs
- Fine Chemicals
- Polyurethanes
- Bulk Chemicals



An environmental impact assessment is usually required as part of the planning application for a new plant or process. This type of assessment examines the effect of the proposed plant on the surrounding environment. All routes to the environment should be considered, releases into the atmosphere, to water and the sea where appropriate, as well as the effect on the land.

Stopford's experienced consultants can offer assistance in the production of environmental impact assessments. The following areas give some indication of the services offered, grouped by the route to the environment.

ATMOSPHERE

- Assessment of Process Vents
- Support in Gas Dispersion modelling for routine discharges

WATER

- Effluent audit and flow sheeting

LAND

- Contaminated Land Assessment

Additional but related services include:

- Advice on Environmental Monitoring, Environmental Risk Assessment



The HAZard and OPerability Study is part of a series of Hazard Studies, which can be used to identify the hazards associated with a process. Hazards are identified and documented, and actions are set to reduce the risk to an acceptable level.

Stopford offer a complete Hazard Study Service, which includes:

Hazard Study 1

- Undertaken at an early stage in project feasibility studies
- Identifies the basic hazards of the materials and operations involved in the process
- Considers possible reaction hazards
- Establishes Safety Health and Environmental criteria for the project
- Allows early consideration of inherent SHE principles

Hazard Study 2

- Undertaken following initial flow diagram development
- Identifies significant SHE hazards
- Checks adequate safeguards included for these hazards
- Useful as a review of existing plant operations

Hazard Study 3 (HAZOP)

- Undertaken following development of final engineering flow diagrams
- Considers operability problems as well as hazards

How can Stopford help?

- Provide Hazard Study Leaders experienced in multi-stage Hazard Studies
- Use process engineers as scribe to record the meeting
- Use latest HAZOP recording software giving a quality meeting record and action tracking capabilities



Hazard Analysis (HAZAN) is a powerful technique, which can be applied to help in decision-making both in the design and modification of plants.

HAZAN is mainly used to analyse the hazards affecting people or the environment. However, it can equally be applied to hazards to equipment and business risks.

While Hazard Studies concentrate on the identification of undesirable events, which could occur, HAZAN concentrates on analysing the mechanisms by which the event occurs. This allows the likelihood and the consequences of the event occurring to be assessed numerically.

Although HAZAN is a numerical technique, much of the work necessary to carry out a successful analysis is in the development of the logic leading to the event.

When the analysis is complete, errors in the logic can be extremely difficult to spot and it is therefore necessary that well-trained experienced analysts carry out these analyses.



What can Stopford offer?

- Consultants experienced in Hazard Analysis
- Objective view of operations
- Experience of similar installations in the process industries
- Clear explanation of logic used
- Assistance in understanding existing Hazard Analysis reports



The COMAH (Control of Major Accident Hazards) Regulations have replaced the CIMAH regulations in the UK. Although COMAH and CIMAH are similar, there are a number of important differences:

- Increased emphasis on Safety Management Systems
- Safety Report Contents more defined, will be available as a public document
- Includes for protection of people and the environment
- Emergency Planning Requirements are better defined and must now be tested every 3 years.

Stopford can assist in the following areas:

Safety Report Preparation

Our Consultants are experienced in all aspects of safety report preparation, and the use of the following tools:

- Multi-Stage Hazard Studies
- Quantified Risk Assessment
- Hazard Analysis
- Failure Mode Effect Analysis

Environmental Assessment

Our experienced environmental consultants can help to address the assessment of potential incidents, which may lead to a Major Accident to the Environment (MATTE), and consider the issues arising from the clean up and environmental recovery from such incidents

Emergency Planning Requirements

Successful Emergency Planning depends on the identification and assessment of all potential scenarios in advance. Using their experience in the process industries and techniques such as those listed below, our consultants can assist in the development of a coherent response plan

- Risk Assessment including Hazard Analysis
- Consequence Analysis
- Dispersion Modelling



Validation Expertise and Support to Industry

“Establishing documented evidence which provides a high degree of assurance that a specific process will consistently produce a product meeting its predetermined specifications and quality attributes” (FDA definition of Validation)

Why Stopford?

- All organisations involved in the manufacture of materials for the Health Care industry must demonstrate compliance with current regulatory agency requirements.
- However, with the wide range of equipment and facilities used in today’s pharmaceutical and biotechnology industries, it is difficult to comply with increasingly stringent international health regulatory agency standards.
- Stopford are uniquely placed to assemble bespoke teams to match the needs of the client and more importantly to provide senior staff throughout the project lifespan ensuring project objectives and resulting design philosophy are clearly identified and met.
- Stopford are experienced in fully integrating with client resources and specialist equipment suppliers in order to develop effective and creative solutions to particular client problems.



Stopford Flexibility

Our Company structure brings together consultancy and Engineering staff with hands on experience who fully understand the needs of the industry they serve. This allows the Stopford team to take the project from inception through detailed design, procurement, construction, commissioning/ validation and start-up or any combination of each.

Our Skill Base

Validation Services

Stopfords team of experienced staff are available to provide a service to the client in the following areas:

- Preparation of Protocol-DQ, IQ, OQ, PQ
- Factory testing & site installation acceptance protocols
- Validation master planning
- GMP and gap analysis reporting
- Cleaning Validation
- Procedure writing
- Sterilisation Process Validation
- Prospective, Retrospective and routine validation services
- Preparation of User Requirement Specifications
- Training for Validation
- Computer control and software validation



The benefits provided by this service include:

- Liaison with equipment vendors ensuring satisfactory completion of validation activities
- Establishing future validation programs
- Guidance and training on operational procedures for production staff
- Clean steam testing to HTM2010
- Testing and validation of high purity water systems
- Testing and validation of medical gas systems
- Autoclave sterilisation testing to HTM2010 and BS en 285
- Disinfecting washer validation and testing
- Lyophilisation process optimisation and validation



Stopford's Design Services

Stopford's engineers are competent to complete detailed designs of pharmaceutical and biotechnology facilities. These skills in summary cover the following areas: -

- Utility sizing and specification including clean and pure stream
- Process equipment specification, evaluation and procurement
- Process development
- Identification and auditing of contract manufacturers
- HVAC design, specification and testing
- CIP/ SIP systems
- Effluent treatment schemes
- Changeroom and pressure regimes
- Room finishes
- Technical and Service spaces
- Vision panel/ Visitor observation points
- Autoclave and sterilisation processes
- Aseptic facility design
- Freeze drying processes
- Packaging, labelling and inspection processes



Our Capability

Stopford's capability obviously rests squarely with the Consultants and Engineering staff they employ.

These skilled individuals have a detailed knowledge of the current regulatory requirements for the industry allowing them to interpret and implement suitable solutions, leading to cost efficiency whilst maintaining the highest level of quality to meet the client's requirements.

Project Management

Stopford is placed to provide the full project management role to industry, and can complete full assignments, incorporating the following services: -

- Feasibility studies
- Process modelling and economic evaluations
- Identification of service providers, equipment manufactures and construction teams
- Cost control and value engineering
- Program management
- HAZOP/ HAZAN and safety review management
- Licence and grant applications
- Resourcing
- Detailed design of all disciplines
- Flowsheeting
- Drawing office services



We have developed strong associations with a number of Universities bringing together broad industrial expertise and skills with academic excellence. This exciting alliance facilitates the expansion of the Stopford Group's service portfolio, enhancing our research and technology capability.

FACILITIES are excellent across the whole range of Chemical, Biological and Environmental Science.

We have access to well-equipped research laboratories include specific facilities for Chemical Engineering, Analytical Chemistry, Chromatography, Biochemistry, Biotechnology and Instrumental Analysis, together with the newly developed laboratories for Environmental Sciences, Molecular Biology, Microbiology, Materials Science, Heterogeneous Catalysis and Thermal Studies.

Extensive experimental facilities include:

- NMR Spectroscopy (400mhz)
- GC-MS
- FT-IR Spectroscopy
- UV Spectroscopy
- HPLC
- GC
- GC-MS, LGMS etc
- Capillary Electrophoresis
- Ion Chromatography
- ICP
- AA (Flame, ETA, Hydride)
- ED-XRF
- TG
- ISE (Fluoride, Nitrate)
- Thermal Analysis/ Suite of Laboratories

Together with the Universities we have an experienced team of Chemists and Chemical Engineers offering facilities for the development of Chemical Processes, Small Laboratory Scale, Pilot Plant to Full Scale Plant, Tailored Programmes, Feasibility Studies and Process Investigation.





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Our highly skilled team of operatives offers the facility of on-site installation services covering all aspects of process pipework installation.

Stopford have particular expertise in stainless steel pipework installations utilising fully validated, fully automated, closed head orbital welding techniques.

Stopford is committed to using all the latest technologies available and was one of the first companies to utilise the TS series range of fittings and gaskets as manufactured by Swagelok*.

Applications for this advanced technology include:

- Water for Injection Systems
- Clean/Pure Steam Systems
- CIP Systems
- For full details visit www.swagelok.com/bio

To complement these latest technologies, Stopford operate a Quality Assurance System, which will provide the necessary documentation to give full traceability of materials used, in conjunction with the validation process.

Prior to any work being undertaken Stopford prepare any necessary method statements and risk assessments that are required under CDM.

Stopford also utilises AutoCAD for the preparation of any necessary drawings or P&ID's.

