

DECOMMISSIONING PROJECT

D008

P1A BUILDING

**PROCESS
INFORMATION**

1. SUMMARY REPORT

2. PROJECT SCOPE

3. CHEMICAL INFORMATION

**4. DECONTAMINATION PROCEDURES &
ASSOCIATED RISK ASSESSMENTS**

5. PLANT P&ID's – if applicable

6. WASTE RECORDS

7. WASTE TRANSFER NOTES

1

| | |
|--------------------------------|--|
| PROJECT NUMBER | <i>Decommissioning 008</i> |
| PROJECT: | <i>P1A Production Building</i> |
| PLANT: | <i>P1A</i> |
| DOCUMENT REFERENCE: | <i>D008/PROCESS/012 Decontamination Summary Report</i> |
| DATE: | <i>4th October 2012</i> |
| BY: | <i>Jane Mills</i> |

Sign-off:

| Name | Position | Signature | Date |
|---------------|--------------------------|------------------------------|----------|
| Jane Mills | Site Engineering Manager | <i>Jane Mills</i> JANE MILLS | 12/10/12 |
| Duncan Marlor | Site Manager | <i>[Signature]</i> | 12/10/12 |

1. Summary

The Production Facility in P1A Building has been through a programme of decontamination and decommissioning to ensure that as much preparation as possible has been completed ready for demolition.

The purpose of this report is to detail the status of the equipment on the plant and to identify any potential areas of contamination that remain in the building.

This report does not waive the responsibility of the Principal Contractor to take reasonable precautions during the demolition to ensure that the work-force is not exposed to an unreasonable risk.

2. Introduction

This report details the status of all plant and equipment that have been decontaminated as part of the P1A building decommissioning project. This document along with the E.I.C and Mechanical summary reports give the plant status for the purposes of demolition.

Where equipment/pipework has been flushed with water, these lines have been sprayed with yellow paint. If no flushing has been completed (i.e spiral wound pipework) or where obviously visual contamination remains that cannot be removed by flushing, these items have been sprayed with BLUE paint.

These visual indications do not provide a guarantee as to the "Cleanliness" of the equipment, only that the pipework or equipment has been flushed with water or subject to a production clean.

All decontamination has been completed following D008/PROCESS/006 – Decontamination Procedure – P1A Production Building. Any amendments to the decontamination that were completed as a requirement of the physical decontamination process have been hand-written into the Decontamination Procedure document.

3. Plant Status

Table 3.1 Plant Status Summary

| Equipment Number | Decontamination Method | Status |
|------------------|---|--|
| P3-05 | Flushed with water | No visible residues |
| P3-05B | Flushed with water | No visible residues |
| D803A | Flushed with water | No visible residues |
| P1-12 | Flushed with water & all pipework flushed with water | Vessel has not been used for >5years. Visual inspection indicates no visible residue or odour. All glass ware is to be considered contaminated |
| P1-13 | Vessel not used for >5years. Upon inspection some residues observed but vessel odour free. Vessel & pipework flushed with water | Reactor is visually clean, potentially contaminated with EDHB. Glassware should be considered potentially contaminated. |
| P1-14 | Vessel not used for >5years. Upon inspection some residues | Reactor is visually clean, although potentially |

| | | |
|-------------------|--|--|
| | observed but vessel odour free. Vessel & pipework flushed with water | contaminated with EDHB. Glassware should be considered potentially contaminated. Associated receivers should be considered to be potentially contaminated. |
| P1-15 | Production Boil-out completed. | Should be considered clean |
| P3-27 | Production boil-out completed | Should be considered clean |
| AP5-1 REC | Vessel not used for >5years. Flushed with water. | Should be clean |
| P1-18 | Production boil-out completed and glassware/column flushed with water. Water tank sterilised with Sodium Hypochlorite and flushed with water | Reactor and water tank should be considered clean. Glassware considered to be potentially contaminated. |
| P1-18 RECIEVER | Flushed with water | Potentially contaminated with residues from n-Butyl paraben manufacture. |
| P1-28 | Production boil-out completed | Should be considered clean |
| P1-28A RECIEVER | Flushed with water after production boil-out of reactor. | Should be considered clean |
| P1-20 | Production boil-out completed | Should be considered clean. Glassware should be considered contaminated with residues from n-Butyl paraben production |
| P1-21 | Residual solvent drained and vessel flushed with water. Glassware flushed with water. Water tank sterilised with Sodium Hypochlorite and flushed with water. | Reactor and water tank should be considered clean. Glassware considered to be potentially contaminated with solvent. |
| P1-22 | Flushed with water | Should be considered clean |
| P1-23 | Vessel drained of residual solvent and flushed with water. Water tank sterilised with Sodium Hypochlorite and flushed with water | Should be considered clean |
| P1-24 | Production boil-out completed. Glassware flushed with water as much as possible | Reactor should be considered clean. Glassware is potentially contaminated. |
| P1-15 | Production boil-out completed. Glassware flushed with water. Receivers flushed with water. | Reactor should be considered clean. Glassware is potentially contaminated. |
| P2-20 | Production boil-out completed. P2-20R receiver boil-out completed. | Should be considered clean |
| Caustic Tank | Flushed with water | Clean |
| Bulk Storage Tank | Flushed with water | Clean |

| | | |
|------------------------|------------------------------------|---|
| P2-16 | Production boil-out completed. | Should be considered clean |
| P2-02 | Production boil-out completed | Should be considered clean |
| Sieve for Sodium salts | Stripped down and cleaned | Clean |
| P1-02 DCE Unit | Filters removed and unit swept out | Ductwork potentially contaminated with powder residues from Sodium salts manufacture & n-butyl paraben manufacture. |

Where testing has been completed, this does **NOT** guarantee that the item is free from contamination, only that it has been tested for certain chemicals that could be present. **NO GUARANTEES ARE GIVEN ON THE CLEANLINESS OF THE EQUIPMENT.**

All utility supplies have been isolated and the plant disconnected.



ANY EQUIPMENT NOT DETAILED IN THIS REPORT SHOULD BE TREATED AS CONTAMINATED AND LIVE.



| | | | | |
|----------|------------|-----------------|-------------|------------|
| Form No. | CMS/QA/004 | Promanex | Last Review | March 2010 |
| Revision | Rev. D | | Review By | B Robinson |

CERTIFICATE OF CHLORINATION

| | |
|-------------------------|---------------------------------------|
| Date: | 16/08/12 |
| Certificate No: | S64544 |
| Client: | Clariant Limited |
| Address: | Llantwitt Fardre, Pontypridd. CF382SN |
| Plant Item(s): | Air Scrubber |
| Plant Reference: | P1 Air Scrubber |
| Regional Office: | Dunscroft, Doncaster |

Promanex Group Ltd certify that the plant referred to above has been cleaned in accordance with the Promanex Group Ltd method statement: Cleaning of Industrial Cooling Towers.

| Pre-disinfection | (every hour) | | Post-disinfection | (every hour) | |
|------------------------------------|-----------------------------|-----|---------------------|-----------------------------|----|
| Time | Disinfectant Reserves – ppm | pH | Time | Disinfectant Reserves - ppm | pH |
| 14:30 | 55 | 6.8 | System Left Offline | | |
| 14:45 | 55 | 6.8 | | | |
| 15:00 | 50 | 6.8 | | | |
| 15:15 | 50 | 6.8 | | | |
| 15:30 | 50 | 6.8 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Contact Time (Hrs) | | | | | |
| Disinfectant Used: | | | | | |
| Completed by Technician(s): | Stephen Lee | | | | |
| Position: | Service Technician | | | | |
| Signature: | S Lee | | | | |

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Registered in England & Wales No. 3548978

PMXLH-11a



Promanex

INSPECTION REPORT

SITE
DATE
PLANT IDENTIFICATION:
LOCATION

Clariant Limited
 17/08/12
 P1 Air Scrubber
 On main road through site

| | YES /NO | COMMENTS | RECOMMENDATIONS (To be completed by account owner) |
|--|------------|------------------------------------|---|
| DOORS/HATCHES | | | |
| Correctly installed | Y | | |
| Good condition | Y | | |
| Materials of construction | | FIBRE GLASS | |
| DISTRUBUTION CHANNELS and SPRAY NOZZLES | | | |
| Correctly Installed | Y | | |
| Scaled/corroded | N | | |
| Even Water Flow | Y | | |
| Biofouling present | Y | PVC | |
| FILTER MESH | | | |
| Filter mesh removed for cleaning | Y | | |
| Scaled | N | | |
| Biofouling/ fouling | Y | | |
| Correctly installed | Y | | |
| Materials of construction | | PVC FRAME, | |
| SUMP | | | |
| Corroded | N | | |
| Scaled | N | | |
| Biofouling/fouling | Y | | |
| Sound construction | Y | | |
| Materials of construction | | FIBRE GLASS | |
| PLANT STRUCTURE | | | |
| Corrosion | N | | |
| Scaled | N | | |
| Biofouling | Y | | |
| Sound construction | Y | | |
| Materials of construction | | FIBRE GLASS | |
| GENERAL | | | |
| Comment on location | | GOOD LOCATION | |
| Comment on drain | | DRAINS ACROSS WALKWAYS AD ROAD, | |
| Comment on ball valve | | GOOD CONDITION | |
| Comment on access | | GOOD ACCESS | |

Note: Photographs before and following cleaning to be supplied by Promanex Service Group.

SIGNED for Promanex: S Lee

DATE: 17/08/12

Promanex

INSPECTION REPORT

| | |
|------------------------------|---------------------------|
| SITE | Clariant Limited |
| DATE | 17/08/12 |
| PLANT IDENTIFICATION: | P1 Air Scrubber |
| LOCATION | On main road through site |

GENERAL VIEW OF AIR SCRUBBER



Promanex

INSPECTION REPORT

SITE
DATE
PLANT IDENTIFICATION:
LOCATION

Clariant Limited
17/08/12
P1 Air Scrubber
On main road through site

INTERNALLY BEFORE CLEAN



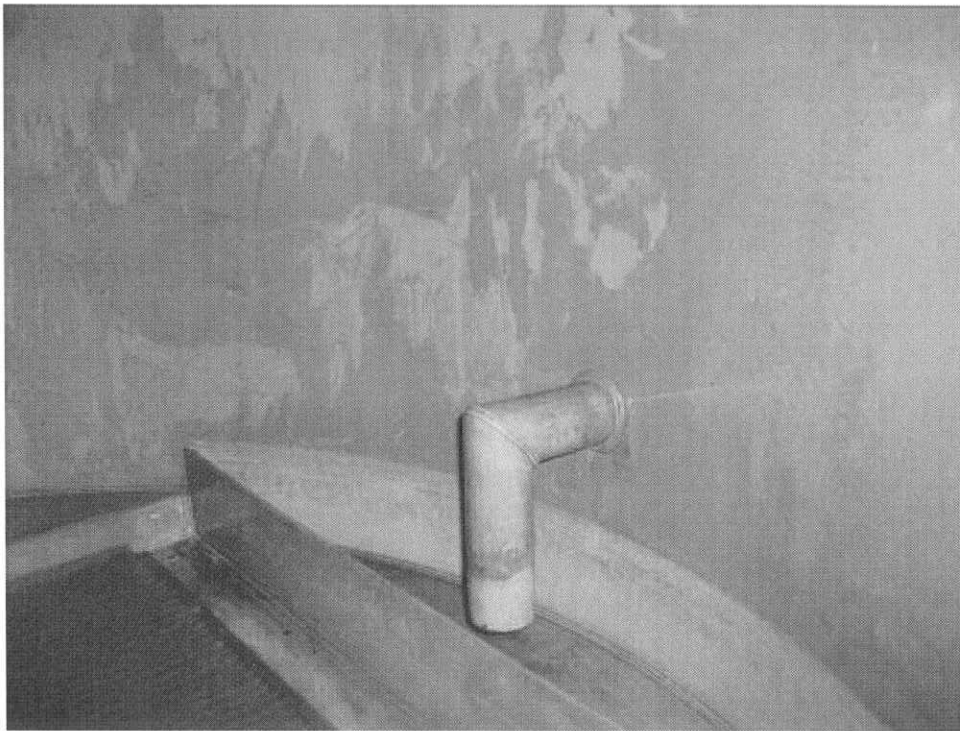
Promanex

INSPECTION REPORT

SITE
DATE
PLANT IDENTIFICATION:
LOCATION

Clariant Limited
17/08/12
P1 Air Scrubber
On main road through site

INTERNALLY AFTER CLEAN

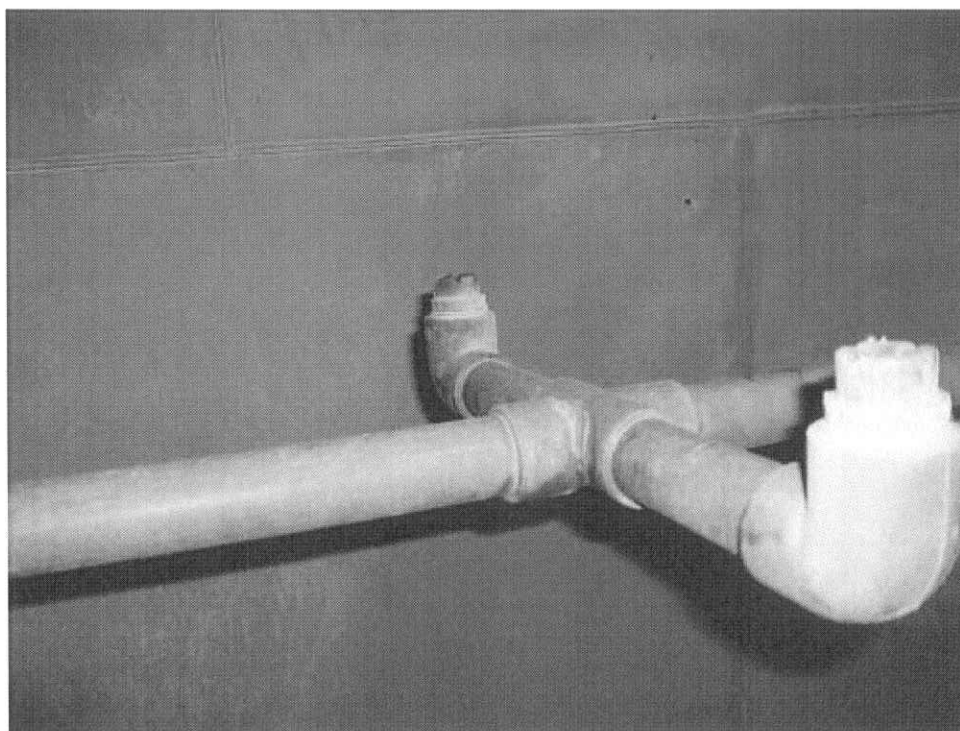


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INSPECTION REPORT

| | |
|------------------------------|---------------------------|
| SITE | Clariant Limited |
| DATE | 17/08/12 |
| PLANT IDENTIFICATION: | P1 Air Scrubber |
| LOCATION | On main road through site |

DISTRIBUTION CHANNELS & SPRAY NOZZLES BEFORE CLEAN



Promanex

INSPECTION REPORT

| | |
|------------------------------|---------------------------|
| SITE | Clariant Limited |
| DATE | 17/08/12 |
| PLANT IDENTIFICATION: | P1 Air Scrubber |
| LOCATION | On main road through site |

DISTRIBUTION CHANNELS & SPRAY NOZZLES AFTER CLEAN



Promanex

INSPECTION REPORT

| | |
|------------------------------|---------------------------|
| SITE | Clariant Limited |
| DATE | 17/08/12 |
| PLANT IDENTIFICATION: | P1 Air Scrubber |
| LOCATION | On main road through site |

FILTER MESH

FILTER MESH WAS NOT CLEANED. THIS WAS BAGGED UP FOR DISPOSAL BY SITE.

Promanex

INSPECTION REPORT

| | |
|------------------------------|---------------------------|
| SITE | Clariant Limited |
| DATE | 17/08/12 |
| PLANT IDENTIFICATION: | P1 Air Scrubber |
| LOCATION | On main road through site |

POND/SUMP BEFORE CLEAN



Promanex

INSPECTION REPORT

SITE
DATE
PLANT IDENTIFICATION:
LOCATION

Clariant Limited
17/08/12
P1 Air Scrubber
On main road through site

POND/SUMP AFTER CLEAN



| | | | | |
|----------------|--------------|-----------------|---------------|--------------|
| Document No. | PMX09/04 | Promanex | Revision No. | 0 |
| Document Owner | Site Manager | | Revision Date | 17 June 2011 |

CERTIFICATE OF CLEANING

| | |
|-----------------------------|---------------------------------------|
| Date: | 17/08/12 |
| Contract No: | S64544 |
| Client: | Clariant Limited |
| Address: | Llantwitt Fardre, Pontypridd. CF382SN |
| Plant Item(s): | Air Scrubber |
| Plant Reference: | P1 Air Scrubber |
| Pack Removed: | N/A |
| Basin Cleaned: | Yes – Deposits removed |
| Signed for Promanex: | <i>S Lee</i> |
| Name: | Stephen Lee |
| Position: | Service Technician |
| Regional Office: | Duncroft, Doncaster |

Promanex certify that the plant referred to above has been cleaned in accordance with the relevant Promanex (Construction & Maintenance Services) method statement: Cleaning of Industrial Cooling Towers.

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PMXLH-14



2

PROJECT NUMBER
Decommissioning 008
PROJECT:
*P1A Building
Decommissioning*
PLANT:
P1A
**DOCUMENT
REFERENCE:**
*D008/PROCESS/001
Project Scope*
DATE:
28th October 2011
BY:
Jane Mills
Project Approvals:

| Name | Position | Signature | Date |
|-------------------|--------------------------|------------------------------|------------|
| Jane Mills | Site Engineering Manager | <i>Jane Mills</i> JANE MILLS | 24/11/11 |
| Paul Davies | Project Engineer | <i>Paul Davies</i> | 25/11/2011 |
| John Spence | Project Engineer | <i>John Spence</i> | 24/11/11 |
| Scott Cinderby | ESHA Manager | <i>S. Cinderby</i> | 25.11.11 |
| Michael Macintosh | Plant Manager | <i>MR Macintosh</i> | 25.11.11. |
| Duncan Marlor | Site Manager | <i>Duncan Marlor</i> | 28.11.11 |

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1. Introduction: Business Case

Production P1A will cease production in November/December 2011 as the material produced is due to be sourced from an external supplier. These facilities are therefore redundant and require decommissioning. The purpose of this project is to ensure that the building P1A is decommissioned in such a way to leave the plant in a known condition.

As Pontypridd site is due to shutdown, it is essential that the condition and status of all plants is known and recorded in order to reduce the potential of accidents or incidents during any future demolition activities. This project will ensure that the plant status is recorded and any isolations/equipment removals are documented.

2. Project Summary

This project details the activities and isolations required for decommissioning to ensure that the plant is left in a “known” condition and all services (e.g. power, utilities) are left “cold & dead”. In order to leave the production area in a safe condition, it will be necessary to leave power to all the lighting in the building until such time that it is proposed to demolish the building.

Currently there are no items of equipment to be transferred to other Clariant production sites, therefore, all items of equipment are due to remain in the building once decontaminated and decommissioned. It is currently anticipated that this equipment may be either sold or scrapped by the demolition contractor during any demolition activities.

The main items of equipment covered by this decommissioning are:

- P3-05
- P3-05B
- D803A
- P1-12
- P1-13
- P1-14
- P1-15
- P3-27
- AP5-1 REC
- P1-18
- P1-18 RECIEVER
- P1-28
- P1-28A RECIEVER
- P1-20
- P1-21
- P1-22
- P1-23
- P1-24
- P1-15
- P2-20
- Caustic Tank
- Bulk Storage Tank
- P2-16
- P2-02
- Sieve for Sodium salts
- P1-02 DCE Unit
- All ancillary equipment associated with these vessels is redundant and requires decommissioning. This includes all transfer pumps, drain tanks, vacuum pumps and any glassware.
- All Instrumentation and control associated with the equipment identified (Where applicable). In this building most instrumentation is local only.
- Utility supplies
 - Nitrogen
 - Cooling Water
 - Chilled Water – Chillers to be decommissioned separately.

- Instrument Air
- Steam – To P1A building ONLY. Steam for P6 building traverses P1A, and needs to remain in operation until June 2012.
- Condensate
- Electricity

The decontamination/decommissioning of any other equipment in P1A/B building is outside the scope of this project and will be dealt with separately.

All chillers will be decommissioned by an external contractor and are therefore outside the scope of the project.

3. Project Scope

3.1 Process/Production

Decontamination of P1A Building in D008/PROCESS/006 – Decontamination Procedure

3.2 Mechanical Scope

Decommissioning of P1A Building identified in D008/MECH/001 – Mechanical Project Summary

3.2 E.I & C Scope

Electrical, Instrumentation and Control decommissioning of P1A Building as identified in D008/E.I.&C/001 – E.I.&C Scope Document.

3.3 Other

- Update insurance schedule to remove equipment from inspection schedule – Pressure and Lifting Equipment
- Update SAP to remove, delete/disable preventative maintenance routines.
- Review spares and assess any changes to spares holding.
- Update asset register with plant status.

4. Project Schedule

4.1 Project Schedule

Production ceases in November 2011. Process Boil-outs to remove gross contamination to occur December 2011. Decommissioning activities to start January 2012.

5. Reference Documents

- See D008 - Document Register for details of all project documents.

3

CHEMICAL INFORMATION – DECOMMISSIONING PROJECT 008, P1A PRODUCTION BUILDING

Project Number: D008
Project Description: P1A - Building Decommissioning
Document Reference: D008/PROCESS/003 – Chemical Information

Products produced:

| Production Building | Reaction Vessel | Product |
|---------------------|-----------------|---|
| P1A | P2-02 & P2-16 | Blending of Sodium Salts |
| | P3-27 | Sodium METHYL Paraben & Sodium PROPYL Paraben |
| | P1-24 & P1-25 | N-Butyl Paraben |

CHEMICAL INFORMATION – DECOMMISSIONING PROJECT 008, P1A PRODUCTION BUILDING

| PRODUCT | Material | Form | MSDS Available | Vessel material used in | Purpose |
|-----------------------|----------------|---------|----------------|-------------------------|---------------------------|
| Sodium METHYL Paraben | Methyl Paraben | Solid | YES | P2-20 P3-27 | Finished Product Reaction |
| | Methanol | Liquid | YES | P3-27 P1-15 | Reaction Slurry vessel |
| | Nitrogen | Gaseous | YES | All | Inerting of vessel |

| PRODUCT | Material | Form | MSDS Available | Vessel material used in | Purpose |
|-----------------------|----------------|---------|----------------|-------------------------|---------------------------|
| Sodium PROPYL Paraben | Propyl Paraben | Solid | YES | P2-20 P3-27 | Finished Product Reaction |
| | Propanol | Liquid | YES | P3-27 P1-15 | Reaction |
| | Nitrogen | Gaseous | YES | ALL | Inerting of vessel |

| PRODUCT | Material | Form | MSDS Available | Vessel material used in | Purpose |
|-----------------|------------------------------|--------|----------------|-------------------------|----------------|
| N-Butyl Paraben | 4-Hydroxybenzoic Acid (PHBA) | Solid | YES | P1-24 P1-25 | Reaction |
| | n-Butyl Paraben | Solid | YES | P1-24 P1-25 P1-20 | Reaction |
| | p-Toluene Sulphonic Acid | Liquid | YES | P1-24 P1-25 | Reaction |
| | Citric Acid | Solid | YES | P1-20 | Reaction |
| | Ammonia solution | Liquid | YES | P1-20 | Neutralisation |
| | Sodium Chloride | Solid | YES | P1-24 P1-25 | Reaction |
| | n-Butanol | Liquid | YES | P1-18 P1-28 P1-20 | Various |

CHEMICAL INFORMATION – DECOMMISSIONING PROJECT 008, P1A PRODUCTION BUILDING

| | | | | | |
|--|----------|--------|-----|-------------------------|-------------------|
| | | | | P1-23 P1-24 P1-25 | |
| | Methanol | Liquid | YES | P1-24 P1-25 | Reaction/Cleaning |

| PRODUCT | Material | Form | MSDS Available | Vessel material used in | Purpose |
|---|-----------------|-------------|---------------------------|------------------------------------|---|
| Ethyl 3,5-dichloro-4-hydroxybenzoic acid (EDHB) | EDHB | Solid | YES | P1-13 P1-14 | Recrystallize for use in Reaction – VESSEL NOT USED AFTER 2002. |

4

| | |
|---------------------------|---|
| PROJECT NUMBER | Decommissioning 008 |
| PROJECT: | <i>Decommissioning of P1A Production plants</i> |
| PLANT: | <i>P1A</i> |
| Document Reference | <i>D008/PROCESS/006 Decontamination Procedure</i> |
| DATE: | <i>1st June 2012</i> |
| BY: | <i>Jane Mills</i> |

The purpose of this document is to detail the decontamination procedure to be followed to achieve a "KNOWN" condition in terms of chemical contamination for the various items of equipment associated with the decommissioning project. This procedure will NOT "Clean" the equipment.

| Name | Position | Signature | Date |
|-------------------|--------------------------|--------------------------------|------------|
| Jane Mills | Site Engineering Manager | <i>Jane Mills</i> JANEMILLS | 28/6/12 |
| Paul Davies | Project Engineer | <i>Paul Davies</i> | 02/07/2012 |
| John Spence | Project Engineer | <i>John Spence</i> | 28/6/12 |
| Scott Cinderby | ESHA Manager | <i>S. Cinderby</i> | 29.06.12 |
| Michael Macintosh | Plant Manager | <i>M Macintosh</i> | 2/7/12 |
| Duncan Marlor | Site Manager | <i>Duncan Marlor</i> | 2/7/12 |

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D008-PROCESS-006 Decontamination Procedure.

Date: Thursday, 28 June 2012

| | |
|----------------------------------|----|
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HEALTH & SAFETY STATEMENT

Although a Decontamination Risk Assessment has been completed, all activities during the decontamination and decommissioning are required to be completed under a permit to work issued by the Team Leader. This will include all Operator activity for the flushing of pipework as well as all maintenance/contractor activity for connecting/disconnecting pipework and hoses.

1. Reference Documents

The following documents are required for reference when using this decontamination procedure:

- D008-PROCESS-001 Project Scope
- D008-PROCESS-002 P&ID List
- D008-PROCESS-003 Chemical Information
- D008-PROCESS-004 Line List
- D008-PROCESS-005 Decontamination Register
- D008-PROCESS-007 Decontamination Risk Assessment
- QA Testing Guidelines for Materials in Chemical Information List.

P&ID's of the plant as identified in Document D008-PROCESS-002 P&ID List.

2. Equipment/Items Required

The following items of equipment will be required in order to complete the decontamination identified in the procedures. This equipment should be obtained before starting any decontamination work and identified as for "Decommissioning ONLY".

- Process Decommissioning Locks
- IBC for clean water
- Waste IBC's for collecting effluent.
- Air diaphragm pump for direct transfer of water into process vessels.
- Hose and lance assembly for connection to air diaphragm pump to empty IBC.
- Hose connection for transfer into process vessels
- Air line for connection of diaphragm pump
- A pallet truck or Fork Lift truck will be required for moving IBC's.

3. Control Overrides Required

This plant is operated in manual.

4. Procedures for Decontamination

Precautions identified in the Decontamination Risk Assessment (D008-PROCESS-D007) must be followed when completing the decontamination identified. For all line breaks or temporary pipework, a permit to work must be obtained.

4.1 P2-02 & P2-16

- This vessel was cleaned as part of the production boil-outs. Further flushing is not required.
- Volkmann system to be disconnected; removed and cleaned off-line ready for disposal – both units.
- Compressed air to be isolated and lines vented.
- Steam to be isolated and fully vented.
- Cooling water to be isolated and jacket drained.

| Process Decommissioning of P2-02 & P2-16 completed | |
|--|----------------------|
| Signature: <i>J. Mills</i> | Date: <i>20/7/12</i> |
| Name: <i>J. Mills</i> | |

4.2 P1-12

- This vessel has not been used for >5years. Vessel inspection indicates free from residues and odour. Therefore no further flushing is required.
- Glassware to be labelled as potentially contaminated.
- Disconnect charge line from diaphragm pump.
- Vacuum line to be flushed as part of the vacuum system.
- Chilled water to be flushed as part of the utilities system.
- Nitrogen line to be isolated, disconnected and purged.
- Once utilities decommissioning is completed, utilities to be isolated and jacket drained.

| Process Decommissioning of P1-12 | |
|----------------------------------|----------------------|
| Signature: <i>J. Mills</i> | Date: <i>20/7/12</i> |
| Name: <i>J. Mills</i> | |

4.3 P1-13

- This vessel has not been used for a significant period of time. On inspection, vessel required rinsing as some residues were visible. The vessel was odour free.
- Fill an IBC of clean water, using the diaphragm pump, transfer the contents to P1-13 to flush pipework.
- Connect water line to valve on overhead condenser (25mm PVC line, labelled – Flush point 1).
- Flush water through glass receiver into P1-13.
- Connect water line to valve on overhead condenser (valve labelled – Flush point 2).
- Close valve to P1-13, and close valve to receiver.
- Fill overhead condenser with water.
- Open valve to P1-13 and flush water into P1-13.
- Drain P1-13 into IBC's and rinse with fresh water.
- Open valve to glass receiver and flush water through.
- Disconnect glass receiver from overheads pipework at local valve.
- Connect water supply and rinse glass receiver.
- Glassware to be labelled as contaminated as no further flushing is to be completed.
- Vacuum system to be flushed as part of the vacuum system decommissioning.
- Chilled water to be flushed as part of the utilities decommissioning.
- Nitrogen to be isolated and vented.
- Once completed, all utilities should be isolated and vessel jacket drained.

| Process Decommissioning of P1-13 Complete | |
|---|----------------------------------|
| Signature: <i>J. Mills</i> | Date: <i>20/7/12</i> |
| Name: <i>J. Mills</i> | |

4.4 P1-14

- This vessel has not been used for a significant period of time. On inspection, vessel required rinsing as some residues were visible. The vessel was odour free.
- Connect water line to valve on overhead condenser (25mm PVC line, labelled – Flush point 3).
- Flush water through glass receiver into P1-14.
- Connect water line to valve on overhead condenser (valve labelled – Flush point 4).
- Close valve to P1-14, and close valve to receiver.
- Fill overhead condenser with water.
- Open valve to P1-15A/B Receivers and flush line.

D008-PROCESS-006 Decontamination Procedure.

Date: Thursday, 28 June 2012

- Open valve to P1-14 and flush water into P1-14.
- Drain P1-14 into IBC's and rinse with fresh water.
- Open valve to glass receiver and flush water through.
- Disconnect glass receiver from overheads pipework at local valve.
- Connect water supply and rinse glass receiver.
- Glassware to be labelled as contaminated as no further flushing is to be completed.
- Vacuum system to be flushed as part of the vacuum system decommissioning.
- Chilled water to be flushed as part of the utilities decommissioning.
- Nitrogen to be isolated and vented.
- Once completed, all utilities should be isolated and vessel jacket drained.

Process Decommissioning of P1-14 complete

| | |
|--|----------------------------------|
| Signature: <i>J. Mills</i> | Date: <i>20/7/12</i> |
| Name: <i>J. Mills</i> | |

4.5 P1-15

- Production boil-out has been completed; therefore it is not proposed to complete any further flushing.
- Any glassware to be labelled as contaminated.
- Chilled water line to be flushed as part of utilities decommissioning.
- Nitrogen line to be isolated and vented.
- Vacuum lines to be flushed as part of the vacuum system decommissioning.
- Once decommissioning completed, then vessel should be isolated and jacket drained.

Process Decommissioning of P1-15 completed

| | |
|--|----------------------------------|
| Signature: <i>J. Mills</i> | Date: <i>20/7/12</i> |
| Name: <i>J. Mills</i> | |

4.6 P1-18

- Production boil-out has been completed for this vessel; therefore no further flushing is required.
- Connect water line to drain valve on glass line at base of column.
- Using this hose, fill glassware, and flush through column as much as possible.
- Flush line to P3-05 from base of column.
- Drain P1-18 of any residues from the flushing. Rinse P1-18.

D008-PROCESS-006 Decontamination Procedure.

Date: Thursday, 28 June 2012

- All glassware should be labelled as potentially contaminated.
- Water tank to be emptied and flushed with clean water. If there is stagnant water when flushing starts, then after emptying, fill with water and add approximately 25kg of Sodium Hypochlorite to sterilise. Empty tank and flush to remove residues.
- Vacuum lines to be flushed as part of the vacuum system decommissioning.
- Nitrogen lines to be isolated and vented.
- Once decommissioning completed, then vessel should be isolated and jacket drained.

Process Decommissioning of P1-18 completed

| | |
|--|---------------------------|
| Signature: <i>J. Mills</i> | Date: 27/7/12 |
| Name: J. Mills | |

4.7 P1-20

- Production boil-out has been completed on this vessel, therefore no further flushing is proposed.
- Glassware to be labelled as potentially contaminated.
- Nitrogen lines to be isolated and vented.

Process Decontamination of P1-20 completed

| | |
|--|---------------------------|
| Signature: <i>J. Mills</i> | Date: 27/7/12 |
| Name: J. Mills | |

4.8 P1-21

- Vessel has been drained of residual solvent and water flushed.
- Connect water line to PVC drain valve at base of condenser.
- Isolate valve into P1-21, then using this water line, flush through the glassware as much as possible.
- All glassware to be labelled as potentially contaminated.
- All waste residue to be drained to IBC's for disposal.
- Water tank to be emptied and flushed with clean water. If there is stagnant water when flushing starts, then after emptying, fill with water and add approximately 25kg of Sodium Hypochlorite to sterilise. Empty tank and flush to remove residues.

| | |
|--|-----------------------------------|
| Process decommissioning of P1-21 completed. | |
| Signature: <i>J. Mills</i> | Date: <i>27/27/12</i> |
| Name: <i>J. Mills</i> | |

4.9 P1-23

- Vessel has been drained of residual solvent and water flushed; therefore it is not proposed to complete any further flushing.
- Water tank to be emptied and flushed with clean water. If there is stagnant water when flushing starts, then after emptying, fill with water and add approximately 25kg of Sodium Hypochlorite to sterilise. Empty tank and flush to remove residues.
- Vacuum line to be cleaned as part of vacuum system.
- Other utilities to be isolated as part of the utilities decommissioning..
- Once decommissioning is completed, isolate and drain jacket.

| | |
|---|----------------------------------|
| Process decommissioning of P1-23 completed | |
| Signature: <i>J. Mills</i> | Date: <i>22/7/12</i> |
| Name: <i>22/7/12</i> | |

4.10 P1-24

- Production boil-out of this vessel has been completed; therefore it is not proposed to complete any further flushing.
- Connect water hose on drain line to glass receiver. Isolate line to P1-24 and flush glassware through as much as possible.
- Drain all glassware of the flush water.
- All glassware to be labelled as potentially contaminated.
- Vacuum lines to be flushed as part of the vacuum system decommissioning.
- Nitrogen lines to be isolated and vented.
- Once decommissioning is completed, isolate and drain jacket.

| | |
|---|----------------------------------|
| Process decommissioning of P1-24 completed | |
| Signature: <i>J. Mills</i> | Date: <i>27/7/12</i> |
| Name: <i>J. Mills</i> | |

4.11 P1-25

- Production boil-out of this vessel has been completed; therefore it is not proposed to complete any further flushing.
- Connect water line to hose point on glass receiver. Isolate line to P1-25.
- Flush water through as much glassware as possible, and collect all water residues in IBC's for disposal.
- All glassware to be marked as contaminated.
- Chilled water line to be flushed as part of the utilities decommissioning.
- Nitrogen line to be isolated and vented.
- Vacuum vent lines to be completed separately.
- Once decommissioning is completed, isolate and drain jacket.

| Process decommissioning of P1-25 completed | |
|--|----------------------|
| Signature: <u>J. Mills</u> | Date: <u>27/7/12</u> |
| Name: <u>J. Mills</u> | |

4.12 P1-28 and P1-28A Receiver

- Production boil-out of P1-28 has been completed; it is therefore not proposed to complete any further flushing of the reactor.
- Connect water hose to drain valve at base of glass column.
- Flush glassware as much as possible, including line to P3-05.
- Rinse any flushing water out of P1-28 into IBC's for disposal.
- Nitrogen to be isolated and vented.
- Once decommissioning is completed, isolate and drain jacket.

4.12.1 P1-28A Receiver

- Connect water line to 25mm drain valve.
- Flush line from P1-18 and P1-28 into P1-28A Receiver.
- Nitrogen to be isolated and vented.
- Flush clean, fresh water into P1-28A receiver from connected water hose.
- Connect hose to enable draining of P1-28A receiver into waste IBC.
- Vacuum lines to be flushed as part of vacuum system.
- All glassware to be marked as contaminated.
- Once decommissioning is completed, isolate and drain jacket.

| Process decommissioning of P1-28 completed | |
|--|----------------------|
| Signature: <u>J. Mills</u> | Date: <u>27/7/12</u> |
| Name: <u>J. Mills</u> | |

4.13 P3-27 & associated receivers


- Production boil-out of P3-27 has been completed; it is therefore not proposed to complete any further flushing of the reactor. This will include the reaction transfer lines into P2-20 and P2-20R.
- Nitrogen to be isolated and vented.
- Chilled water supply to be flushed as part of the utilities decommissioning.
- Vacuum lines to be flushed separately.

4.13.1 Receiver

- Nitrogen to be isolated and fully vented.
- Disconnect line from extract system to receiver.
- Using this nozzle, flush receiver with fresh water to clean and drain into IBC's.
- Vacuum lines to be cleaned as part of vacuum system.

4.13.2 Hot water tank

- Water tank to be emptied and flushed with clean water. If there is stagnant water when flushing starts, then after emptying, fill with water and add approximately 25kg of Sodium Hypochlorite to sterilise. Empty tank and flush to remove residues.
- Once decommissioning completed, drain coil of condensate.

| Process decommissioning of P3-27 completed | |
|--|-------------------------------|
| Signature:  | Date: 27 7 12 |
| Name: J. Mills | |

4.14 P2-20R & T06

- Production clean-out of P2-20R has already been completed as part of the Methyl Sodium Salts Production cleaning. (P2-20 & P3-27); therefore no further process cleaning is proposed.
- Nitrogen to be isolated and fully vented.
- Vacuum line to be flushed separately.
- Once decommissioning completed, isolate and drain jacket.

4.14.1 T06 Tank

- Disconnect input line from T06.
- Using this nozzle, flush T06 with water and collect residues in IBC's for disposal.
- Cooling water lines to be drained as part of utility decommissioning.

| Process decommissioning of P2-20R & T06 completed | |
|---|---------------------------|
| Signature: <i>J. Mills</i> | Date: 27/7/12 |
| Name: J. Mills | |

4.15 P2-20 Drier

- Production boil-out has been completed on the drier and the feed into the drier was flushed as part of this boil-out. Therefore no further flushing is proposed.
- Vacuum lines will be flushed as part of the vacuum system.
- Nitrogen lines to be isolated and vented.

4.15.1 Sievemaster

- Check sodium salts sieve for residues and clean as necessary.

| Process Decontamination of P2-20 completed | |
|--|---------------------------|
| Signature: <i>J. Mills</i> | Date: 27/7/12 |
| Name: J. Mills | |

4.16 P3-05 & Associated Receivers (P3-05B, D803A/B)

4.16.1 P3-05

- Vessel should be inspected for residues.
- Should no visible residues be apparent, then flush vessel with water.
- Should residues be apparent, then obtain production cleaning procedure for this vessel and complete production boil-out.
- Jacket to be drained once decommissioning is completed.
- Nitrogen line to be isolated and vented.
- All vacuum lines are to be flushed as part of the vacuum system.

4.16.2 D803A/B

- D803B is located outside, underneath the staging and is not connected to anything. Remove largest nozzle and flush system with water.
- D803A is located inside building next to P3-05.
- Remove largest nozzle and flush system with water (scaffolding may be required for access.)

4.16.3 P3-05B

- Disconnect inlet pipework and flush with water.

4.17 AP5 Receiver

- Remove manway lid – scaffolding may be required.
- Flush tank with water.

| | |
|--|----------------------------------|
| Process decommissioning of AP5 Receiver completed | |
| All pipework should be assumed to be contaminated. | |
| Signature: <i>J. Mills</i> | Date: <i>27/7/12</i> |
| Name: <i>J. Mills</i> | |

4.18 Vacuum System

4.18.1 BUSCH Vacuum System

The main BUSCH vacuum pump associated with P1A production building have been decommissioned and removed, however the pipework for these systems remain in place and require flushing.

- Disconnect vacuum system from all reactors and receivers to avoid potential water contamination.
- Where possible, these should be disconnected at a valve and all valves closed. If no valves available, then valves are to be installed.
- Connect water line to vacuum pipework underneath P1-25. A screwed connection exists to connect to. Fill system with water.
- Connect hoses to low points in sequence and flush through vacuum system to all low points.
- All water from flushing is to be collected to IBC's and labelled for disposal.
- All vacuum lines are to be drained as much as possible and labelled as potentially contaminated.
- Water tank associated with vacuum pump is to be drained of all water. Refill with fresh water and add 10litres of Sodium hypochlorite.
- Leave to stand for a minimum of 30minutes.
- Drain tank and then rinse with fresh water.

4.18.2 NASH Pump Vacuum System

The NASH pumps and associated flanges are likely to contain Asbestos, therefore where possible; no flanges should be broken around the NASH pumps themselves. The vacuum pipework around the vessels is primarily screwed pipework and therefore connections can be made.

- Disconnect vacuum system from all reactors and receivers to avoid potential water contamination.
- Where possible these should be disconnected at a valve and all valves closed. If no valves are available, then valves are to be installed.
- Connect water line to vacuum pipework under P1-14 and flush system with water.
- Connect hoses to low points in sequence and flush through vacuum system.


D008-PROCESS-006 Decontamination Procedure.

Date: Thursday, 28 June 2012

- All water from flushing is to be collected in IBC's and labelled for disposal.
- All vacuum lines are to be drained as much as possible and labelled as potentially contaminated.
- Water tank associated with vacuum pump is to be drained of all water. Refill with fresh water and add 10litres of Sodium hypochlorite.
- Leave to stand for a minimum of 30minutes.
- Drain tank and then rinse with fresh water.

Process decommissioning of vacuum system completed

All pipework should be assumed to be contaminated.

| | |
|--|---------------------------|
| Signature:  | Date: 27/7/12 |
| Name: J. Mills | |


4.19 P1-02 DCE Units

All dust extraction systems have been left as it is not possible to clean these systems. They can therefore be assumed to be contaminated.

- DCE Housing unit to be vacuumed to remove as much powder residue as possible, hoppers should be emptied and filters removed. All filters to be disposed of as solid waste.

Decontamination of Dust Extraction system

Where possible lines have been emptied, however residues will remain in all spiral wound pipework on the dust extraction system.

| | |
|--|---------------------------|
| Signature:  | Date: 27/7/12 |
| Name: J. Mills | |

4.20 Utilities

- Nitrogen supply to be isolated and vented.
- Steam and cooling water are part of the P6 system and therefore cannot be isolated fully in the building; local jacket draining only will be completed.

4.20.1 Chilled Water Supply

- Chillers to be decommissioned by Cooltherm separately.
- Glycol/Water tanks to be drained and flushed with fresh water. All Glycol/water to be collected to IBC's as the COD is too high for the effluent plant to cope with.
- Flush through pipework with fresh water to remove glycol/water.
- Drain all effluent to IBC's and label. All IBC's to be tested for COD before disposal via effluent plant.

D008-PROCESS-006 Decontamination Procedure.

Date: Thursday, 28 June 2012

Decontamination of Utility Pipework

I confirm that all utility pipework has been isolated and drained in accordance with the above schedule.

| | |
|--|----------------------------------|
| Signature: <i>J. Mills</i> | Date: <i>27/7/12</i> |
| Name: <i>J. Mills</i> | |

Decommissioning of Chillers associated with P1A has been completed by COOLTHERM.

| | |
|--|----------------------------------|
| Signature: <i>J. Mills</i> | Date: <i>27/7/12</i> |
| Name: <i>J. Mills</i> | |

* THIS ADDITIONAL CLEANING PROCEDURE IS ISSUED TO COVER P2-20 & P3-27 - RE-CLEAN, FOLLOWING RE-USE CLARIANT PRODUCTION UK LIMITED - ICS

Procedure for Methanol Boil-outs of P1-15, P3-27, P2-20, P1-37 and associated transfer lines.

ISSUE NO: 1

DATE: 25/11/11

AUTHOR: MICHAEL MACINTOSH

| | |
|--------------|---|
| Location: P1 | Boil-out Authorised by: <i>MR MacIntosh</i> |
|--------------|---|

Check the plant logbook to ensure the Plant is empty before starting procedure

| Equipment | Plant number | Current Status: | Signature | Date |
|-----------------------------------|--------------|-----------------|--------------------|--------|
| 8000lts S/S Rotary vacuum dryer | P1-37/P2-20 | See logbook | <i>[Signature]</i> | 6/6/12 |
| Receiver | P1-36 | See logbook | <i>[Signature]</i> | 6/6/12 |
| Receiver | P2-20 | See logbook | <i>[Signature]</i> | 6/6/12 |
| 500 gallon glass-lined vessel | P1-15 | See logbook | <i>[Signature]</i> | 6/6/12 |
| 500 gallon stainless steel vessel | P3-27 | See logbook | <i>[Signature]</i> | 6/6/12 |

Below is a Brief summary of H & S information including PPE of raw materials included in the Original process stream (see Material Safety Data sheets and COSHH assessments for full details). In order to reduce exposure, check that all plant and associated filling flasks are empty.

| Material | Hazard | PPE (as well as Boiler suits, Safety Boots and helmet) |
|--|---|--|
| Nipagin M (Methyl Paraben) | Slightly irritating to eyes and skin | Gloves and Dust mask |
| Methanol | Highly flammable, toxic May cause eye irritation | Face shield, Gauntlets, Green PVC suit, Rubber Wellingtons |
| Nipagin M Sodium (Sodium Methyl Paraben) | Harmful, Irritant | Face shield, Folding Mask, Gauntlets |
| Hot water/Steam | Burns | Face shield, Gauntlets, Green PVC suit, Rubber Wellingtons |

Approved by: (Production Manager)

MR MacIntosh Date: 29/11/11

Approved by: (ESHA Manager)

S. Linderby Date: 29.11.11

Approved by: (Engineering Manager)

J. Mills Date: 29/11/11

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Procedure for Methanol Boil-outs of P1-15, P3-27, P2-20, P1-37 and associated transfer lines.

ISSUE NO: 1

DATE: 25/11/11

INTRODUCTION

SCOPE OF SOP

This SOP describes the practices to be followed in order to safely remove Gross contamination from the listed vessels in preparation for hand-over to the de-commissioning team. Further water cleaning may be required.

RESTRICTIONS TO USE

- The cleaning of a vessel is to be performed by authorised, trained personnel only.
- Any operations during the washing of a vessel, which are not detailed within this SOP, must be communicated to supervision before commencing the operation. This is to allow complete assessment of all hazards and potential hazards.
- Any apparent problems or abnormalities arising in or with use of this SOP e.g. instructional errors or omissions must be alerted to supervision or line management.
- Any plant changes or plant modifications must be communicated to line management in order to allow SOP amendments and re-issue.

* An **Electrostatic Charge** can build up in the movement of low- conductivity flammables or combustible liquids. This risk is minimised by the use of conductive materials.

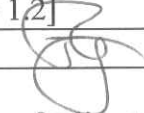
Procedure for Methanol Boil-outs of P1-15, P3-27, P2-20, P1-37 and associated transfer lines.

ISSUE NO: 1

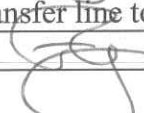
DATE: 25/11/11

STEP 1: Water Flushing the Aqueous caustic tank and transfer to P3-27.

1.1] First Visually check the caustic tank is empty; If empty continue to step 1.2]


| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 18.00 | Signature |  |
|------|--------|------|-------|-----------|---|

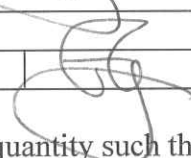
1.2] Close the tank drain valve and open the manual valves on the caustic transfer line to P3-27

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 18.05 | Signature |  |
|------|--------|------|-------|-----------|---|


1.3] Using a water hose, in order to rinse Caustic residues to the bottom of the Tank.

wash the inside tank sidewalls as per batch quantity below, fit a flexi-hose from the discharge valve, open the discharge valve and drain to the plant effluent.

| | Batch quantity | Actual quantity used | Signature |
|-----------------------------|----------------|----------------------|--|
| Filtered Process water hose | 200 Litres | 200 Ltr |  |








| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 18.20 | Signature |  |
|------|--------|------|-------|-----------|--|


1.4] Close discharge valve then fill the Caustic tank with further process quantity such that the tank is filled almost to the top – Allow for mixing vortex, then start the Mixer Agitator. Record the quantity required to fill the tank in the table below. Allow to stir for 15 minutes the switch off agitator.

| | Actual quantity used | Signature |
|--|----------------------|--|
| Filtered Process water through flowmeter | NA. |  |

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 18.30 | Signature |  |
|------|--------|------|-------|-----------|---|

5] Nitrogen purge P3-27 as per SOP** N2 apply vacuum to the vessel, remove the in-line Filter cartridges from the transfer line between the tank and P3-27. Replace the filter housing, and transfer the water to P3-27 via the transfer line. Follow the procedures described below in order to transfer the wash from the caustic tank to P3-27.

| Transfer Checklist Caustic tank to P3-27 | Tick when complete |
|--|---|
| Ensure agitators is off on both the Caustic tank and P3-27 |  |
| Vacuum applied on P3-27 |  |
| Open the valves in the transfer line between the Caustic tank and P3-27 |  |
| Open the valves in the transfer line between the Caustic tank and P3-27 |  |
| When the wash transfer is complete, close the transfer valves |  |
| Carefully remove the Filter housings in order to empty residual water. |  |
| Open P3-27 base valve and discharge the water wash directly to the effluent drain. |  |

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 18.40 | Signature |  |
|------|--------|------|-------|-----------|---|

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Procedure for Methanol Boil-outs of P1-15, P3-27, P2-20, P1-37 and associated transfer lines.

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DATE: 25/11/11











STEP2: Cleandown of P1-15, P3-27 and P2-20

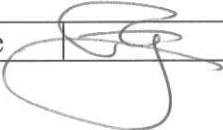
2.1] Check Cooling Tower – CT -01 is on and the cooling circulating around the condensers. Boil out P1-15 Following **SOP**WASH** (Boiling a Reactor out with Fresh Methanol) with the qty listed below.

| | Batch quantity | Actual quantity used | Time finish charge | Signature |
|-----------------------|---------------------|----------------------|--------------------|---|
| FRESH METHANOL | 1,000 Litres | N/A | N/A |  |


| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 18.40 | Signature |  |
|------|--------|------|-------|-----------|--|

2.2] Nitrogen purge P3-27 as per **SOP** N2** apply vacuum to the vessel, remove the in-line Filter cartridges from the transfer line between P1-15 and P3-27. Replace the filter housing, and transfer the boil out wash to P3-27 via the transfer line. Follow the procedures described below to transfer the wash from P1-15 to P3-27.

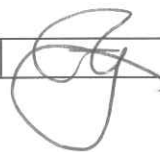
| Transfer Checklist P1-15 to P3-27 | Tick when complete |
|--|---|
| Ensure agitators is off on P1-15 and it's off on P3-27 |  |
| Apply vacuum to P3-27 |  |
| Ensure vent on P1-15 is open |  |
| Open the valves in the transfer line between P1-15 and P3-27 |  |
| Apply nitrogen to P1-15 to prevent air ingress into P1-15 during transfer |  |
| Switch the P3-27 agitator on |  |
| Vent any vacuum in P1-15 with nitrogen |  |
| Open the valves in the transference line between P1-15 and P3-27 |  |
| When the boil out transfer is complete, close the transfer valves and vent the vacuum in P3-27 with nitrogen |  |
| Carefully remove the Filter housings in order to empty residual Methanol |  |

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 18.50 | Signature |  |
|------|--------|------|-------|-----------|--|

2.3] Nitrogen purge the dryer **SOP**N2**.

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 19.00 | Signature |  |
|------|--------|------|-------|-----------|---|

2.4] Apply full vacuum to the dryer P2-20

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 19.05 | Signature |  |
|------|--------|------|-------|-----------|---|


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Procedure for Methanol Boil-outs of P1-15, P3-27, P2-20, P1-37 and associated transfer lines.

ISSUE NO: 1

DATE: 25/11/11

2.5] Turn on the agitator of the dryer P2-20

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 19.10 | Signature |  |
|------|--------|------|-------|-----------|--|


2.6] Apply Vacuum to P2-20

Follow the procedures described below to transfer the batch from P3-27 to the P2-20 Dryer. Safety risks are minimized by following the check list below.

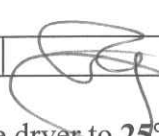
| Transfer Checklist (Selected Dryer :P2-20) | Tick when complete |
|---|-------------------------------------|
| Close P2-20 Base valve. | <input checked="" type="checkbox"/> |
| Ensure both agitators are running on P3-27 and the selected dryer. | <input checked="" type="checkbox"/> |
| Apply vacuum to the dryer. | <input checked="" type="checkbox"/> |
| Set the transfer valves up to the selected dryer (keep P3-27 bottom valve shut) | <input checked="" type="checkbox"/> |
| Open the nitrogen valve to P3-27 to avoid air ingress | <input checked="" type="checkbox"/> |
| Open the transfer valve at the base of P3-27 to start the transfer | <input checked="" type="checkbox"/> |
| When the level in P3-27 is around the agitator, switch it off | <input checked="" type="checkbox"/> |
| When the transfer is complete close the valves in the transfer lines. Keep the vacuum in the selected dryer | <input checked="" type="checkbox"/> |
| Flush the pipe with 10-15 litres of filtered water | <input checked="" type="checkbox"/> |

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 19.20 | Signature |  |
|------|--------|------|-------|-----------|---|

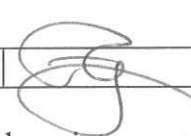
2.7] Turn off the Vacuum pump, Nitrogen purge the dryer as per SOP**N2 - Open the vent valve on the dryer. Apply low pressure steam ¼ of a turn to the dryer.

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 19.35 | Signature |  |
|------|--------|------|-------|-----------|---|

2.8] Heat the dryer to reflux 62°C - 66°C. Close the steam valve on the dryer.

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 20.00 | Signature |  |
|------|--------|------|-------|-----------|---|

2.9] Apply cooling water to the jacket of the dryer. Cool the contents of the dryer to 25°C -28°C SOP**PURE. Close the cooling valves and drain the jacket of the dryer.

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 21.00 | Signature |  |
|------|--------|------|-------|-----------|---|

2.10] Open the outlet valve of the dryer. Discharge the Methanol from the dryer into an earthed, anti-static IBC labelled "Methanol from Drier Clean down SOP**TR.FLAMM

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 21.10 | Signature |  |
|------|--------|------|-------|-----------|---|

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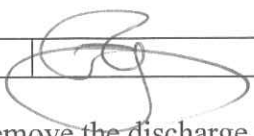
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Procedure for Methanol Boil-outs of P1-15, P3-27, P2-20, P1-37 and associated transfer lines.


ISSUE NO: 1

DATE: 25/11/11


2.11] Apply full vacuum to the dryer

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 21.15 | Signature |  |
|------|--------|------|-------|-----------|--|

2.12] Inform Line Management to instruct Maintenance Department to remove the discharge flange from the outlet valve of the dryer


| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 21.20 | Signature |  |
|------|--------|------|-------|-----------|--|

2.13] Empty receiver P2-20 into an earthed anti-static IBC ref SOP**TR.FLAMM


| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 21.30 | Signature |  |
|------|--------|------|-------|-----------|--|

STEP 3: CONDENSER CLEAN DOWN P2-20


3.1] Shut the cooling water and the valve between the receiver and the condenser; add water to the condenser by the flush pipe on the top of the glassware. Open the vent of the condenser to relief any air and flood the condenser completely with water. When it's totally flooded allow the water to stand for 1 hour.

| | | | | | |
|------------|-------|-------------|-------|-----------|--|
| Start Time | 21.35 | Finish Time | 22.35 | Signature |  |
|------------|-------|-------------|-------|-----------|--|


3.2] Ensure the receiver is totally empty.

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 22.45 | Signature |  |
|------|--------|------|-------|-----------|--|

3.3] Apply full vacuum to the receiver and then open the valve between the receiver and the condenser to pull down the water from the condenser. Flush the condenser (from the top of the glassware to the receiver) for 5 – 10 minutes.

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 22.50 | Signature |  |
|------|--------|------|-------|-----------|--|

3.4] Empty the volume of the receiver to the effluent and record the procedure in the Plant Log Book.

| | | | | | |
|-----------|--------|------|-------|-----------|--|
| Date Time | 6/6/12 | Time | 22.55 | Signature |  |
|-----------|--------|------|-------|-----------|--|

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Procedure for Methanol Boil-outs of P1-15, P3-27, P2-20, P1-37 and associated transfer lines.

ISSUE NO: 1

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Step 4: Clean down for P1-37


4.1] Repeat steps: 2.1 and 2.2 for P1-15 and P3-27.

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 23.00 | Signature |  |
|------|--------|------|-------|-----------|---|


4.2] Nitrogen purge the dryer **SOP**N2**.

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 23.10 | Signature |  |
|------|--------|------|-------|-----------|---|

4.3] Apply full vacuum to the dryer P1-37

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 23.15 | Signature |  |
|------|--------|------|-------|-----------|---|

4.4] Turn on the agitator of the dryer P1-37

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 23.20 | Signature |  |
|------|--------|------|-------|-----------|--|

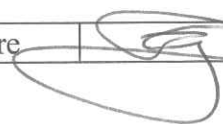
4.5] Transfer to Dryer P1-37

Follow the procedures described below to transfer the batch from P3-27 to the P1-37 Dryer. Safety risks are minimized by following the check list below.

| Transfer Checklist (Selected Dryer :P1-37) | Tick when complete |
|---|-------------------------------------|
| Close P1-37 Base valve. | <input checked="" type="checkbox"/> |
| Ensure both agitators are running on P3-27 and on the selected dryer | <input checked="" type="checkbox"/> |
| Apply vacuum to the dryer | <input checked="" type="checkbox"/> |
| Set the transfer valves up to the selected dryer (keep P3-27 bottom valve shut) | <input checked="" type="checkbox"/> |
| Open the nitrogen valve to P3-27 to avoid air ingress | <input checked="" type="checkbox"/> |
| Open the transfer valve at the base of P3-27 to start the transfer | <input checked="" type="checkbox"/> |
| When the level in P3-27 is around the agitator, switch it off | <input checked="" type="checkbox"/> |
| When the transfer is complete close the valves in the transfer lines. Keep the vacuum in the selected dryer | <input checked="" type="checkbox"/> |
| Flush the pipe with 10-15 litres of filtered water | <input checked="" type="checkbox"/> |

| | | | | | |
|------|--------|------|-------|-----------|---|
| Date | 6/6/12 | Time | 23.30 | Signature |  |
|------|--------|------|-------|-----------|---|

4.6] Turn off the Vacuum pump, Nitrogen purge the dryer as per **SOP**N2** - Open the vent valve on the dryer. Apply low pressure steam ¼ of a turn to the dryer.

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 23.35 | Signature |  |
|------|--------|------|-------|-----------|--|

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Procedure for Methanol Boil-outs of P1-15, P3-27, P2-20, P1-37 and associated transfer lines.

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DATE: 25/11/11

4.7] Heat the dryer to reflux **62°C - 66°C**. Close the steam valve on the dryer.

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 23.55 | Signature | |
|------|--------|------|-------|-----------|--|

4.8] Apply cooling water to the jacket of the dryer. Cool the contents of the dryer to **25°C -28°C**
SOPPURE**. Close the cooling valves and drain the jacket of the dryer.

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 01.00 | Signature | |
|------|--------|------|-------|-----------|--|

4.9] Open the outlet valve of the dryer. Discharge the Methanol from the dryer into an earthed, anti-static IBC labelled "Methanol from Drier Clean down **SOP**TR.FLAMM**

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 01.10 | Signature | |
|------|--------|------|-------|-----------|--|

4.10] Apply full vacuum to the dryer

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 01.15 | Signature | |
|------|--------|------|-------|-----------|--|

4.11] Inform Line Management to instruct Maintenance Department to remove the discharge flange from the outlet valve of the dryer

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 01.20 | Signature | |
|------|--------|------|-------|-----------|--|

4.12] Empty receiver P1-36 into an earthed anti-static IBC ref **SOP**TR.FLAMM**

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 01.30 | Signature | |
|------|--------|------|-------|-----------|--|

Step 5: CONDENSER CLEAN DOWN P1-37

5.1] Shut the cooling water and the valve between the receiver and the condenser; add half of the condenser volume of water to the condenser itself and apply gently steam from the bottom of the condenser for 1 hour (the steam flow must be set just to warm up the water inside of the condenser). Monitor the whole operation. In case of excessive vibration immediately shut off the steam and inform line manager.

| | | | | | |
|------------------|-------|-------------------|-------|-----------|--|
| Steam Start Time | 01.35 | Steam Finish Time | 02.35 | Signature | |
|------------------|-------|-------------------|-------|-----------|--|

5.2] Empty the volume of the condenser to the effluent drain.

| | | | | | |
|------|--------|------|-------|-----------|--|
| Date | 6/6/12 | Time | 02.40 | Signature | |
|------|--------|------|-------|-----------|--|






Procedure for Methanol Boil-outs of P1-15, P3-27, P2-20, P1-37 and associated transfer lines.

ISSUE NO: 1






DATE: 25/11/11

Step 6: Glassware and receiver draining.

6.1] Once all previous steps are completed Drain the glassware and condensers or residual solvent, these should only be drained into a S/S earthed container and must be placed into an earthed, anti-static IBC labelled "Methanol from Propyl clean down for disposal"

| Equipment | Plant number | Status | Signature | Date |
|-----------|--------------|-----------------------------|--|--------|
| Glassware | P1-37/P2-20 | Drained of residual solvent |  | 6/6/12 |
| Receiver | P1-36 | Drained of residual solvent |  | 6/6/12 |
| Receiver | P2-20 | Drained of residual solvent |  | 6/6/12 |
| Glassware | P1-15 | Drained of residual solvent |  | 6/6/12 |
| Receivers | P3-27 | Drained of residual solvent |  | 6/6/12 |

Step 7: Plant clean-down confirmations

| Equipment | Plant number | Confirm all steps completed | Signature | Date |
|-----------------------------------|--------------|-----------------------------|---|--------|
| 8000lts S/S Rotary vacuum dryer | P1-37/P2-20 | ✓ |  | 6/6/12 |
| Receiver | P1-36 | ✓ |  | 6/6/12 |
| Receiver | P2-20 | ✓ |  | 6/6/12 |
| 500 gallon glass-lined vessel | P1-15 | ✓ |  | 6/6/12 |
| 500 gallon stainless steel vessel | P3-27 | ✓ |  | 6/6/12 |

7.1] Handover accepted by De-commissioning team.

| | | | | | |
|------|-------------------|------|--|-----------|---|
| Date | 6/6/12 | Time | | Signature |  |
|------|-------------------|------|--|-----------|---|

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Procedure for Methanol Boil-outs of P1-24, P1-25, P1-20, P1-18, P1-28, P3-05 and associated transfer lines.





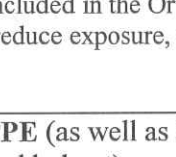
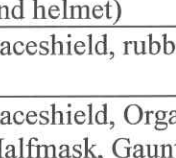
ISSUE NO: 1

DATE OF ISSUE: 15/11/11

AUTHOR: MICHAEL MACINTOSH

| | |
|--------------|-------------------------|
| Location: P1 | Boil-out Authorised by: |
|--------------|-------------------------|

Check the plant logbook to ensure the Plant is empty before starting procedure

| Equipment | Plant number | Status(Delete as applicable) | Signature | Date |
|---------------------------------------|--------------|------------------------------|--|---------|
| 500 gallon stainless steel | P1-24 | See logbook |  | 7/12/11 |
| 500 gallon stainless steel | P1-25 | See logbook |  | 7/12/11 |
| 500 gallon glass lined | P1-20 | See logbook |  | 7/12/11 |
| 500 gallon glass lined | P1-18 | See logbook |  | 7/12/11 |
| 500 gallon glass lined | P1-28 | See logbook |  | 7/12/11 |
| 1360L glass lined distillation vessel | P3-05 | See logbook |  | 7/12/11 |

Below is a Brief summary of H & S information including PPE of raw materials included in the Original process stream (see Material Safety Data sheets and COSHH assessments for full details). In order to reduce exposure, check that all plant and associated filling flasks are empty.

| Material | Hazard | PPE (as well as Boiler suits, Safety Boots and helmet) |
|-------------------------|---|--|
| n-Butanol | Highly Flammable, Toxic, May cause eye irritation | Faceshield, rubber gloves or gauntlets. |
| p-Hydroxybenzoic acid | Irritant | Faceshield, Organic Vapour/Dust Halfmask, Gauntlets |
| Methanol | Highly flammable, Toxic | Faceshield, rubber gloves or gauntlets. |
| p-toluenesulphonic acid | Corrosive, Causes burns. | Goggles, Faceshield, Chemical suit, Gauntlets. |
| Citric acid | Irritant | Faceshield, Organic Vapour/Dust Halfmask, Gauntlets. |
| 35%w/w Aqueous Ammonia | Corrosive, Causes burns | Full face respirator, Gauntlets, Chemical suit. |
| Sodium Chloride | Irritating to eyes | Goggles. Gloves. |

Approved by: (Production Manager)

 Date: 6/12/11

Approved by: (ESHA Manager)

 Date: 06.12.11

Approved by: (Engineering Manager)

 Date: 6/12/11

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Procedure for Methanol Boil-outs of P1-24, P1-25, P1-20, P1-18, P1-28, P3-05 and associated transfer lines.

ISSUE NO: 1

DATE OF ISSUE: 15/11/11

INTRODUCTION

SCOPE OF SOP

This SOP describes the practices to be followed in order to safely remove Gross contamination from the listed vessels in preparation for hand-over to the de-commissioning team. Further water cleaning may be required.

RESTRICTIONS TO USE

- The cleaning of a vessel is to be performed by authorised, trained personnel only.
- Any operations during the washing of a vessel, which are not detailed within this SOP, must be communicated to supervision before commencing the operation. This is to allow for a complete assessment of all hazards and potential hazards.
- Any apparent problems or abnormalities arising in or with use of this SOP e.g. instructional errors or omissions must be alerted to supervision or line management.
- Any plant changes or plant modifications must be communicated to line management in order to allow SOP amendments and re-issue.

* An **Electrostatic Charge** can build up in the movement of low- conductivity flammables or combustible liquids. This risk is minimised by the use of conductive materials.


Procedure for Methanol Boil-outs of P1-24, P1-25, P1-20, P1-18, P1-28, P3-05 and associated transfer lines.


ISSUE NO: 1

DATE OF ISSUE: 15/11/11


STEP 1: Cleaning P1-24 and P1-28


1.1] Check Cooling Tower – CT -01 is on and the cooling circulating around the condensers. Drain Glassware of residual n-Butanol to an Earthed flammable IBC then Boil out P1-24 Following **SOP**WASH** (Boiling a Reactor out with Fresh Methanol) with the qty's listed below.

| | Batch quantity | Actual quantity used | Time finish charge | Signature |
|-----------------------|---------------------|----------------------|--------------------|---|
| FRESH METHANOL | 1,000 Litres | 1,000 LT. | 18.50. |  |

| | | | | | |
|------|----------|------|-------|-----------|---|
| Date | 24/11/11 | Time | 19.30 | Signature |  |
|------|----------|------|-------|-----------|---|

1.2] Nitrogen purge P1-28 as per **SOP** N2**, set up flexible hoses and an earthed S/S Diaphragm pump linked from the base valve of P1-24 to the inlet line of P1-28. Cool to **(25°C -28°C)** then follow the procedures described below to transfer the Methanol wash from P1-24 to P1-28.

| Transfer Checklist P1-24 to P1-28 | Tick when complete |
|---|---|
| Ensure the agitators on both P1-24 and P1-28 are off. | <input checked="" type="checkbox"/> |
| Ensure the transfer lines and Pump are earthed. | <input checked="" type="checkbox"/> |
| Ensure the vents on P1-28 and P1-24 are open. | <input checked="" type="checkbox"/> |
| Open the valves in the transfer line between P1-24 and P1-28 | <input checked="" type="checkbox"/> |
| Apply nitrogen to P1-24 to prevent air ingress during transfer | <input checked="" type="checkbox"/> |
| Check transfer lines; There should be no visible leaks. | <input checked="" type="checkbox"/> |
| Open the air supply to the diaphragm pump to start the transfer. | <input checked="" type="checkbox"/> |
| When the boil out transfer is complete, turn off the air supply to the pump, close the transfer valves and vent the vacuum in P1-24 with nitrogen (if required) | <input checked="" type="checkbox"/> |
| Drain residual Methanol from the pump and lines. |  |

| | | | | | |
|------|----------|------|-------|-----------|---|
| Date | 24/11/11 | Time | 20.15 | Signature |  |
|------|----------|------|-------|-----------|---|


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Procedure for Methanol Boil-outs of P1-24, P1-25, P1-20, P1-18, P1-28, P3-05 and associated transfer lines.

ISSUE NO: 1


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1.3] Check Cooling Tower – CT -01 is on and the cooling is circulating around the condensers. Drain Glassware of residual n-Butanol to an Earthed flammable IBC then Boil out P1-28 Following SOP**WASH (Boiling a Reactor out with Fresh Methanol) with the qty listed below – This is the Methanol already transferred from P1-24.

| | Batch quantity | Actual quantity used | Time finish charge | Signature |
|--|---------------------|----------------------|--------------------|---|
| METHANOL ex- P1-24 boil-out | 1,000 Litres | <i>1,000 Ltrs</i> | <i>20.15</i> |  |


| | | | | | |
|------|-----------------|------|--------------|-----------|---|
| Date | <i>24/11/11</i> | Time | <i>21.40</i> | Signature |  |
|------|-----------------|------|--------------|-----------|---|


1.4] Open the outlet valve of P1-28 Discharge the Methanol into an earthed, anti-static IBC labelled "Methanol ex- n-Butyl clean down", this is to be used for Step 2.

| | | | | | |
|------|-----------------|------|--------------|-----------|---|
| Date | <i>24/11/11</i> | Time | <i>22.10</i> | Signature |  |
|------|-----------------|------|--------------|-----------|---|

STEP 2: Cleaning P1-25 and P1-18

2.1] Check Cooling Tower – CT -01 is on and the cooling circulating around the condensers Drain Glassware of residual n-Butanol to an Earthed flammable IBC then Boil out P1-25 Following SOP**WASH (Boiling a Reactor out with Fresh Methanol) with the quantity listed below.

| | Batch quantity | Actual quantity used | Time finish charge | Signature |
|---------------------------------|---------------------|----------------------|--------------------|---|
| METHANOL EX – STEP 1 | 1,000 Litres | <i>1,000 Ltrs</i> | <i>22.52</i> |  |

| | | | | | |
|------|-----------------|------|--------------|-----------|---|
| Date | <i>24/11/11</i> | Time | <i>23.45</i> | Signature |  |
|------|-----------------|------|--------------|-----------|---|

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Procedure for Methanol Boil-outs of P1-24, P1-25, P1-20, P1-18, P1-28, P3-05 and associated transfer lines.

ISSUE NO: 1

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2.2] Nitrogen purge P1-18 as per **SOP** N2**, set up a flexible hoses and an earthed S/S Diaphragm pump Linked from the base valve of P1-25 to the inlet line of P1-18. Cool to (**25°C -28°C**) Follow the procedures described below to transfer the Methanol wash from P1-25 to P1-18.

| Transfer Checklist P1-25 to P1-18 | Tick when complete |
|---|--------------------|
| Ensure the agitators on both P1-25 and P1-18 are off. | ✓ |
| Ensure the transfer lines and Pump are earthed. | ✓ |
| Ensure the vents on P1-18 and P1-25 are open. | ✓ |
| Open the valves in the transfer line between P1-24 and P1-18 | ✓ |
| Apply nitrogen to P1-25 to prevent air ingress during transfer | ✓ |
| Check transfer lines; There should be no visible leaks. | ✓ |
| Open air supply to the diaphragm pump to start the transfer. | ✓ |
| When the boil out transfer is complete, turn off the air supply to the pump, close the transfer valves and vent the vacuum in P1-25 with nitrogen (if required) | ✓ |
| Drain residual Methanol from the pump and lines. | ✓ |

| | | | | | |
|------|---------|------|-------|-----------|------|
| Date | 7/12/11 | Time | 20.05 | Signature | m Al |
|------|---------|------|-------|-----------|------|

2.3] Check Cooling Tower – CT -01 is on and the cooling circulating around the condensers. Drain Glassware of residual n-Butanol to an Earthed flammable IBC then Boil out P1-18 Following **SOP**WASH** (Boiling a Reactor out with Fresh Methanol) with the qty listed below – This is the Methanol already transferred from P1-25.

| | Batch quantity | Actual quantity used | Time finish charge | Signature |
|--------------------------|---------------------|----------------------|--------------------|-----------|
| METHANOL ex-P1-25 | 1,000 Litres | 1,000 Ltr | 20.30 | m Al |

2.4] Open the outlet valve of P1-18 Discharge the Methanol into an earthed, anti-static IBC labelled "Methanol from n-Butyl clean down for disposal"

| | | | | | |
|------|---------|------|-------|-----------|------|
| Date | 7/12/11 | Time | 23.10 | Signature | m Al |
|------|---------|------|-------|-----------|------|

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Procedure for Methanol Boil-outs of P1-24, P1-25, P1-20, P1-18, P1-28, P3-05 and associated transfer lines.

ISSUE NO: 1

DATE OF ISSUE: 15/11/11

STEP 3: Cleaning P1-20 Crystalliser.

3.1] Check Cooling Tower – CT -01 is on and the cooling circulating around the condensers Drain Glassware of residual Solvent into an Earthed flammable IBC then Boil out P1-20 Following **SOP**WASH** (Boiling a Reactor out with Fresh Methanol) with the quantity listed below.

| | Batch quantity | Actual quantity used | Time finish charge | Signature |
|-----------------------|---------------------|----------------------|--------------------|--------------|
| FRESH METHANOL | 1,000 Litres | 1,000 L | 00-50 | <i>mr RL</i> |

| | | | | | |
|------|---------|------|-------|-----------|--------------|
| Date | 8/12/11 | Time | 00-50 | Signature | <i>mr RL</i> |
|------|---------|------|-------|-----------|--------------|

3.2] Open the outlet valve of P1-20 Discharge the Methanol into an earthed, anti-static IBC labelled "Methanol from n-Butyl clean down for disposal"

| | | | | | |
|------|---------|------|-------|-----------|--------------|
| Date | 8/12/11 | Time | 02-15 | Signature | <i>mr RL</i> |
|------|---------|------|-------|-----------|--------------|

STEP 4: P3-05 Clean down.

4.1] Check Cooling Tower – CT -01 is on and the cooling circulating around the condensers Drain Glassware and receivers of residual Solvent into an Earthed flammable IBC. Boil out P3-05 Following **SOP**WASH** (Boiling a Reactor out with Fresh Methanol) with the quantity listed below.

| | Batch quantity | Actual quantity used | Time finish charge | Signature |
|-----------------------|-------------------|----------------------|--------------------|--------------|
| FRESH METHANOL | 300 Litres | 300 L | 02-45 | <i>mr RL</i> |

| | | | | | |
|------|---------|------|-------|-----------|--------------|
| Date | 8/12/11 | Time | 02-45 | Signature | <i>mr RL</i> |
|------|---------|------|-------|-----------|--------------|

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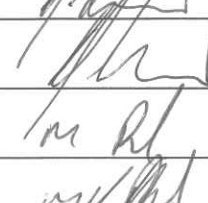

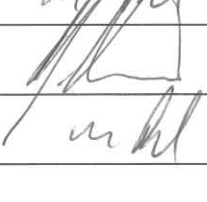
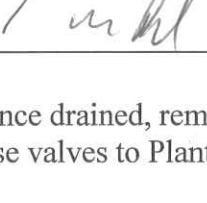
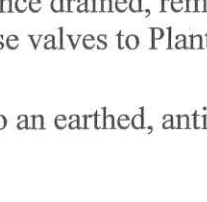
Procedure for Methanol Boil-outs of P1-24, P1-25, P1-20, P1-18, P1-28, P3-05 and associated transfer lines.

ISSUE NO: 1

DATE OF ISSUE: 15/11/11


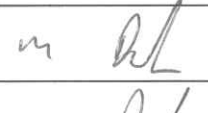
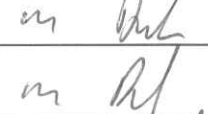
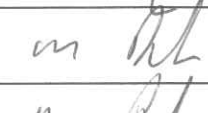

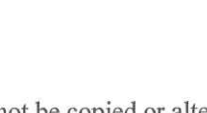
STEP 5: Glassware and receiver draining.

5.1] When all previous steps are completed: Drain the glassware and condensers of residual solvent, these must be be drained into a S/S earthed container and poured into an earthed, S/S anti-static IBC labelled "Solvents from n-Butyl clean down for disposal"

| Equipment | Plant number | Status | Signature | Date |
|-----------|--------------|-----------------------------|--|----------|
| Glassware | P1-24 | Drained of residual solvent |  | 24/11/11 |
| Glassware | P1-25 | Drained of residual solvent |  | 24/11/11 |
| Glassware | P1-20 | Drained of residual solvent |  | 8/12/11 |
| Glassware | P1-18 | Drained of residual solvent |  | 8/12/11 |
| Glassware | P1-28 | Drained of residual solvent |  | 24/11/11 |
| Glassware | P3-05 | Drained of residual solvent |  | 24/11/11 |

5.2] Both P1-21 and P1-23 are holding vessels for n-Butanol liquors, once drained, remove their manways and thoroughly flush the sidewalls with a water hose, then open the base valves to Plant effluent.

5.3] Empty each receiver with nitrogen using **SOP**TR.FLAMM** into an earthed, anti-static IBC labelled "Solvents from n-Butyl clean down for disposal"

| Equipment | Plant number | Status | Signature | Date |
|-----------------|--------------|---|--|---------|
| Receiver | P1-18 | Drained of residual solvent |  | 8/12/11 |
| Receiver | P1-28 | Drained of residual solvent |  | 8/12/11 |
| Receiver | P3-05 | Drained of residual solvent |  | 8/12/11 |
| Receiver/Vessel | P1-23 | Drained of residual solvent and water flushed |  | 8/12/11 |
| Receiver/Vessel | P1-21 | Drained of residual solvent and water flushed |  | 8/12/11 |
| Receiver | P1-20 | Drained of residual solvent |  | 8/12/11 |

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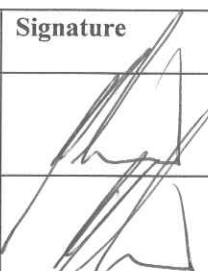

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Procedure for Methanol Boil-outs of P1-24, P1-25, P1-20, P1-18, P1-28, P3-05 and associated transfer lines.

ISSUE NO: 1

DATE OF ISSUE: 15/11/11

STEP 6: Plant clean-down confirmations

| Equipment | Plant number | Confirm all steps completed | Signature | Date |
|---------------------------------------|--------------|-----------------------------|--|---------|
| 500 gallon stainless steel | P1-24 | ✓ |  | 8/12/11 |
| 500 gallon stainless steel | P1-25 | ✓ |  | 8/12/11 |
| 500 gallon glass lined | P1-20 | ✓ | m AL | 8/12/11 |
| 500 gallon glass lined | P1-18 | ✓ | m AL | 8/12/11 |
| 500 gallon glass lined | P1-28 | ✓ | m AL | 8/12/11 |
| 1360L glass lined distillation vessel | P3-05 | ✓ | m AL | 8/12/11 |

STEP 7: Plant clean-down confirmations

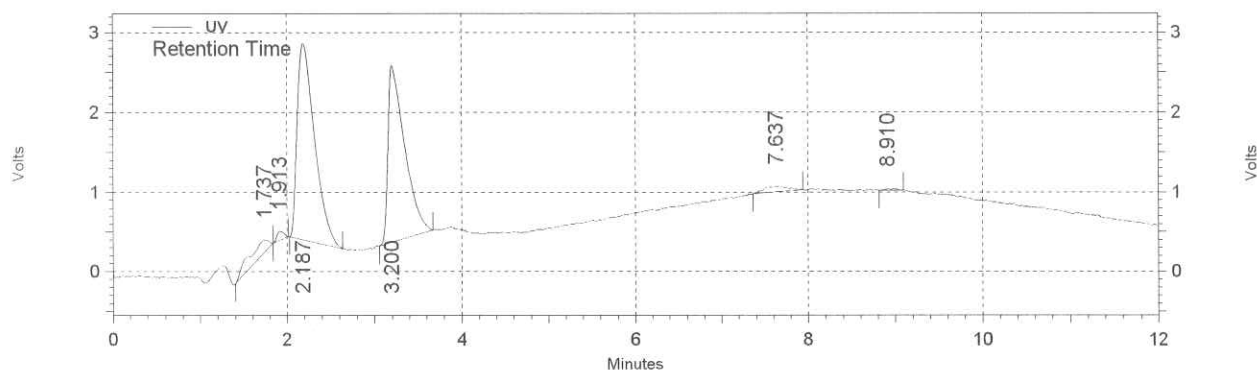
7.1] Plant handover accepted by De-commissioning team.

| | | | | | |
|------|--|------|--|-----------|--|
| Date | | Time | | Signature | |
|------|--|------|--|-----------|--|

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Area % Report

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 Printed: 11/07/2012 13:44:36



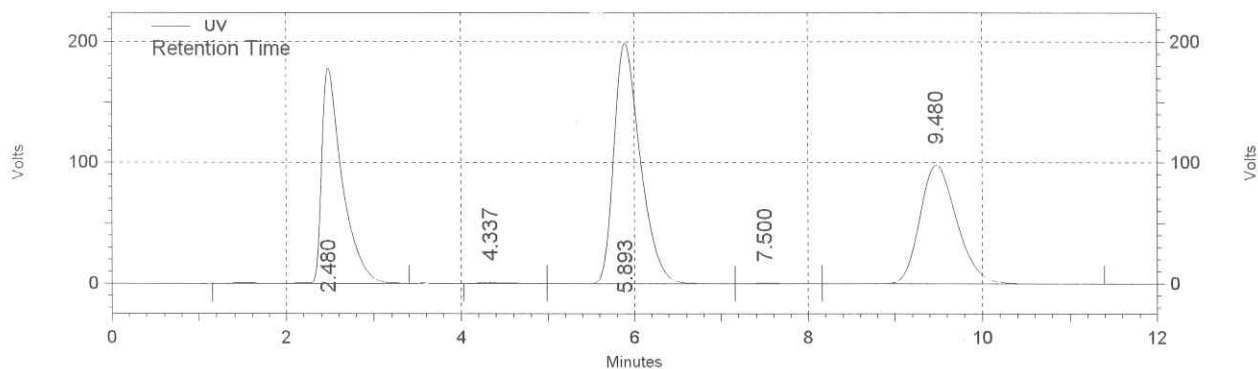
UV Results

| Retention Time | Area | Area % | Height | Height % |
|----------------|--------|--------|--------|----------|
| 1.737 | 12278 | 4.43 | 631 | 3.13 |
| 1.913 | 2472 | 0.89 | 451 | 2.24 |
| 2.187 | 137234 | 49.52 | 9843 | 48.81 |
| 3.200 | 119111 | 42.98 | 8862 | 43.94 |
| 7.637 | 5316 | 1.92 | 290 | 1.44 |
| 8.910 | 731 | 0.26 | 90 | 0.45 |
| Totals | 277142 | 100.00 | 20167 | 100.00 |

pH 6.78
 COD = 35600

Area % Report

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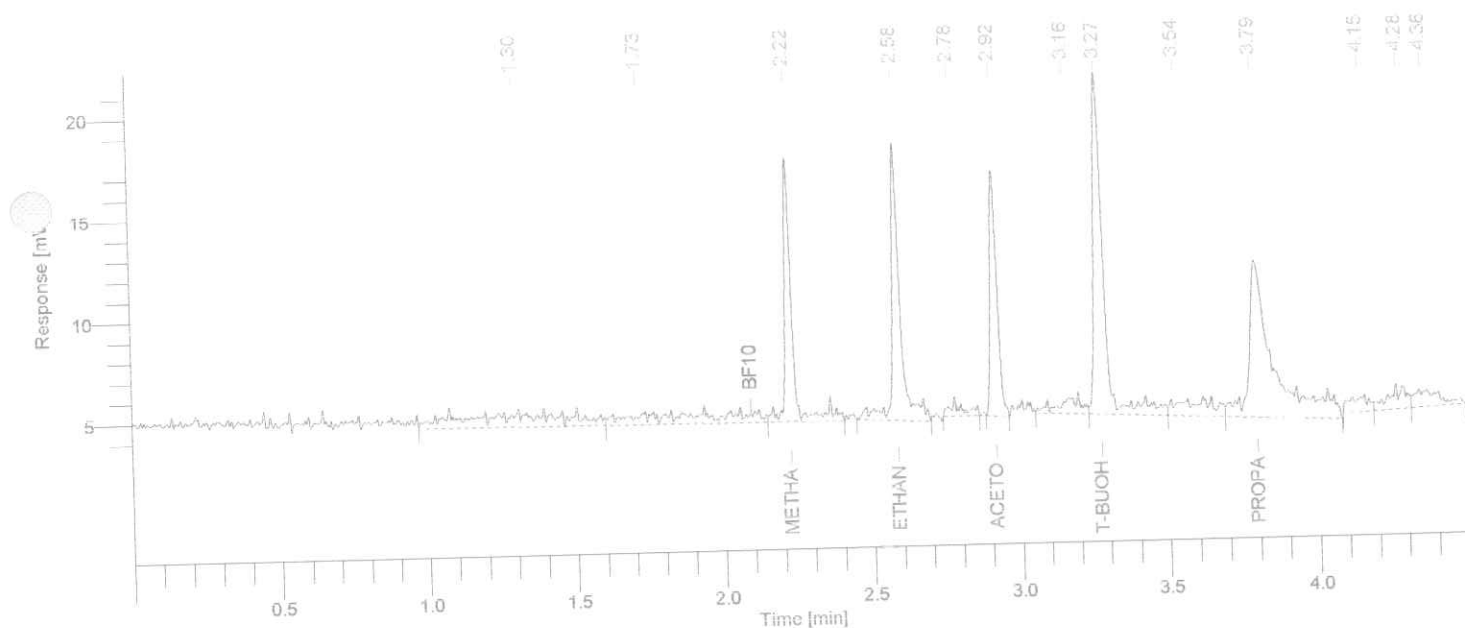
UV Results

| Retention Time | Area | Area % | Height | Height % |
|----------------|----------|--------|---------|----------|
| 2.480 | 11647724 | 29.11 | 714629 | 37.49 |
| 4.337 | 55755 | 0.14 | 2697 | 0.14 |
| 5.893 | 16793227 | 41.97 | 795661 | 41.75 |
| 7.500 | 33954 | 0.08 | 1118 | 0.06 |
| 9.480 | 11478464 | 28.69 | 391892 | 20.56 |
| Totals | 40009124 | 100.00 | 1905997 | 100.00 |

Software Version : 6.3.0.0445
 Sample Name : std
 Instrument Name : AutosystemXL GC1
 Rack/Vial : 0/79
 Sample Amount : 1.000000
 Cycle : 2

Date : 12/07/2012 13:00:13
 Data Acquisition Time : 12/07/2012 09:29:31
 Channel : B
 Operator : MANAGER
 Dilution Factor : 1.000000

Result File : C:\TcData\WEEK 25 12.07.12\DTS AND EFF AND P1
 CHILLER\std-20120712-093411.rst
 Sequence File : C:\TcData\Sequences\effluent.seq



REPORT

| Peak # | Time [min] | Area [$\mu\text{V}\cdot\text{s}$] | Height [μV] | Area [%] | BL |
|--------|------------|-------------------------------------|--------------------------|----------|-----|
| 1 | 1.304 | 17431.06 | 882.24 | 8.26 | BV |
| 2 | 1.726 | 12886.97 | 586.80 | 6.11 | *VV |
| 3 | 2.222 | 22536.69 | 13044.73 | 10.68 | *VB |
| 4 | 2.585 | 27403.47 | 13600.31 | 12.99 | *BB |
| 5 | 2.776 | 2676.10 | 921.89 | 1.27 | *BB |
| 6 | 2.916 | 19881.57 | 12113.01 | 9.42 | *BB |
| 7 | 3.163 | 4652.49 | 769.74 | 2.20 | *BV |
| 8 | 3.272 | 39194.38 | 16772.36 | 18.57 | *VV |
| 9 | 3.539 | 6985.78 | 656.89 | 3.31 | *VV |

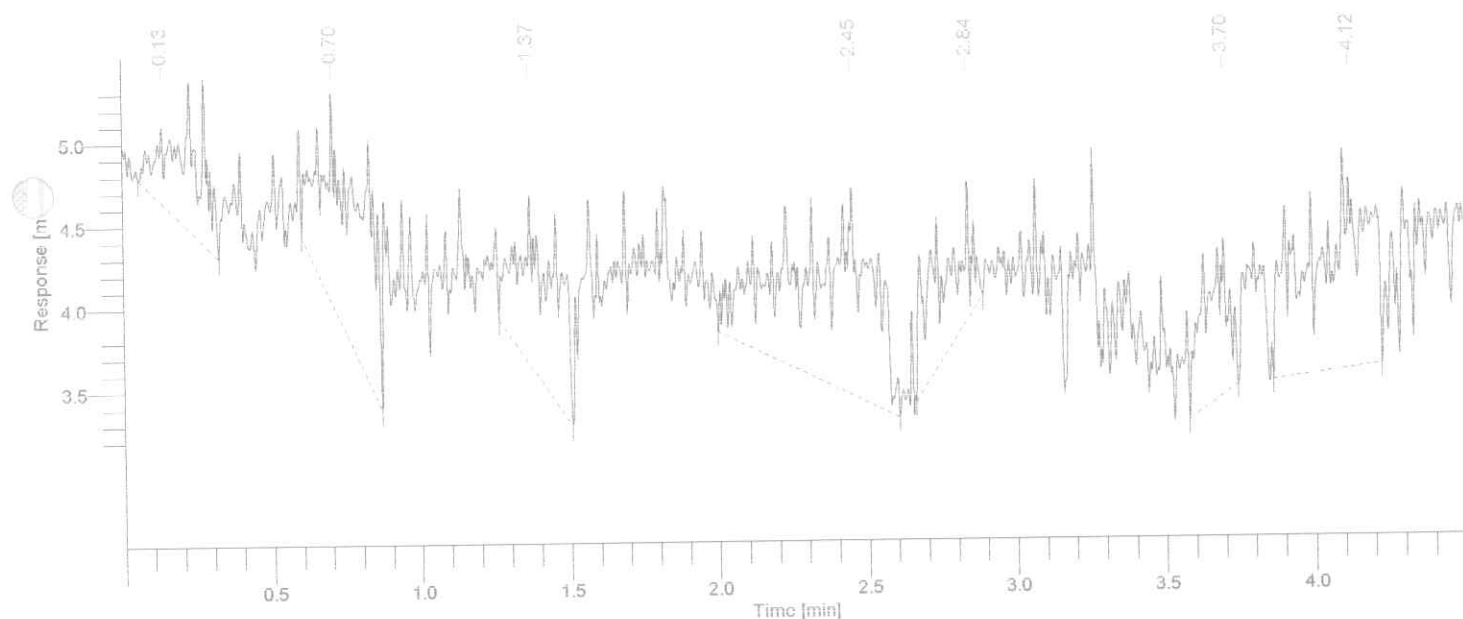
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CHILLER\std-20120712-093411.rst

| Peak # | Time [min] | Area [$\mu\text{V}\cdot\text{s}$] | Height [μV] | Area [%] | BL |
|-----------|---------------|--|-----------------------------|-------------|-----|
| 10 | 3.794 | 43743.83 | 7733.35 | 20.73 | *VB |
| 11 | 4.153 | 3636.02 | 837.87 | 1.72 | *BV |
| 12 | 4.284 | 4925.87 | 1135.41 | 2.33 | *VV |
| 13 | 4.363 | 5070.73 | 824.51 | 2.40 | *VB |
| | | 211024.96 | 69879.09 | 100.00 | |

Software Version : 6.3.0.0445
Sample Name : P1 CHILLER NO DILUTION
Instrument Name : AutosystemXL GC1
Rack/Vial : 0/22
Sample Amount : 1.000000
Cycle : 5

Date : 12/07/2012 12:52:51
Data Acquisition Time : 12/07/2012 09:53:10
Channel : B
Operator : MANAGER
Dilution Factor : 1.000000

Result File : C:\TcData\WEEK 25 12.07.12\DTS AND EFF AND P1 CHILLER\P1 CHILLER NO DILUTION.rst
Sequence File : C:\TcData\Sequences\effluent.seq



REPORT

| Peak # | Time [min] | Area [μV·s] | Height [μV] | Area [%] | BL |
|--------|------------|-------------|-------------|----------|----|
| 1 | 0.132 | 5541.25 | 444.48 | 7.54 | BB |
| 2 | 0.704 | 12370.95 | 1228.71 | 16.84 | BB |
| 3 | 1.367 | 8751.91 | 977.37 | 11.91 | BB |
| 4 | 2.448 | 19867.18 | 1207.06 | 27.04 | BB |
| 5 | 2.838 | 6001.92 | 796.63 | 8.17 | BB |
| 6 | 3.696 | 5339.91 | 891.62 | 7.27 | BB |
| 7 | 4.116 | 15596.82 | 1079.02 | 21.23 | BB |

73469.93 6624.91 100.00

5

D008/PROCESS/002 - P&ID Register

| | |
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| Title: | P1A Building Decommissioning |
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| Main Equipment | Various Production Equipment |

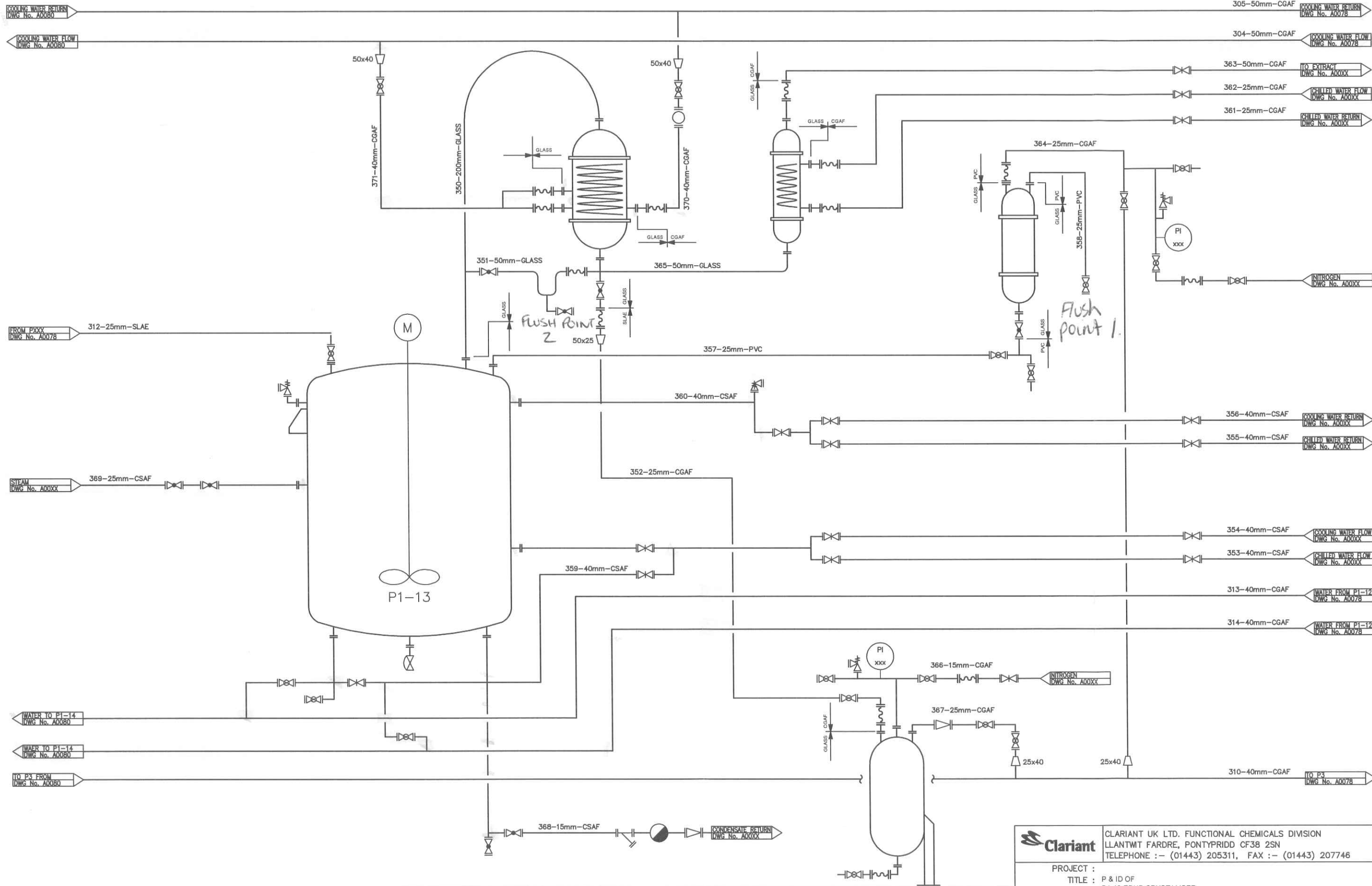
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| A0075 Rev C1 | P2-20 –R and Caustic Filtration |
| A0076 Rev C1 | P&ID of P2-02 & P2-16 NautaMix |
| A0078 Rev C1 | P1-12 |
| A0079 Rev C1 | P1-13 EDHB Crystalliser |
| A0080 Rev C1 | P1-14 EDHB Crystalliser |
| A0081 Rev C1 | P1-15 Sodium Methyl Paraben Slurry Make-up |
| A0082 Rev C1 | P3-27 Sodium Methyl Paraben Reaction Vessel |
| A0084 Rev C1 | P1-18 N-Butyl Recovery |
| A0085 Rev C1 | P1-28 N-Butyl Recovery |
| A0086 Rev C1 | P1-20 N-Butyl Crystalliser |
| A0087 Rev C1 | P1-21 N-Butyl Receiver |
| A0089 Rev C1 | P1-23 N-Butyl Water-Butanol Separator |
| A0090 Rev C1 | P1-24 N-Butyl Reactor |
| A0091 Rev C1 | P1-25 N-Butyl Reactor |

D008/PROCESS/002 - P&ID Register

| | |
|----------------|------------------------------|
| Project: | Decommissioning 008 |
| Title: | P1A Building Decommissioning |
| Buildings | P1A |
| Main Equipment | Various Production Equipment |

| P&ID Number | Title |
|------------------------|---|
| A0074 Rev C1 | P2-20 Rotary Vac Drier |
| A0075 Rev C1 | P2-20 –R and Caustic Filtration |
| A0076 Rev C1 | P&ID of P2-02 & P2-16 NautaMix |
| A0078 Rev C1 | P1-12 |
| A0079 Rev C1 | P1-13 EDHB Crystalliser |
| A0080 Rev C1 | P1-14 EDHB Crystalliser |
| A0081 Rev C1 | P1-15 Sodium Methyl Paraben Slurry Make-up |
| A0082 Rev C1 | P3-27 Sodium Methyl Paraben Reaction Vessel |
| A0084 Rev C1 | P1-18 N-Butyl Recovery |
| A0085 Rev C1 | P1-28 N-Butyl Recovery |
| A0086 Rev C1 | P1-20 N-Butyl Crystalliser |
| A0087 Rev C1 | P1-21 N-Butyl Receiver |
| A0089 Rev C1 | P1-23 N-Butyl Water-Butanol Separator |
| A0090 Rev C1 | P1-24 N-Butyl Reactor |
| A0091 Rev C1 | P1-25 N-Butyl Reactor |

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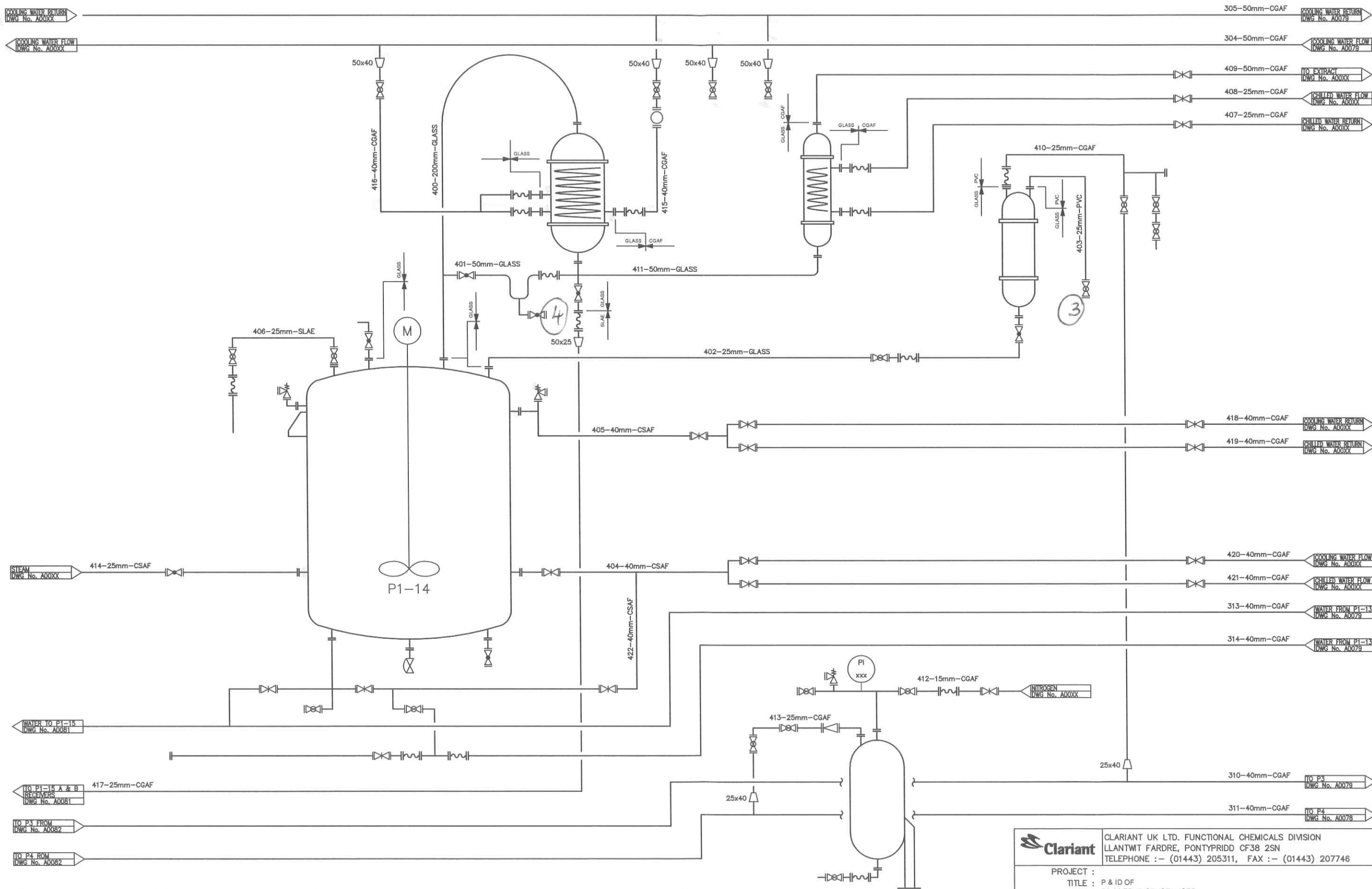
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| INSTRUMENTS | | |

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| Clariant | | CLARIANT UK LTD. FUNCTIONAL CHEMICALS DIVISION LLANTWY FARDRE, PONTYPRIDD CF38 2SN TELEPHONE :- (01443) 205311, FAX :- (01443) 207746 | | | |
| PROJECT : TITLE : P & ID OF P1-13 EDHB CRYSTALLISER | | | | | |
| CONTRACTOR : | | | | | |
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| SORT CODE | | PLANT NO. | | DRAWN BY | RG |
| DRG. CAT. | | DATE | 15/11/06 | ENGINEER | |
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| NUMBER SYSTEM | | | |
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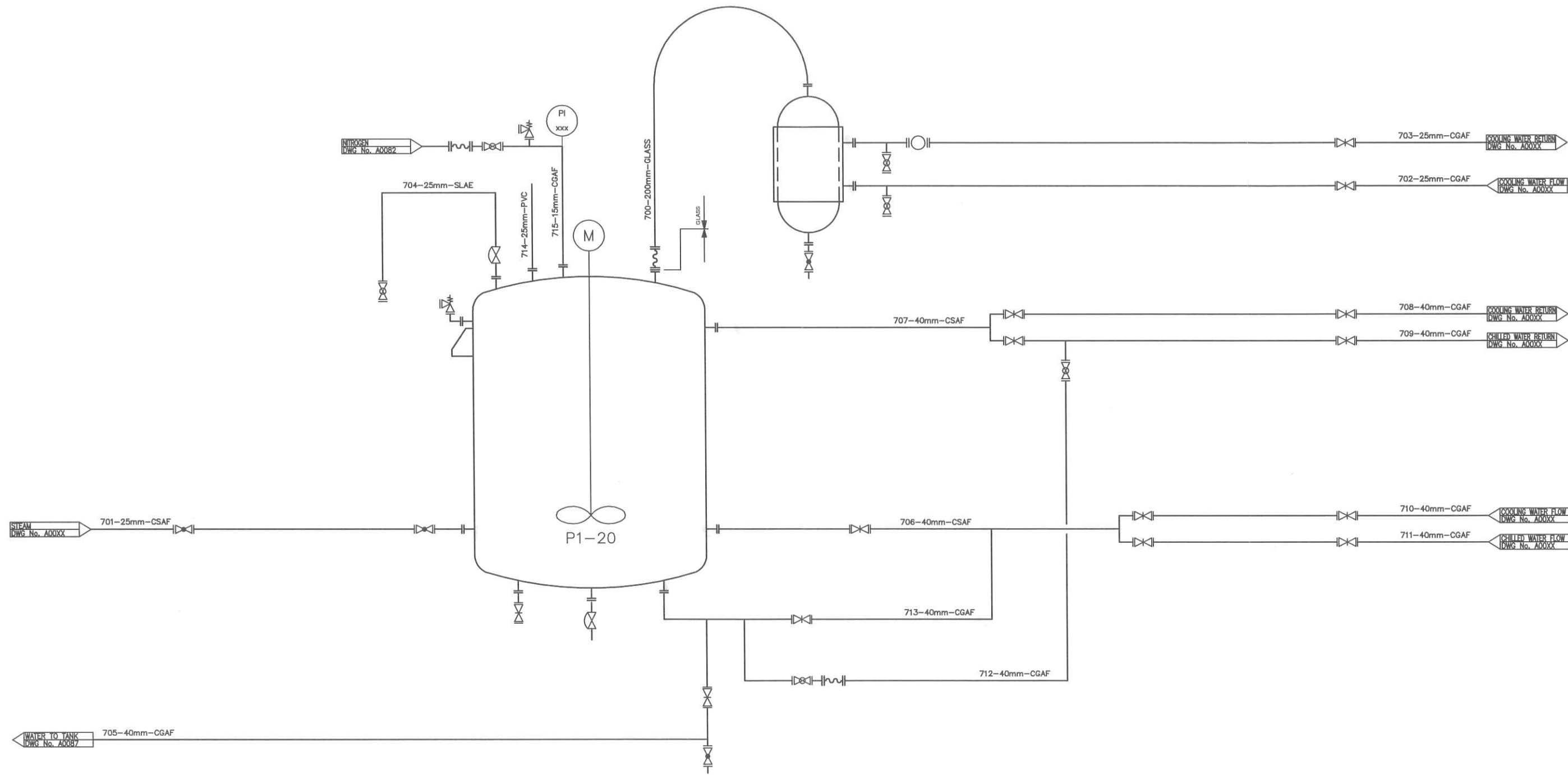
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REFERENCE DRAWINGS

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| PROJECT : | | | | TITLE : P & ID OF P1-14 EDHB CRYSTALLISER | | | |
| CONTRACTOR : | | | | CON.DRG. NO. | | | |
| BUILDING | P1 | CAR/W.O. | | DRAWN BY | RG | APPVD BY | |
| SORT CODE | | PLANT NO. | | ENGINEER | | | |
| DRG. CAT. | | DATE | 16/11/06 | SHEET | 1 | | |
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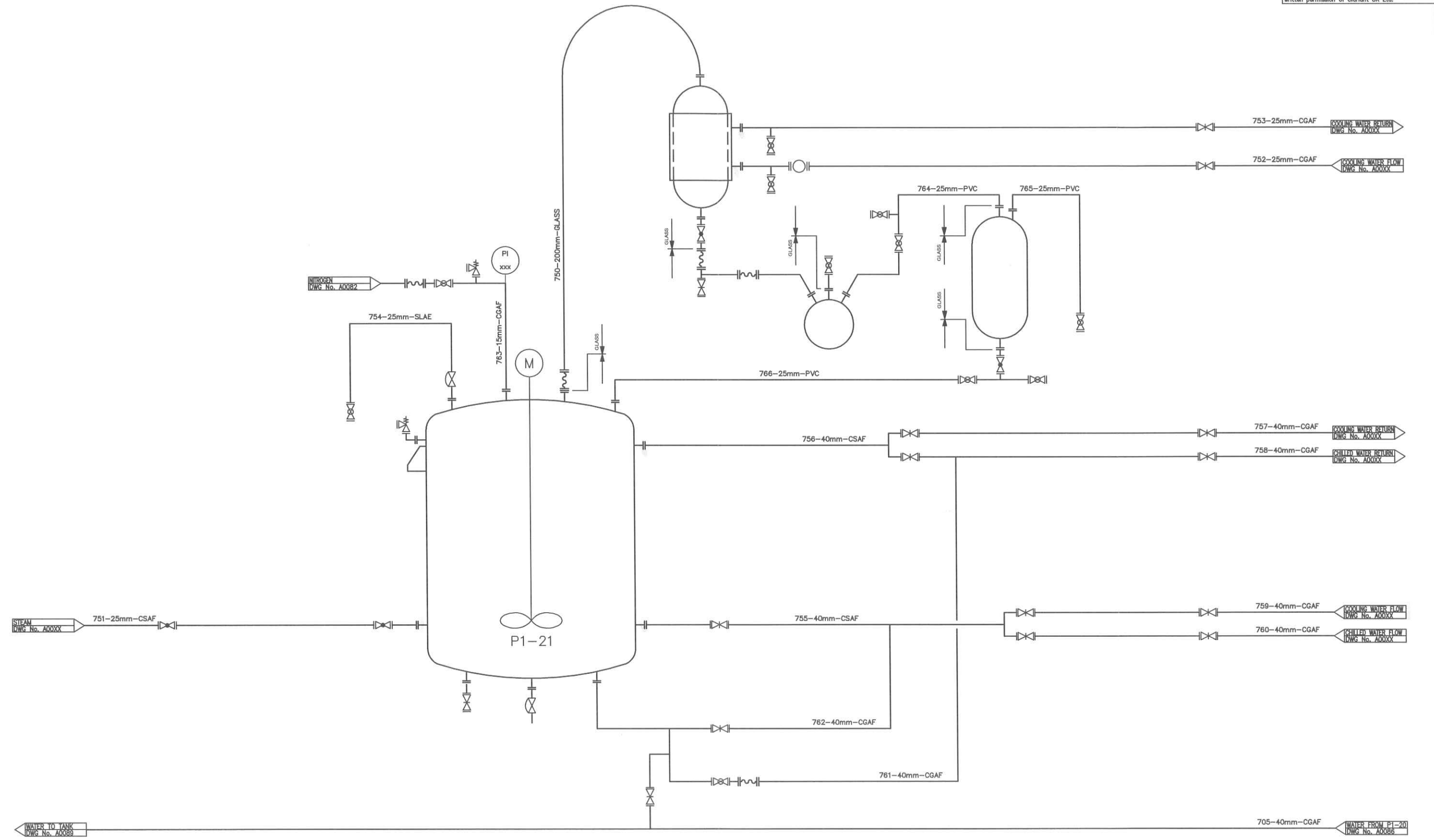
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| INSTRUMENTS | FROM | TO | LAST USED |
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| LINE ITEMS | | | |
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| | | CLARIANT UK LTD. FUNCTIONAL CHEMICALS DIVISION LLANTWIT FARDRE, PONTYPRIDD CF38 2SN TELEPHONE :- (01443) 205311, FAX :- (01443) 207746 | | | |
| PROJECT : | | TITLE : P & ID OF P1-20 N-BUTYL CRYSTALLISER | | | |
| CONTRACTOR : | | | | | |
| BUILDING | P1 | CAR/W.O. | | CON.DRG. NO. | |
| SORT CODE | | PLANT NO. | | DRAWN BY | RG |
| DRG. CAT. | | DATE | 22/11/06 | ENGINEER | |
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| REV | | BY | REVISIONS | DATE | REV | BY | REVISIONS | DATE |
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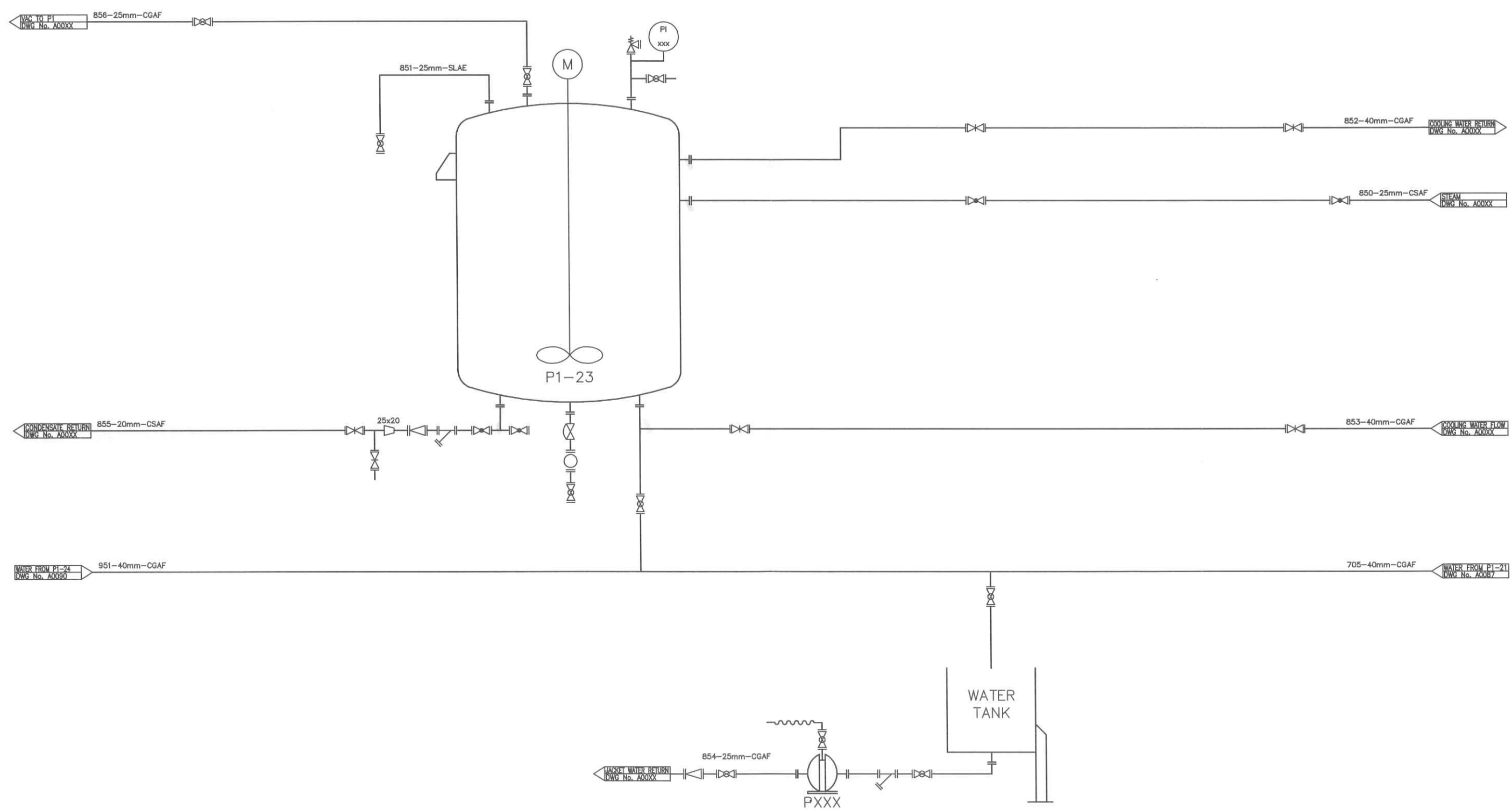
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| CONTRACTOR : | | | | | |
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|-----------------------|--------|--------|--|------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| T R I E S | C 1 | R G | U P D A T E D F O R S I T E S U R V E Y 2 0 0 6 - 7 | 2 2 /11/06 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|--------|--------|--|------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|



CLARIANT UK LTD. FUNCTIONAL CHEMICALS DIVISION
LLANTWY FARDRE, PONTYPRIDD CF38 2SN
TELEPHONE :- (01443) 205311, FAX :- (01443) 207746

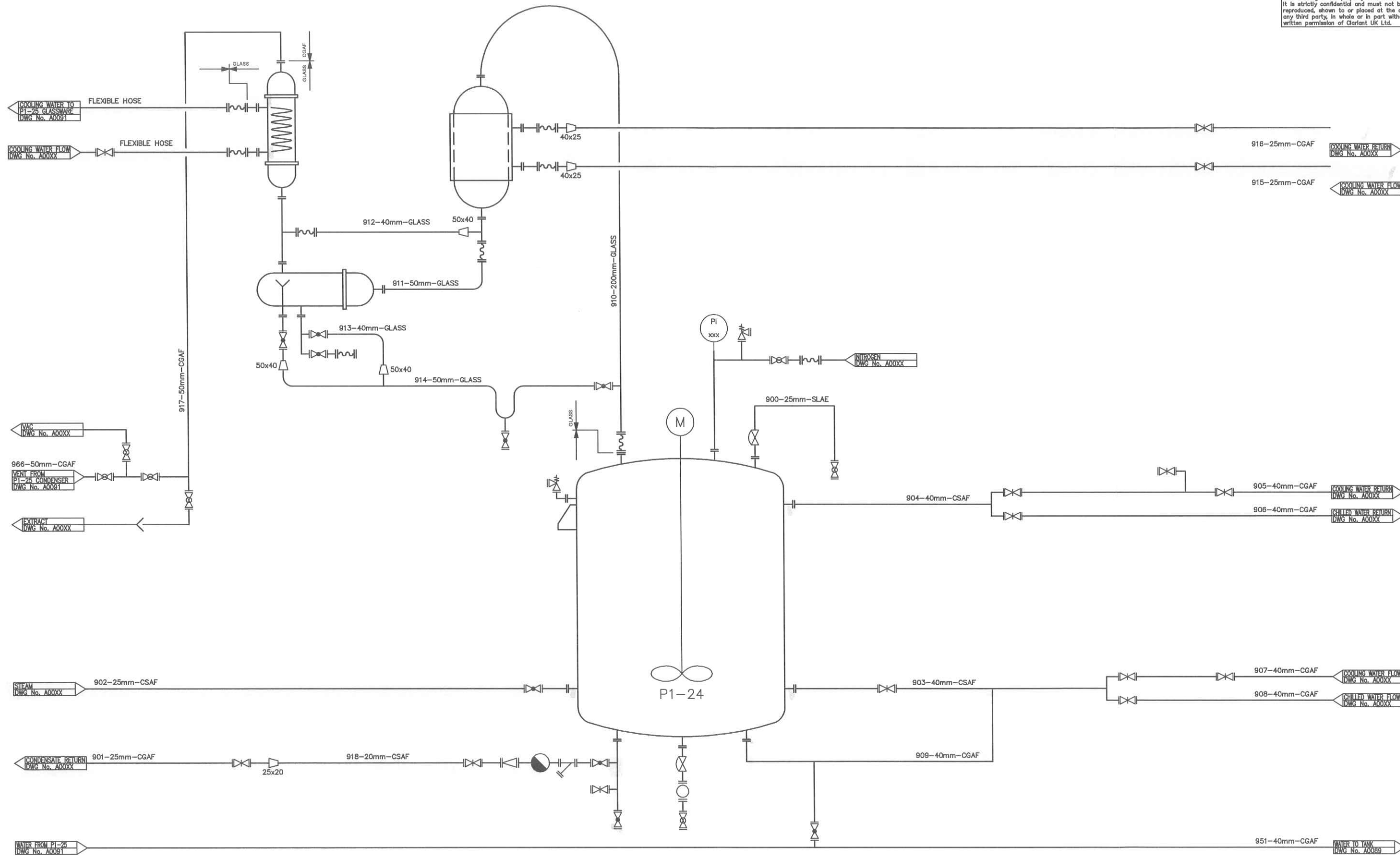
PROJECT :
TITLE : P & ID OF
P1-23 N-BUTYL WATER-BUTANOL SEPARATOR

CONTRACTOR :

| | | | | | | | |
|--------------------|----|-----------|----------|--------------|--------|----------|---------|
| BUILDING | P1 | CAR/W.O. | | CON.DRG. NO. | | APPVD BY | |
| SORT CODE | | PLANT NO. | | DRAWN BY | RG | | |
| DRG. CAT. | | DATE | 22/11/06 | ENGINEER | | | |
| AUTOCAD DRAWING | | SCALE | SHEET | DRAWING | NUMBER | A | 0089 |
| DO NOT HAND MODIFY | | N.T.S. | 1 | | | | REV. C1 |

ORIGINAL SIZE : A1

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any third party, in whole or in part without the
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| REVISIONS | | | | REFERENCE DRAWINGS | | | |
|-----------|----|--------------------------------|----------|--------------------|----|-----------|------|
| REV | BY | REVISIONS | DATE | REV | BY | REVISIONS | DATE |
| C1 | RG | UPDATED FOR SITE SURVEY 2006-7 | 23/11/06 | | | | |

| VALUES | FROM | TO | LAST USED |
|-----------------|------|-----|-----------|
| PRESSURE VALVES | | | |
| LINE ITEMS | | | |
| INSTRUMENTS | 900 | 949 | 918 |

| | | | | | |
|---------------------------------------|----|---|----------|--------------|----|
| Clariant | | CLARIANT UK LTD. FUNCTIONAL CHEMICALS DIVISION LLANTWY FARDRE, PONTYPRIDD CF38 2SN TELEPHONE :- (01443) 205311, FAX :- (01443) 207746 | | | |
| PROJECT : | | TITLE : P & ID OF P1-24 N-BUTYL REACTOR | | | |
| CONTRACTOR : | | | | | |
| BUILDING | P1 | CAR/W.O. | | CON.DRG. NO. | |
| SORT CODE | | PLANT NO. | | DRAWN BY | RG |
| DRG. CAT. | | DATE | 23/11/06 | ENGINEER | |
| AUTOCAD DRAWING DO NOT HAND MODIFY | | SCALE | N.T.S. | SHEET | 1 |
| DRAWING NUMBER | | A | 0090 | REV. | C1 |

ORIGINAL SIZE : A1


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The diagram illustrates a chemical process involving a central reactor (P1-28) and a receiver (P1-28A). The reactor is equipped with an internal stirrer and is connected to various feed and effluent streams. The receiver (P1-28A) is used for receiving and storing materials. The process includes the following components and streams:

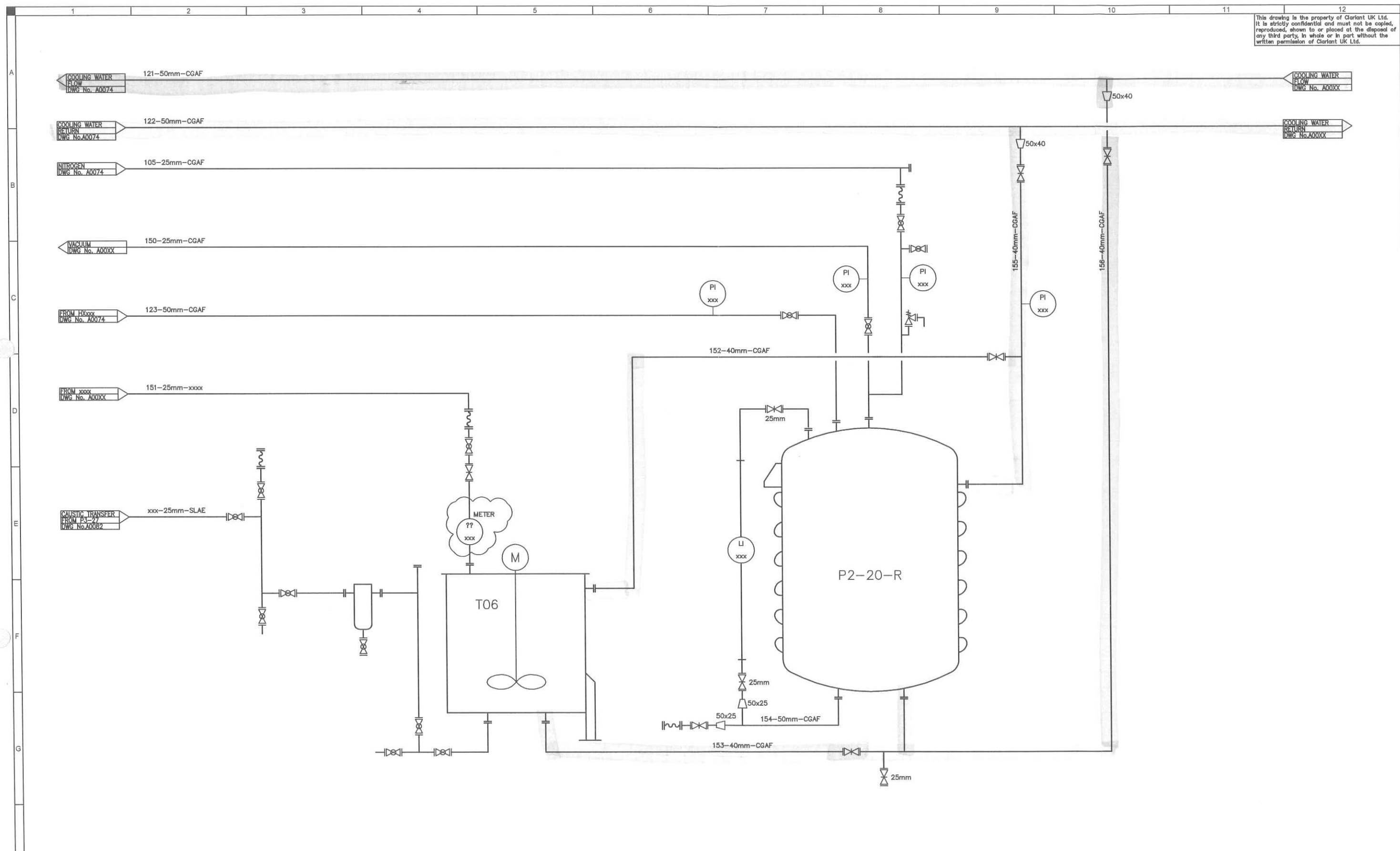
- Reactor (P1-28):** A large vertical vessel with an internal stirrer, labeled P1-28.
- Receiver (P1-28A):** A smaller vertical vessel labeled RECEIVER P1-28A.
- Streams:**
 - 661-25mm-CSAF:** Steam feed to the reactor.
 - 664-25mm-CGAF:** Nitrogen feed to the reactor.
 - 654-200mm-GLASS:** Glass feed to the reactor.
 - 652-40mm-CSAF:** CSAF feed to the reactor.
 - 651-40mm-CSAF:** CSAF feed to the reactor.
 - 657-20mm-CSAF:** CSAF feed to the reactor.
 - 659-40mm-CGAF:** CGAF feed to the reactor.
 - 658-40mm-CGAF:** CGAF feed to the reactor.
 - 655-40mm-CGAF:** CGAF feed to the reactor.
 - 656-40mm-CGAF:** CGAF feed to the reactor.
 - 665-40mm-SLAE:** SLAE feed to the reactor.
 - 663-40mm-CGAF:** CGAF feed to the reactor.
 - 650-40mm-CGAF:** CGAF feed to the reactor.
 - 603-25mm-CGAF:** CGAF feed to the reactor.
 - 313-40mm-CGAF:** CGAF feed to the reactor.
 - 607-20mm-CSAF:** CSAF feed to the reactor.
 - 662-40mm-CGAF:** CGAF feed to the reactor.
- Components:**
 - PI xxx:** Pressure Indicator.
 - LI xxx:** Level Indicator.
 - M:** Motor.
 - Valves:** Various control valves throughout the system.
 - Flow Indicators:** Arrows indicating the direction of flow.

Clariant
CLARIANT UK LTD. FUNCTIONAL CHEMICALS DIVISION
LLANTWIT FARDRE, PONTYPRIDD CF38 2SN
TELEPHONE :- (01443) 205311, FAX :- (01443) 207746

PROJECT :
TITLE : P & ID OF

| | | | | | | | |
|---|----|--|-----------------|--------------|-------------------|----------|---------|
|  Clariant | | CLARIANT UK LTD. FUNCTIONAL CHEMICALS DIVISION LLANTWIT FARDRE, PONTYPRIDD CF38 2SN TELEPHONE :- (01443) 205311, FAX :- (01443) 207746 | | | | | |
| | | PROJECT : TITLE : P & ID OF P1-28 N-BUTYL RECOVERY | | | | | |
| CONTRACTOR : | | | | | | | |
| BUILDING | P1 | CAR/W.O. | | CON.DRG. NO. | | APPVD BY | |
| SORT CODE | | PLANT NO. | | DRAWN BY | RG | | |
| DRG. CAT. | | DATE | 21/11/06 | ENGINEER | | | |
| AUTOCAD DRAWING DO NOT HAND MODIFY | | | SCALE N.T.S. | SHEET 1 | DRAWING NUMBER | A | 0085 |
| | | | | | | | REV. C1 |

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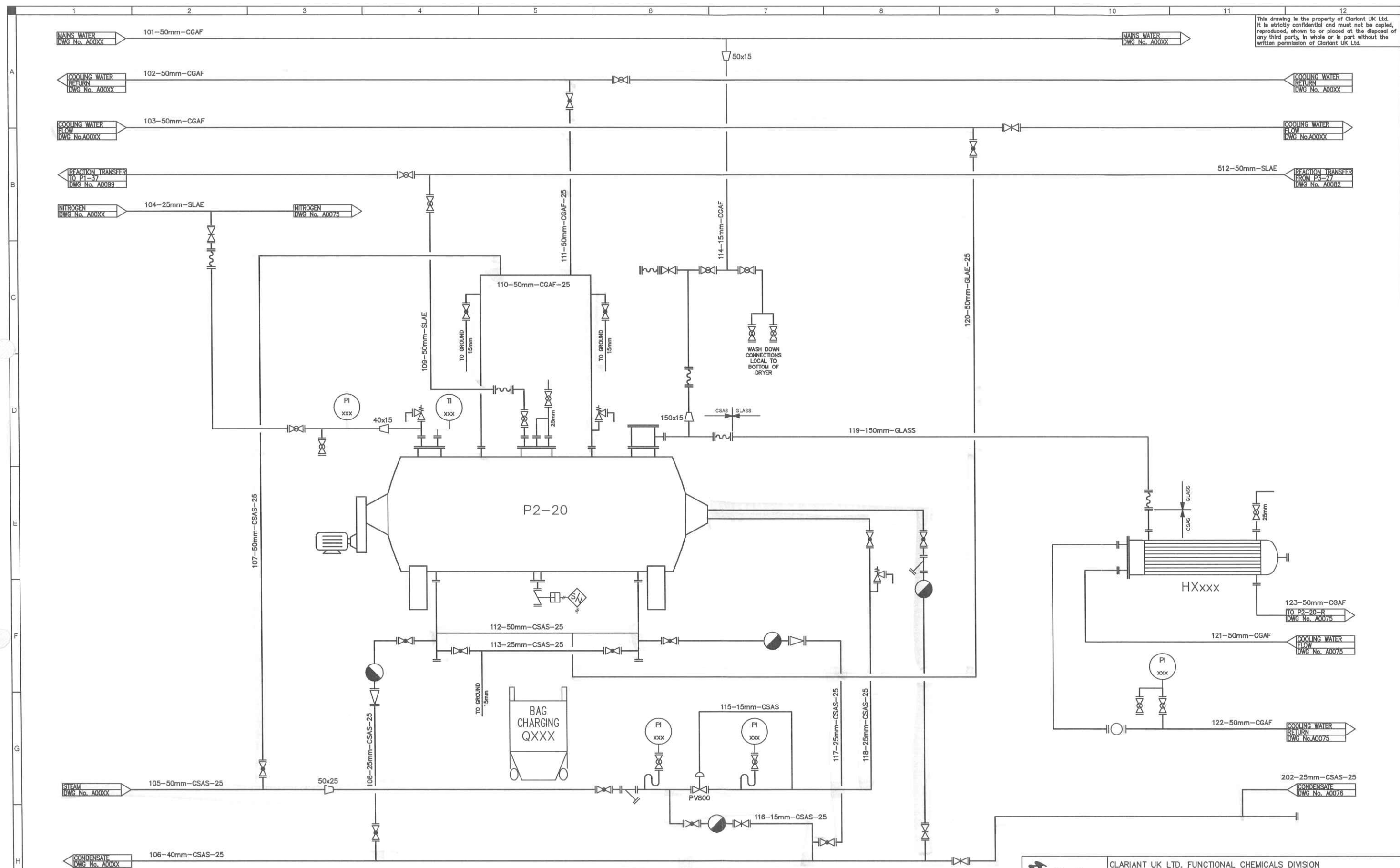
| REV | BY | REVISIONS | DATE | REV | BY | REVISIONS | DATE |
|-----|----|--------------------------------|----------|-----|----|-----------|------|
| C1 | RG | UPDATED FOR SITE SURVEY 2006-7 | 09/11/06 | | | | |

| VALUES | FROM | TO | LAST USED |
|-----------------|------|-----|-----------|
| PRESSURE VALVES | | | |
| LINE ITEMS | | | |
| LINE No. | 150 | 199 | 156 |
| INSTRUMENTS | | | |

REFERENCE DRAWINGS

| | | | | | |
|--|----|---|------------|-------------------|---------|
| Clariant | | CLARIANT UK LTD. FUNCTIONAL CHEMICALS DIVISION LLANTWY FARDRE, PONTYPRIDD CF38 2SN TELEPHONE :- (01443) 205311, FAX :- (01443) 207746 | | | |
| PROJECT : TITLE : P & ID OF P2-20-R AND CAUSTIC FILTRATION | | | | | |
| CONTRACTOR : | | | | | |
| BUILDING | P1 | CAR/W.O. | | CON.DRG. NO. | |
| SORT CODE | | PLANT NO. | | DRAWN BY | RG |
| DRG. CAT. | | DATE | 09/11/06 | ENGINEER | |
| AUTOCAD DRAWING DO NOT HAND MODIFY | | SCALE N.T.S. | SHEET 1 | DRAWING NUMBER | A 0075 |
| | | | | | REV. C1 |

ORIGINAL SIZE : A1



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| REVISIONS | | | | REFERENCE DRAWINGS | | | |
|-----------|----|--------------------------------|----------|--------------------|----|-----------|------|
| REV | BY | REVISIONS | DATE | REV | BY | REVISIONS | DATE |
| C1 | RG | UPDATED FOR SITE SURVEY 2006-7 | 08/11/06 | | | | |

| VALUES | FROM | TO | LAST USED |
|-----------------|------|-----|-----------|
| PRESSURE VALVES | | | |
| LINE ITEMS | 100 | 140 | 123 |
| INSTRUMENTS | | | |

| | | | | | |
|---|----|--|------------|-------------------|--------|
| Clariant | | CLARIANT UK LTD. FUNCTIONAL CHEMICALS DIVISION LLANTWIT FARDRE, PONTYPRIDD CF38 2SN TELEPHONE :- (01443) 205311, FAX :- (01443) 207746 | | | |
| PROJECT : TITLE : P & ID OF P2-20 ROTARY VAC. DRYER | | | | | |
| CONTRACTOR : | | | | | |
| BUILDING | P1 | CAR/W.O. | | CON.DRG. NO. | |
| SORT CODE | | PLANT NO. | | DRAWN BY | RG |
| DRG. CAT. | | DATE | 08/11/06 | ENGINEER | |
| AUTOCAD DRAWING DO NOT HAND MODIFY | | SCALE N.T.S. | SHEET 1 | DRAWING NUMBER | A 0074 |
| | | | | REV. | C1 |

6

WASTE OIL RECORD SHEET.

Date

17/08/2012

Completed by

A. Brewer

Decommissioning Project No

D008

Plant

P1A/B Production

Sheet Reference No:

D008/001

Carboy contains oil from the following equipment:-

P1-37 50 Ltr.

P1-03 25 Ltr.

P2-20 55 Ltr.

P2-02-1 } 10 Ltr.

P2-16 }

P1-12 } 10 Ltr.

13

14

15

P3-05 }

P1-18 }

28

20

21

24

25 }

P1 - 27 } 20 Ltrs

30

31

44 }

P1 - 07 } 30 Ltrs

08

09

10

11

17 }

Oil emptied into an IBC marked "Waste Oil from P6 De-commissioning, IBC 1)

P1 7, 8, 9, 13, 20, 25, 27, 28, 31

P3-05

20 Ltrs GLYCERINE.

Amount of Oil to waste

210 litres oil 20 litres glycerine

Carboy emptied into the Waste Oil IBC

YES : NO

Signed



W Brooks

Project Number: D008
 Project Description: P1A Production Building
 Document Reference: D008/Process/009 – Waste Record Onsite

Waste Record – for onsite disposal (i.e. Effluent System of mixed with other solvent waste for Tanker)

| Date Waste Generated | Type of Waste (Liquid/Solid) | Description | Disposal Route | Quantity | Hazardous/Non Hazardous. |
|----------------------|------------------------------|---|----------------|-----------|--------------------------|
| 22/7/12 | LIQUID | BOILOUT WATER P2-02 | Effluent | 2 X IBC | NON HAZ |
| 22/7/12 | LIQUID | BOILOUT WATER P1-16 | Effluent | 2 X IBC | NON HAZ |
| 22/7/12 | LIQUID | P1-13 GLASSWARE FLUSH | Effluent | 1 X IBC | NON HAZ |
| 23/7/12 | LIQUID | P1-24 + P1-25 GLASSWARE FLUSH | Effluent | 1 X IBC | NON HAZ |
| 23/7/12 | LIQUID | P1-18, P1-28, P1-21, GLASSWARE FLUSH | Effluent | 1 X IBC | NON HAZ |
| 25.7.12 | LIQUID | P1 VAC SYSTEM + RELIEVES | Disposal | 2 X IBC'S | HAZ |
| 27.7.12 | Liquid | VAE LINES + APS Receiver | Effluent | 1 X IBC | NON HAZ |
| 28.7.12. | LIQUID. | WATER/GLYCOL P1-03 | Disposal | 1 X IBC | High COD 32000mg/l. |
| 29.7.12. | LIQUID. | CHILLER LINES FLUSH + WATER FROM HUCK PUMP BUND | Effluent | 1 X IBC | Non Haz |
| 30.7.12 | SOLID. | OIL DRY FROM HUCK PUMP BUND | Disposal | 80 kg. | HAZ |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

(single -COD -COD)

Date: 6/12/11
 Issue: 1
 Replaces Issue: N/A
 Dated: N/A

Project Number: D008
 Project Description: P1A Production Building
 Document Reference: D008/Process/009 – Waste Record Onsite

Waste Record – for onsite disposal (i.e. Effluent System of mixed with other solvent waste for Tanker)

| Date Waste Generated | Type of Waste (Liquid/Solid) | Description | Disposal Route | Quantity | Hazardous/Non Hazardous. |
|----------------------|------------------------------|---|----------------|-----------|--------------------------|
| 22/7/12 | LIQUID | BOILOUT WATER P2-02 | Effluent | 2 x IBC | NON HAZ |
| 22/7/12 | LIQUID | BOILOUT WATER P1-16 | Effluent | 2 x IBC | NON HAZ |
| 22/7/12 | LIQUID | P1-13 GLASSWARE FLUSH | Effluent | 1 x IBC | NON HAZ |
| 23/7/12 | LIQUID | P1-24 + P1-25 GLASSWARE FLUSH | Effluent | 1 x IBC | NON HAZ |
| 23/7/12 | LIQUID | P1-18, P1-28, P1-21, GLASSWARE FLUSH | Effluent | 1 x IBC | NON HAZ |
| 25.7.12 | LIQUID | P1 VAC SYSTEM + RESIDUES | Disposal | 2 x IBC'S | HAZ |
| 27.7.12 | Liquid | VAC LINES + APS RECOVER | | 1 x IBC | |
| 28.7.12. | LIQUID. | WATER/GLYCOL P1-03 | | 1 x IBC | |
| 29.7.12. | LIQUID. | CHILLER LINES FLUSH + WATER FROM HUCK PUMP BUND | | 1 x IBC | |
| 30.7.12 | SOLID. | OIL DRY FROM HUCK PUMP BUND | | 80 kg. | |
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Date: 6/12/11
 Issue: 1
 Replaces Issue: N/A
 Dated: N/A

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