Introduction to Briggs Pharma

2019

BRIGGS

Agenda

- Introduction to Briggs Pharma
  - Our history
  - Our clients
  - Our capability and approach
  - Engineering Design Service
  - Project Management and Process Engineering Capability
  - In-house automation
  - Commissioning and Validation approach


gsk
GlaxoSmithKline


Mylan®


P&G


NOVARTIS


SANOFI

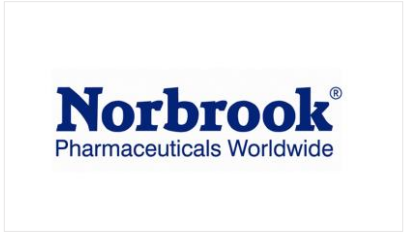

Baxter


novo nordisk

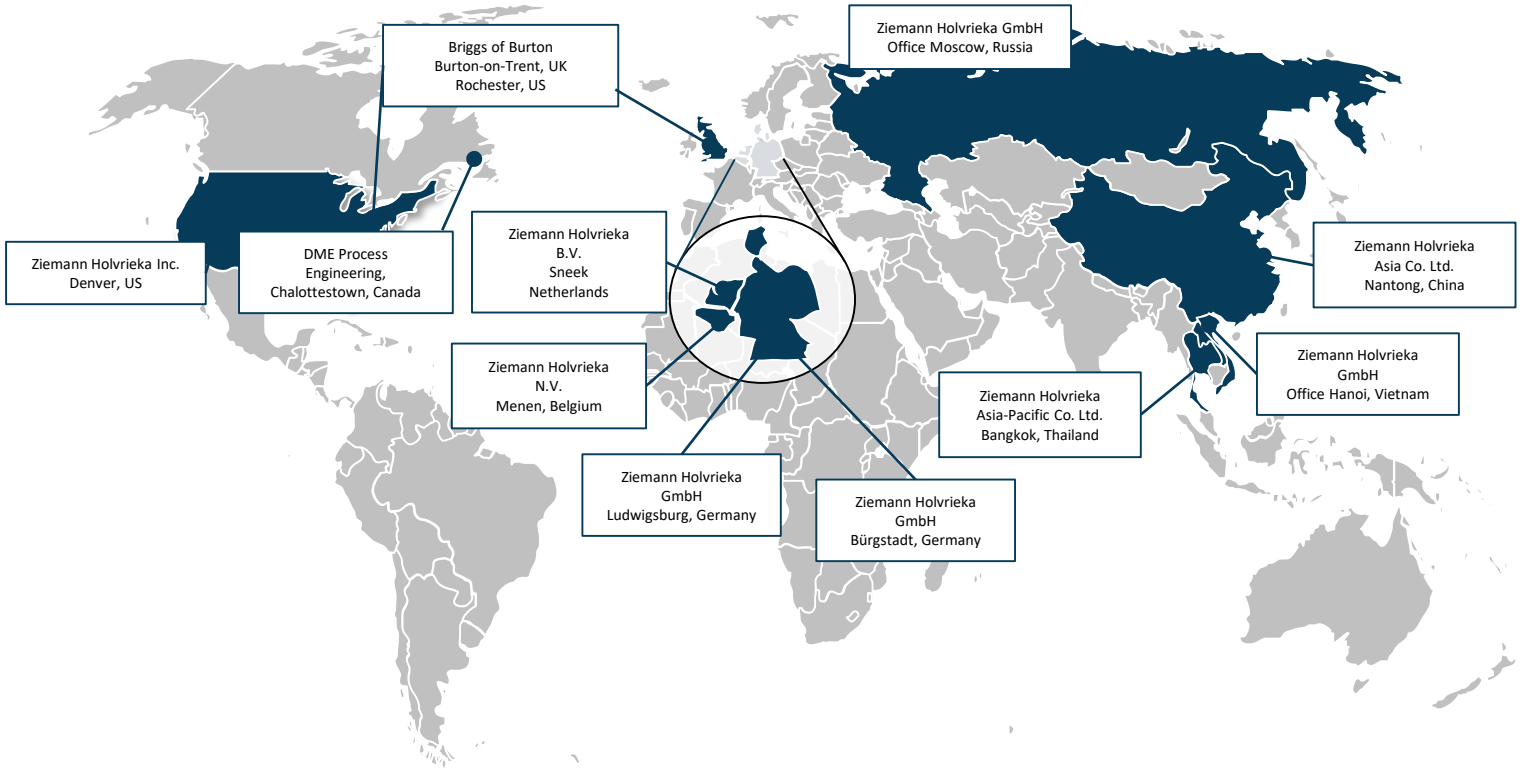

MSD


Pfizer


Purolite®


Norbrook®
Pharmaceuticals Worldwide

Briggs within the CETP Group

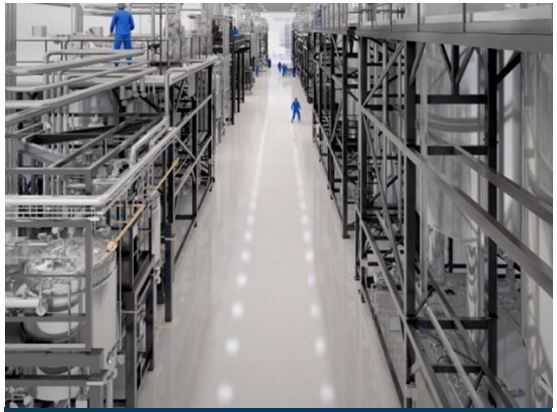


Briggs Pharma History

Fermenter (300 litres), installed 1957 at Beecham Pharmaceuticals, made by Burnett & Rolfe Ltd, Rochester, Kent, England.

GIUSTI

Giusti has several decades of experience designing and building pharma systems.



Currently building 12 Pre-assembled Units (PAUs) as part of a $2 billion US dollars) manufacturing facility being built in Clayton, NC

Briggs Pharma

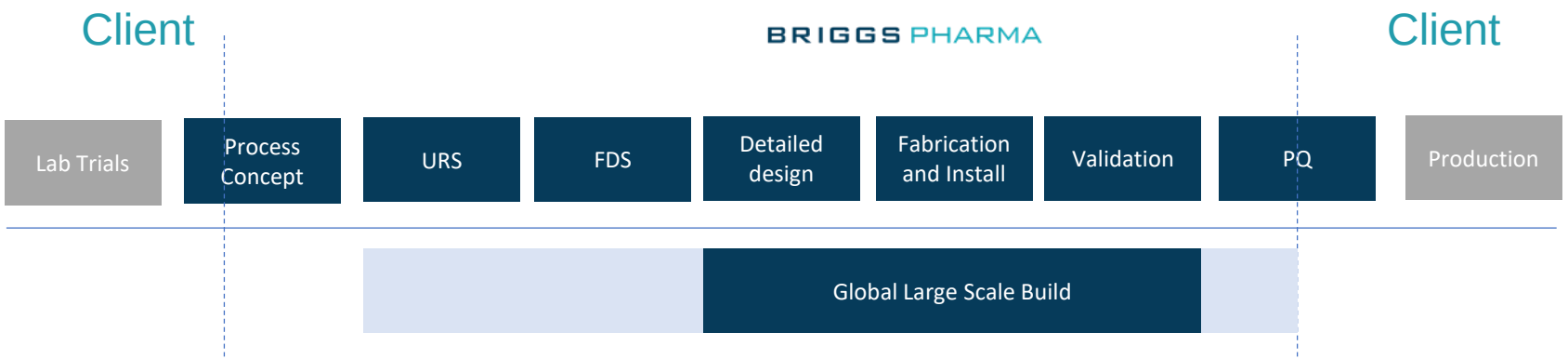
Specialisation

- Powder and Liquid Transfer
- Mixing Systems
- Fermentation for Insulin
- Hygienic Process Engineering
  - Clean In Place (CIP)
  - Wash In Place (WIP)
  - Sterilisation In Place (SIP)
- Process Automation and Control
  - GAMP5
  - Validated Systems
- Site Management
  - Principal Contractor
  - CDM

Engineering Capability

- Overall Process Design and Process Optimisation
- 3D Modelling and Vessel Design
- Hygienic Design and Cleaning in Place
- Pharmaceutical Validation and Commissioning:
  - Design Qualification (DQ)
  - Installation Qualification (IQ)
  - Operational Qualification (OQ)
  - Performance Qualification (PQ)

Project Involvement



Briggs of Burton

- APIs
- Creams & Lotions
- Inhalant Mixing
- Fermentation for Insulin
- Utilities

- Feed Studies
- HazOp Consultancy
- Process Design
- P&ID's
- 3D Modelling
- Electrical Design
- Small Vessel Build
- Turnkey
- Process Skid Manufacture
- PLC Programming
- Electrical Panel Build
- FAT inc. Riboflavin testing
- Site Mechanical & Electrical Installation
- SAT
- Validation
- Training
- Spares

Briggs Inc. | **Briggs Asia**

Sales Support

ZH Gmbh | **ZH Asia**

Sales Support

Manufacturing Support

- Large scale vessel design
- Large vessel scale manufacture
- Bespoke fabrication

Design and Manufacture

Group Manufacturing Capability

Skid Manufacture

Mixing Suites

Large Scale

Pharmaceutical System Design

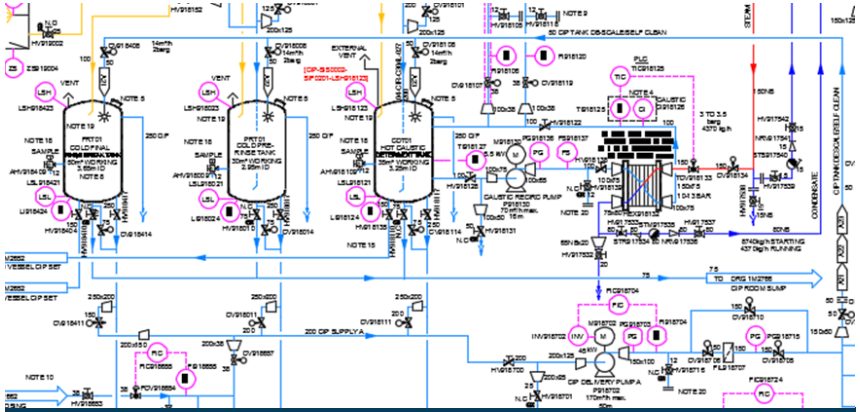
- Validation support: DQ, IQ, OQ and FAT, SAT
- Validation Protocols, FDS, Commissioning Docs
- Materials Traceability: EN10204 3.1; ADI/BSE/TSE Free; FDA and USP
- Surface Finish: Mechanical (in house) and Electro polishing (external)
- Pickling and Passivation support (external)
- Weld logs against Vessel General arrangement or Pipework Isometric Drawings
- Welder Qualification against weld procedures
- NDT: Dye penetrant, Borescope, X-ray (external)
- Riboflavin Testing
- Vessel design to ASME BPE
- Hygienic design – Dead legs and drain-ability

MHRA
Regulating Medicines and Medical Devices

FDA
APPROVED

bsi.
ISO 9001:2015
Quality Management

Briggs Intelligent P&ID



The Briggs process team are able to develop a pharmaceutical process design to exact specification.

	B	C	D	E	F	G	H	I	J
	PFD / P&ID No	Size	Service	Equipment Description	Operation	Equipment Type	Supplier	Order Status	Model
	EE3775-P&ID-001	2"	CONDENSATE	NON-RETURN	SELF ACTING	NON-RETURN		Not Ordered	
	EE3775-P&ID-001	2"	Steam	BALL	MANUAL	SHUT OFF		Not Ordered	
	EE3775-P&ID-001	2"	Vessel Relief Valve	PRESSURE RELIEF 2 PORT	SELF ACTING	SINGLE SEAT SPRING		Not Ordered	
	EE3775-P&ID-001	2"	Compressed Air	BALL	AUTOMATIC	SHUT OFF		Not Ordered	
	EE3775-P&ID-001	3"	Purified Water	FLEXIBLE HOSE	EQUIPMENT	INLINE ITEM		Not Ordered	
	EE3775-P&ID-001	2"	Condensate	STEAM TRAP	EQUIPMENT	INLINE ITEM		Not Ordered	
	EE3775-P&ID-001	1 1/2"	Steam	STRAINER	EQUIPMENT	INLINE ITEM		Not Ordered	
	EE3775-P&ID-001	1 1/2"	Steam	STRAINER	EQUIPMENT	INLINE ITEM		Not Ordered	
	EE3775-P&ID-001	25		PRESSURE GAUGE	DIRECT READ	PRESSURE INDICATOR		Not Ordered	
	EE3775-P&ID-001	25		TEMPERATURE INDICATOR	DIRECT READ	PRESSURE INDICATOR		Not Ordered	

Unknown = no Information received from Client.
upplier to provide suitable seat
al / elastomer for the product shown.

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Our intelligent P&ID automatically creates data lists which can be referred to during detailed design, procurements and used for digital validation sign off

Front End Engineering Design (FEED) Study

- Deliverables:
  - Basis of Design
  - Process description
  - Process Flow Diagrams
  - Process and Instrumentation Diagrams
  - Capacity Planning and Production Forecasts
  - 2D layout
  - 3D model
  - Programme
  - Budget price
- Choose deliverables based on project scale and budget

- Engineering design
  - Costed on man-hours and duration
  - Fixed set of deliverables
- Provides fixed scope and budget
- Design to Tender option
  - Defined scope
  - Process Design
  - Tender returns
  - Closed bids

BRIGGS PHARMA

Briggs Capacity Planning Model

- Allows visualisation of equipment requirements to suit plant capacity
- Graphical representation of the plant operation, alongside capacity calculations
- Identifies equipment requirements, route design including process and CIP, utility load
- Identifies pinch points and bottlenecks

Manufacturing Design Standards

PD 5500 & ISO EN 13445

- Production of CAT 1 / CAT 2 and CAT 3 vessels
- Independently Inspected by British Engineering Services

bsi. PD 5500

ASME VIII Div. 1

- Independently Inspected by TUV
- Design and fabrication to ASME U and R standards
- GOST certification

ASME U R

Fabrication and Installation

- Manufacture of items to meet the requirements of the URS
- Supply of components to meet MHRA/FDA approval
- Certification of surface finish
- Manufacturing, CDM site management and installation work to GMP standards to ensure all products are consistently produced and controlled to particular standards

Project Management

- Project Strategy
  - Performance Specification
  - Hygiene Specifications
  - Construction sequence
- Plant installation
- Project programme
- Project milestones
- Project Cost
- Project specifications
- Communication
- Procurement
- Health and safety
- Approvals
- Change management
- Handover
- Training

RoSPA 2019 Gold Award

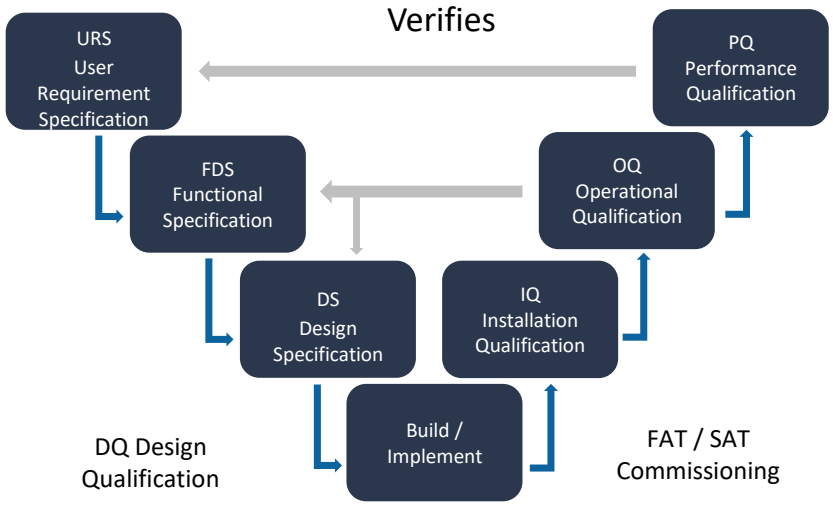
Royal Society for the Prevention of Accidents (RoSPA) Awards:

- Briggs won a RoSPA Gold Award for Health and Safety for a second year in a row
- Achieving a very high level of performance
- Demonstrating well developed occupational health & safety management systems and culture
- Outstanding control of risk and very low levels of error, harm and loss.

Validation and Commissioning

Validation

- Supplier audit for critical applications
- Creation of a validation matrix to meet the requirements of the FDS and DQ
- Installation qualification (IQ) verifying the equipment version and correct mechanical installation and correct documentation
- Operational qualification (OQ) verifying the consistent operation of equipment and the control system
- Validation Report, on successful completion of qualification testing a validation report will confirm the system is ready for use in the manufacturing process for which it was designed.



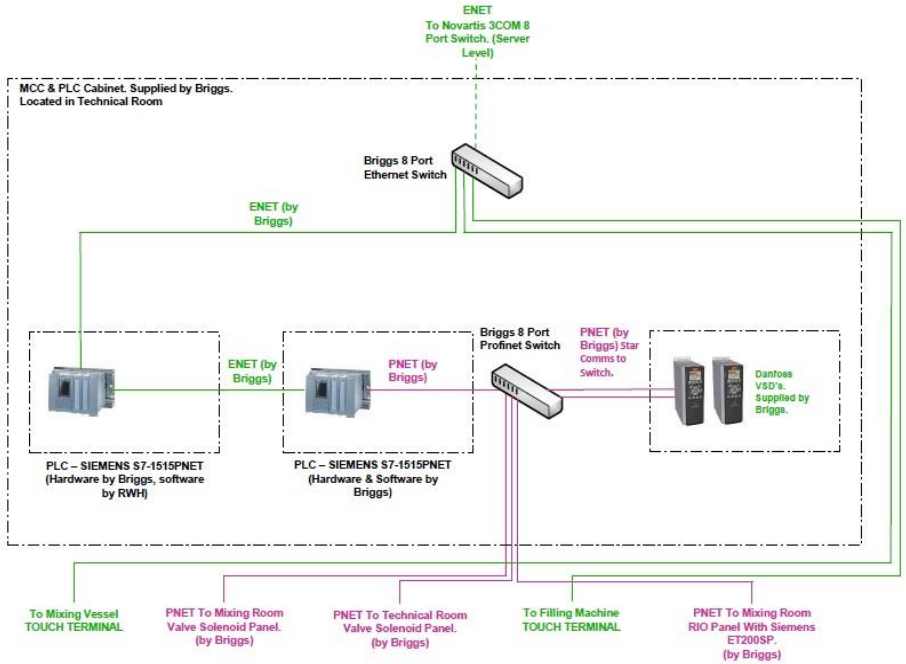
User Requirement Specification (URS)

- Briggs offer process engineering services to either support or lead the creation of the URS document
- Provide a structured definition of system requirements
- Produce a requirement traceability matrix
- Allow complimentary lifecycle documents to be developed
- Support auditable system development
- Establish test acceptance criteria
- Support maintenance of the system

Req Nº	Requirement	GMP Impact Y/N	Correct Y/N
1.1 General			
1.1.1	A system **must** be supplied capable of washing and drying a maximum of 14.5kg of 0.3mm ceramic beads.	Y	
1.1.2	Beads **must** be washed using an upward flow of water to create a fluidised bed of beads.	N	
1.1.3	Drying **must** be achieved by utilising an upward flow of air through the bed.	N	
1.1.4	The fluidised bed and canister design **must** allow for a depyrogenation cycle in an oven with internal dimensions 700x1530x800 (WxHxD) following bead washing and drying.	N	
1.1.5	At the end of a complete fluidised bed cycle, the system **must** leave itself in a clean and dry state.	Y	
1.1.6	All metallic direct and non-direct bead contact parts **must** be Stainless Steel 316L or an equivalent or better grade.	Y	
1.1.7	All metallic non-bead contact components **should** be Stainless steel 316 or an equivalent or better grade.	N	
1.1.8	Stainless Steel bead contact surfaces **should** be electro-polished and **must** have a minimum surface finish of 0.4 Ra.	N	
1.1.9	All elastomers **must** be non-shedding, hygienic and FDA compliant with suitable leachables and extractables certification.	Y	
1.1.10	When the fluidised bed is not in use, the system **must** be protected from potential contamination caused by the exhaust line.	Y	
1.1.11	All bead contact surfaces **must** be smooth and free of cracks, crevices, scratches or pits.	Y	
1.1.12	The unit **must** consist of no rough or sharp edges that could lead to injury to operators and maintenance staff.	N	

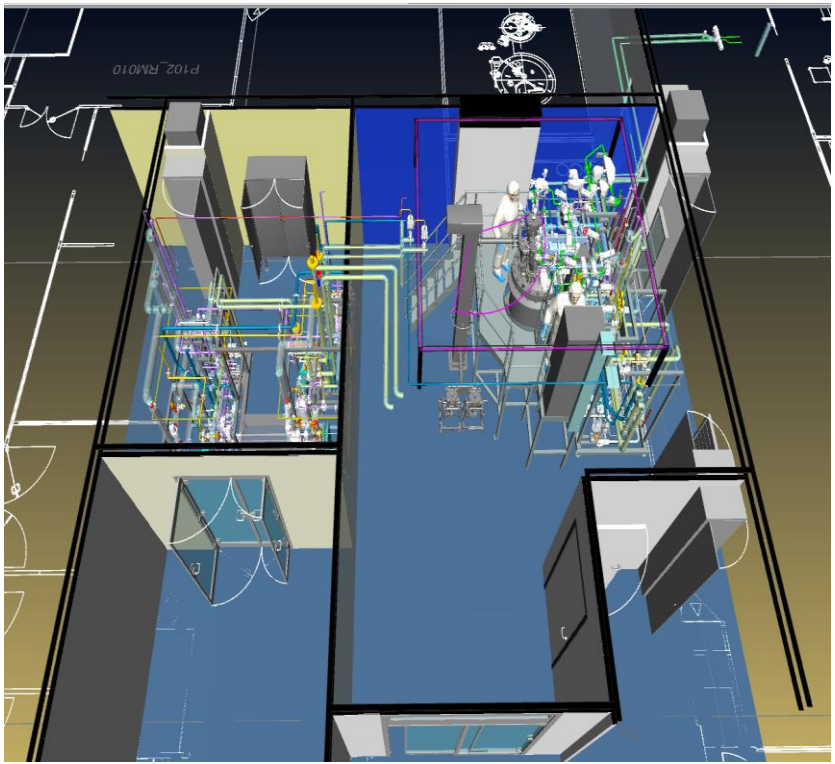
Functional Design Specification (FDS)

- Briggs create a Functional Specification which establishes how the requirements of the URS will be implemented.
- Functions to be performed
- Facilities to be provided
- Detailed process of sequence logics and interlocks
- Interfaces to instruments, equipment and other systems
- Produced by Briggs in response to the URS



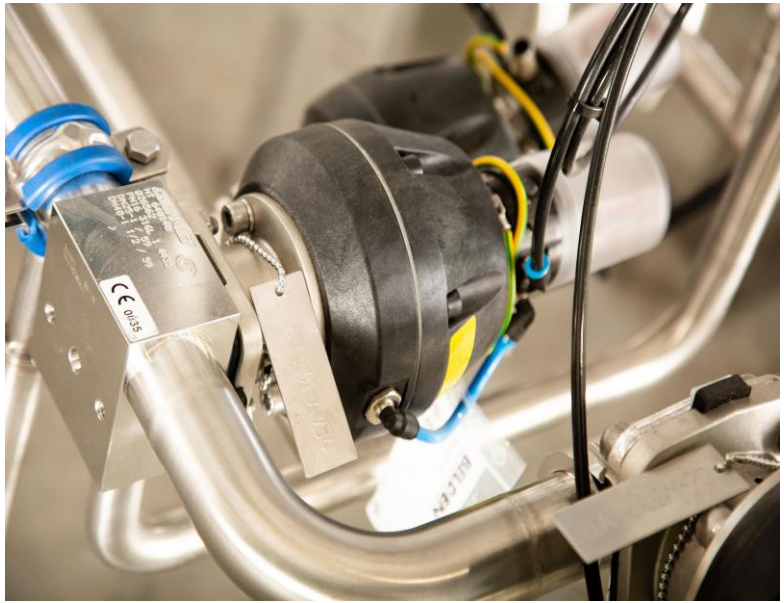
Detailed Design

- Process & Instrument Diagrams showing process flow
- Identification and location of associated control and monitoring loops
- 3d plant layouts
- Identification and location of major items
- Design qualification (DQ) to meet the requirements of the FDS & URS



Installation Qualification (IQ)

- As part of our SAT Briggs will perform the installation qualification. This verifies that all aspects of the installation adhere to the specification and are correctly installed, including;
  - Installation conditions(wiring, utilities and functionality)
  - Calibration, maintenance and cleaning schedules
  - Supplier documentation
  - Software documentation
  - Spare parts lists
  - Equipment design features



Operational Qualification (OQ)

- As part of our SAT Briggs will also perform the operational qualification. This verifies that all aspects of the installation operate correctly through all anticipated ranges, including;
  - Process control limits (time, temperature, pressure, speed)
  - Software parameters
  - Process operating procedures
  - Process change control
  - Short term stability and capability of the process
  - Potential failure modes (failure mode and effects)
  - Fault tree analysis

Performance Qualification

- Although the end user is ultimately responsible for this process Briggs offer support to achieve qualification for the manufacturing process. This can typically include qualification of;
  - Data summary
  - Manufacturing conditions
  - Calibration of equipment
  - Sampling plan
  - Analysis methodology
  - Variability limits
  - Non-conformance contingencies

Thank you

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