This assessment has been carried out to review the new Anodise plant installation against the BAT requirements of EPR 2.07 (The surface Treatment of Metals and Plastics by Electrolytic and Chemical Processes).

Process Summary

The Anodise process incorporates:

- Three stage counter-flow rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer.
- Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank.
- Each set of counter-flow rinse stages have been fitted with separate flow meters.
- Eductors will be installed in the degreasing and anodise process tanks.
- Programmable dwell times to ensure that minimal chemical drag out is achieved in line with production volumes required.
- Ultrasonic cleaning has also been fitted to Desmut tank to reduce rework.
- Extensive auto-dosing monitored and controlled by process ensures only chemical additions are made, only when required.
- The plant has been designed to utilise up to 300mm freeboard height within tanks.
- The lip extraction has been designed to be mounted above tank lip.
- The process is Anodise process and does not utilise either cadmium or chromium (VI).

On-going and Future Actions/Investigations

- Optimise the dwell times above the chemical tanks to ensure maximum recovery of chemicals in relation to production volumes.
- Optimise rinse flow rates to ensure minimum water usage whilst maintaining rinse quality.
- Design jigs to position the components to ensure minimal chemical drag over.
- Future investigation to measure benefits of switching first rinse after chemical tanks to drag-out instead of counter-flow.

BAT PROCESS ASSESSMENT

Energy efficiency

The following should be used where appropriate:

	Indicative BAT	Site Specific
1	High efficiency dewatering techniques to minimise drying energy.	The electric dryer has been fitted with a lid which opens when the flight bar is lowered and closes once the flight bar is located within the dryer. A heat exchanger will be installed on the process rectifier. The output of the heat exchange is to be used for space heating
2	Minimisation of water use and closed circulating water systems.	Each set of counter-flow rinse stages have been fitted with separate flow meters. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank There are no current plans to install ion exchange or other treatment unit to re-circulate rinse waters. There are no closed loop systems in operation in the process however, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank
3	Using spent cooling water (which is raised in temperature) for rinsing purposes.	A Closed loop chiller unit will be installed to maintain the lower temperatures required in the sulphuric acid process tanks.
4	Automated control for DC rectifiers.	Kraft oil cooled rectifiers are to be used on the plant.
5	Electrolytic processes that operate under thermally stable conditions without the need for heating or cooling.	It is not possible to operate the electrolytic processes under thermally stable conditions without the need for heating or cooling due to operating parameters of the process**.**
6	Minimum use of fume extraction consistent with COSHH Regulations.	Minimum extraction rates will be adopted to maintain legal compliance of workplace exposure limits.
7	Inverter speed control or flow damper for fume extraction centrifugal fans.	The extraction system will have dampers installed to allow the system to balanced correctly.

Efficient use of raw materials and water

The following should be used where appropriate:

	Indicative BAT	Site Specific
1	Ion exchange or other treatment unit to re-circulate rinse waters.	There are no current plans to install ion exchange or other treatment unit to re-circulate rinse waters. However, there will be a view to investigate moving the ion exchange units from existing anodise plant to new process as the existing anodise process is due to end. Expected timing: 2017/18 dependent upon production volumes. There are no closed loop systems in operation in the process however, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the
2	Closed loop operation with three to four stage cascade rinsing, so that drag-out can be returned upstream to balance the evaporative loss and minimise waste.	

	Indicative BAT	Site Specific
		volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank
3	Spent pickle acid for pH control in the effluent treatment facility.	There are no current plans to utilise spent fluid within the effluent treatment facility due to the fact that the acid is too highly contaminated. Also, the anodise process only produces acid waste approximately every six months when the entire tank solution is renewed following laboratory analysis.
4	Proprietary plating electrolytes that have a low concentration of dissolved solids and operate with minimum energy requirements for heating or cooling. These should avoid cadmium where possible and should require relatively simple effluent treatment.	The process chemistry is defined by the chemical supplier Sur Tec who has worked with the TRW plant in Koblenz to determine the correct mix of proprietary chemicals in order for the Anodise process to meet the specific customer performance and quality requirements. The process being installed has been evaluated and approved by the customer as able to meet their product specification requirements. There is no cadmium within the process.
5	Minimise drag-out by maximising the drainage time of the work over the tank or in a separate drainage tank.	Dwell time above the process tanks to follow the minimum BREF guidelines. The dwell times are programmable and as such can be monitored and adjusted to ensure minimal chemical drag out is achieved in line with production volumes required. Components will be jigged to minimise carry-over. TRW are presently evaluating the way components are jigged and the design of the jigs themselves. There are no drag-in/drag-out tanks installed on the process. However, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank Raw material consumption will be monitored during the operation of the process and is dependent upon production volumes. If necessary following the monitoring, investigations will be made into the potential to use one of the rinse tanks as a drag-in/drag-out tank on the anodise process tank, however, this will subsequently reduce the process to two stage rinsing, with top spray unit, as opposed to three.
6	ECO-rinse tank(s) to reduce mass drag-out and subsequent rinse-water consumption.	
7	Electrochemical metals recovery technology for unreturned drag-out.	There is no current metals recovery technology installed on the process. All rinse waters are treated at the existing effluent stage prior to release to foul sewer.
8	Evaporation technology in conjunction with 3-5 stage cascade rinsing to allow closed loop operation.	There is no use of evaporation technology or closed loop system in operation on the process, however, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on

	Indicative BAT	Site Specific
		the last swill tank
9	Hydrogen peroxide in the pickling tanks to reduce NOx emission and acid consumption.	N/A
10	Low temperature processes consistent with good metal deposition rate. The use of lids on process tanks operating at 60°C and above, and hexagons or croffles should be considered for all manually operated tanks.	The process is automated and due to the expected volumes it is not feasible to use lids on the process tanks. Process temperatures are not expected to be above 60°C.
11	Recycle trade effluent to less critical rinsing stages.	There are no current plans to recycle trade effluent to less critical rinsing stages due to the distance the plating process is from the effluent treatment plant. Also the anodise quality is essential and therefore introducing a non uniform water source into the system may have an adverse affect.
12	Proprietary cleaners that allow a lower operating temperature.	As TRW serves customers in the automotive sector the surface finish has to be completed in strict accordance with stringent technical performance specifications. These specifications determine the type of solution to be used, its concentration and various other operating parameters. Within these constraints, TRW has attempted to identify and use those materials that are less environmentally harmful or sustainable, where the alternative exists
13	A low temperature biological cleaner system in place of the traditional alkaline soak cleaner for a long production life, low waste and low energy consumption.	

Avoidance, recovery and disposal of wastes

The following should be used where appropriate:

	Indicative BAT	Site Specific
1	Effluent treatment facilities should be designed to process spent process fluids and recover anode metals for reuse, e.g. cadmium, copper and nickel.	There are no current plans to utilise spent fluid within the effluent treatment facility due to the fact that the acid is too highly contaminated. Also, the anodise process only process acid waste approximately every six months when the entire tank solution is renewed following laboratory analysis.
2	Spent alkaline cleaners and acid pickles should be used for pH control in the effluent treatment facility.	
3	You should evaluate the use of phosphating sludge as filler for agricultural and horticultural use.	N/A
4	Filter cake may have uses, and these should be investigated in preference to landfill disposal.	Wastes produced by the site are constantly being reviewed to determine viable alternative forms of disposal/recovery and this includes the filter cake from the existing effluent process.

	Indicative BAT	Site Specific
5	Filter cake presses should be operated at not less than 7 bar and preferably 10-15 bar to reduce its mass, volume and water content.	A pressure of 3.2 tonnes is applied to the filter press during its operation to expel as much moisture as possible from the hydroxide sludge and form a solid cake.
6	Consider use of a low temperature biological cleaner system in place of the traditional alkaline soak cleaner for a long production life, low waste and low energy consumption.	As TRW serves customers in the automotive sector the surface finish has to be completed in strict accordance with stringent technical performance specifications. These specifications determine the type of solution to be used, its concentration and various other operating parameters. Within these constraints, TRW has attempted to identify and use those materials that are less environmentally harmful or sustainable, where the alternative exists
7	Consider use of ion exchange or other treatment unit to re-circulate rinse waters.	There are no current plans to install ion exchange or other treatment unit to re-circulate rinse waters. However, there will be a view to investigate moving the ion exchange units from existing anodise plant to new process as the existing anodise process is due to end. Expected timing: 2017/18 dependent upon production volumes.
8	Consider use of closed loop operation with three to four stage cascade rinsing, so that drag-out can be returned upstream to balance the evaporative loss and minimise waste.	There are no closed loop systems in operation in the process however, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank
9	Minimise drag-out by maximising the drainage time of the work over the tank or in a separate drainage tank.	Dwell time above the process tanks to follow the minimum BREF guidelines. The dwell times are programmable and as such can be monitored and adjusted to ensure minimal chemical drag out is achieved in line with production volumes required. Components will be jigged to minimise carry-over. TRW are presently evaluating the way components are jigged and the design of the jigs themselves. There are no drag-in/drag-out tanks installed on the process. However, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank Raw material consumption will be monitored during the operation of the process and is dependent upon production volumes. If necessary following the monitoring, investigations will be made into the potential to use one of the rinse tanks as a drag-in/drag-out tank on the anodise process tank, however, this will subsequently reduce the process to two stage rinsing, with top spray unit, as opposed to three.
10	Use electrochemical metals recovery technology for unreturned drag-out.	There is no current metals recovery technology installed on the process. All rinse waters are treated at the existing effluent stage prior to release to foul sewer.

	Indicative BAT	Site Specific
11	Use electrodialysis technology for the re-oxidation of hexavalent chromium [chromate, or Cr(VI)] degraded to trivalent chromium [Cr(III)] in chromic acid anodising electrolytes.	There are no Chrome VI products currently planned to be used in this process however, a Cr(III) chromic acid product is to be used.

Material storage and handling

All process chemicals are usually supplied and stored in 25 litre special plastic containers supplied by chemicals distributors. High consumption acids, e.g. concentrated sulphuric acid, are stored in the larger 45 litre special plastic containers supplied by chemicals distributors.

Where initial tank solutions are prepared chemicals are generally supplied in 1000 litre returnable Intermediate Bulk Containers (IBCs) and dilution of strong acid to the operational concentration is usually carried out at the process tanks.

All containers are stored in their original containers with the lids remaining in place until used. The chemical storage area is bunded and all stations are/will be labelled. Segregation is clear. It is designed to allow access by forklift trucks. The chemical store will be on CCTV and alarms will be routed through to the security gatehouse, which is manned 24/7.

The whole anodise process plant, including pumps are situated within a bunded area and the exisiting effluent treatment plant will be utilised and is also bunded.

Chemical cleaning using aqueous cleaners

	Indicative BAT	Site Specific
The key areas of control are: • energy consumption • fugitive emissions to air • rinse water efficiency • cleaning fluid lifetime • disposal of spent cleaners.		
1	Consider use of ion exchange or other treatment unit to re-circulate rinse waters.	There are no current plans to install ion exchange or other treatment unit to re-circulate rinse waters. However, there will be a view to investigate moving the ion exchange units from existing anodise plant to new process as the existing anodise process is due to end. Expected timing: 2017/18 dependent upon production volumes. There are no closed loop systems in operation in the process however, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank
2	Closed loop operation with three to four stage cascade rinsing, so that drag-out can be returned upstream, is a particularly effective way to balance the loss of water by evaporation and minimise waste of costly process chemicals.	
3	Where appropriate, generate turbulence by means of an eductor to provide improved cleaning, and maintain particulates in suspension so that they can be removed continuously by external filtration.	The degreaser and anodise process tanks have eductors fitted to generate turbulence. Ultrasonic cleaning has also been fitted following the degreasing process. All other process and swill tanks have air agitation fitted.

	Indicative BAT	Site Specific
4	Where appropriate, use membrane filtration to remove oil and grease, emulsions and dispersants	The degrease tank solution is to be filtered to remove oil and grease, etc from the process.
5	Where possible, maintain adequate freeboard above the cleaner level (minimum of 150 mm) to minimise entrainment of liquid and subsequent emissions to air. Extraction lip ducts should be mounted at least 50mm above the top of the tank lip angle, and you should use the minimum air flow consistent with satisfactory extraction.	The plant has been designed to utilise up to 300mm freeboard height within tanks. The lip extraction has been designed to be mounted above tank lip. Minimum extraction rates to be adopted to maintain legal compliance of workplace exposure limits.
6	Where appropriate, use “hexagons” or “croffles” to reduce evaporative loss and reduce energy consumption. Use automated lids on large cleaner tanks to reduce fume extraction energy costs as well as to reduce consumption for process heating.	There are currently no plans to utilise “hexagons” or “croffles”. Energy monitoring activities will be carried out on the process following installation and improvement actions reviewed based on the results of the monitoring.
7	Consider the use of proprietary cleaners that allow a lower operating temperature.	As TRW serves customers in the automotive sector the surface finish has to be completed in strict accordance with stringent technical performance specifications. These specifications determine the type of solution to be used, its concentration and various other operating parameters. Within these constraints, TRW has attempted to identify and use those materials that are less environmentally harmful or sustainable, where the alternative exists
8	Consider use of a low temperature biological cleaner system in place of the traditional alkaline soak cleaner for a long production life, low waste and low energy consumption.	

Pickling

Surface treatment

	Indicative BAT	Site Specific
The key areas of control are: • rinse water economy • prevention and control of point source and fugitive emissions to air • pickle efficiency • acid regeneration • acid recycling • use of inhibitors which are readily biodegradable.		
1	There should be two or three stage cascade pickling with continuous pickle acid feed and continuous discharge to the effluent treatment facility.	The Ultrasonic cleaning solution is used in a single tank which is auto dosed to maintain the correct solution strength. All waste products are to be removed as and when laboratory analysis determines that the solution is spent. The will be no discharge to the effluent treatment facility from the process tanks. Only the rinse waters will be discharged to the effluent treatment facility.
2	There should be a minimum of two stages of cascade rinsing with agitation.	Three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank

	Indicative BAT	Site Specific
3	Consider ion exchange or other treatment unit to re-circulate rinse waters.	There are no current plans to install ion exchange or other treatment unit to re-circulate rinse waters. However, there will be a view to investigate moving the ion exchange units from existing anodise plant to new process as the existing anodise process is due to end. Expected timing: 2017/18 dependent upon production volumes. There are no closed loop systems in operation in the process however, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank
4	Consider use of spent pickle acid for pH control in the effluent treatment facility.	There are no current plans to utilise spent fluid within the effluent treatment facility due to the fact that the acid is too highly contaminated. Also, the anodise process only process acid waste approximately every six months when the entire tank solution is renewed following laboratory analysis. Also, the effluent system utilises sulphuric acid for pH control and the pickle acid is not compatible.

Electroplating

	Indicative BAT	Site Specific
The main areas of control are: • rinse water economy – see Section 1 • mass drag-out reduction • return of drag-out • recovery of higher value metals from drag-out which cannot be returned • energy consumption – see section 1 • prevention of fugitive emissions to air – see section 3		
1	You should give full consideration to using substances other than cadmium, chromium(VI) and other hazardous materials. Where alternatives are not available, you must provide proper controls.	The process is Anodise and does not utilise either cadmium or chromium(VI).
Where appropriate for the process you should:		
2	Maximise stages of cascade rinsing, with agitation where appropriate.	Three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank.

	Indicative BAT	Site Specific
3	Use ion exchange or other treatment units to re-circulate rinse waters.	There are no current plans to install ion exchange or other treatment unit to re-circulate rinse waters. However, there will be a view to investigate moving the ion exchange units from existing anodise plant to new process as the existing anodise process is due to end. Expected timing: 2017/18 dependent upon production volumes. There are no closed loop systems in operation in the process however, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank
4	Use proprietary plating electrolytes that have a low concentration of dissolved solids and operate with minimum energy requirements for heating or cooling. These should avoid cadmium where possible and should require relatively simple effluent treatment.	The process chemistry is defined by the chemical supplier Sur Tec who has worked with the TRW plant in Koblenz to determine the correct mix of proprietary chemicals in order for the Anodise process to meet the specific customer performance and quality requirements. The process being installed has been evaluated and approved by the customer as able to meet their product specification requirements. There is no cadmium within the process.
5	Replace EDTA by QUADROL in autocatalytic copper systems.	Surtec have confirmed there is no EDTA present in all formulations of the proposed Surtec chemistry to be used on the process.
6	Minimise drag-out by maximising the drainage time of the work over the tank or in a separate drainage tank.	Dwell time above the process tanks to follow the minimum BREF guidelines. The dwell times are programmable and as such can be monitored and adjusted to ensure minimal chemical drag out is achieved in line with production volumes required. Components will be jigged to minimise carry-over. TRW are presently evaluating the way components are jigged and the design of the jigs themselves. There are no drag-in/drag-out tanks installed on the process. However, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank Raw material consumption will be monitored during the operation of the process and is dependent upon production volumes. If necessary following the monitoring, investigations will be made into the potential to use one of the rinse tanks as a drag-in/drag-out tank on the anodise process tank, however, this will subsequently reduce the process to two stage rinsing, with top spray unit, as opposed to three.
7	Use ECO-rinse tank(s) to reduce mass drag-out and subsequent rinse-water consumption.	
8	Use electrochemical metals recovery technology for unreturned drag-out.	There is no current metals recovery technology installed on the process. All rinse waters are treated at the effluent stage prior to release to foul sewer to remove heavy metals to below permitted release limits.

	Indicative BAT	Site Specific
9	Use evaporation technology in conjunction with 3-5 stage cascade rinsing to allow closed loop operation.	There is no use of evaporation technology or closed loop system in operation on the process, however, three stage cascade rinsing has been adopted to allow the rinse flow rates to be reduced. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank
10	Generate turbulence by hydraulic power and eductors	Air / educator agitation fitted to various process and rinse tanks
11	Use electrodialysis technology for the re-oxidation of chromium (VI) reduced to chromium (III) in chromic acid anodising electrolytes.	N/A
12	Use hydrogen peroxide in the pickling tanks to reduce NOx emission and acid consumption.	There are no current plans to use hydrogen peroxide in the pickling tanks. The process utilises ultrasonic cleaning
13	Employ low temperature processes consistent with good metal deposition rate. You should use lids on process tanks operating at 60°C and above, and you should consider hexagons or croffles for all manually operated tanks.	The process is automated and due to the expected volumes it is not feasible to use lids on the process tanks. Process temperatures are not expected to be above 60°C.
14	A minimum of 4 and preferably 5 stages of cascade rinsing after chromic/sulphuric acid etch, with techniques for minimising drag-out. Consider alternatives to chromic/sulphuric acid as an etchant.	N/A
15	Provide jig or barrel supports whilst draining for manually operated process tanks.	N/A
16	Use continuous filtration and removal of sludge from phosphating process tanks.	N/A

Rinsing

	Indicative BAT	Site Specific
The main areas of control are: • water economy – see Section 1 • mass drag-out reduction – see electroplating.		
1	Multistage cascade rinsing.	There are no current plans to install ion exchange or other treatment unit to re-circulate rinse waters. However, there will be a view to investigate moving the ion exchange units from

	Indicative BAT	Site Specific
2	Closed-loop or recirculation systems with rinse water treatment (ion exchange, reverse osmosis, electrodialysis, air swept evaporation or vacuum evaporation).	existing anodise plant to new process as the existing anodise process is due to end. Expected timing: 2017/18 dependent upon production volumes. There are no closed loop systems in operation in the process however, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank
3	Conductivity probes.	There are no conductivity probes fitted to the rinse tanks however, TRW will investigate the use of a portable conductivity meter which can be used to undertake regular sampling of the rinse waters. Each set of three stage cascade tanks have been fitted with flow meters and flow restrictors.
4	Water meters on each line.	
5	Flow restrictors.	
6	Minimised drag-out by employing a drainage time over the process tanks of at least 20 seconds for rack work and 30 seconds for barrelled work.	Dwell time above the process tanks to follow the minimum BREF guidelines. The dwell times are programmable and as such can be monitored and adjusted to ensure minimal chemical drag out is achieved in line with production volumes required. Components will be jigged to minimise carry-over. TRW are presently evaluating the way components are jigged and the design of the jigs themselves. There are no drag-in/drag-out tanks installed on the process. However, three stage cascade rinsing, with agitation, has been adopted to allow the rinse flow rates to be reduced minimising the volume of rinse water being used, treated and subsequently released to foul sewer. Each set of counter-flow rinse stages have been fitted with top spray unit on the last swill tank Raw material consumption will be monitored during the operation of the process and is dependent upon production volumes. If necessary following the monitoring, investigations will be made into the potential to use one of the rinse tanks as a drag-in/drag-out tank on the anodise process tank, however, this will subsequently reduce the process to two stage rinsing, with top spray unit, as opposed to three.
7	Drag-in – drag-out tanks (ECO rinse system) to reduce mass drag-out and subsequent rinse water consumption.	
8	Continuous filtration and removal of sludge from phosphating process tanks	N/A
9	Recycling of trade effluent to less critical rinsing stages.	Trade effluent is not to be recycled to less critical rinsing stages due to the distance the anodise process is from the effluent treatment plant. Also the anodise quality is essential and therefore introducing a non uniform water source into the system may have an adverse affect.

Drying

You should consider using the following techniques in order to save energy:

	Indicative BAT	Site Specific
1	Centrifugal drying for small work	N/A
2	Providing lids for hot water tank driers	No hot water driers fitted to the process. The electric dryer has been fitted with a lid which opens when the flight bar is lowered and closes once the flight bar is located within the dryer.
3	Providing a continuous bleed-off from hot-water driers as supply for the preceding cascade rinsing system, ...	No hot water driers fitted to the process