2024

PPC Water Efficiency Audit 2.4.1.2: 25/03/24

PERMIT NUMBER: BX 33761G

[redacted]

Executive Summary

As part of its obligations and commitments under the PPC regulations, specifically Section 2.4.1.2 of permit BX3376IG, Continental Teves is required by Natural Resources Wales to undertake a periodic waste minimisation and water use efficiency audit. This is required every four years, the previous being in 2020. This is alongside any other monitoring and reporting requirements of the permit.

Currently, Continental Teves have several processes that use water. These include a zinc\zinc nickel plating plant, soluble oil coolant in metal cutting machines, firefighting water, laboratory facilities and domestic facilities (vending machines, toilets, showers etc.).

The mains water supply enters the factory via two meters. These are identified and Meter 1 (M1) and Meter 2 (M2) for the purposes of this report. Meter 1 is situated at the northwestern corner of site and Meter 2 is situated approximately halfway along the western perimeter of the factory. Both meters are situated outside of the perimeter fencing of Continental Teves on the public highway. Continental Teves rely on the supplier of the water, Dwr Cymru-Welsh Water, to provide them with the consumption readings from these two meters on a monthly basis.

M1 supplies water for the fire sprinkler system via a large storage tank situated at the southwestern corner of the site. This tank also supplies water to the plating plant, this connection being at approximately halfway up the tank to ensure there is always sufficient water in the tank for the sprinkler system. There are air gaps in the system to prevent back siphoning of the plating plant water into the storage tank. M2 supplies the remaining water to the site. The plating plant has a water deionising plant which is used to supply deionised water to the critical rinses after the passivation process and for make-up of the passivation and sealant solutions.

Wastewater entering the public sewer consists of two types: waste process water from the plating plant via an effluent treatment plant. This is discharged under a Consent to Discharge agreement with Welsh Water and the PPC permit that this report refers to. The remaining water is from domestic water. Water from the machining process is disposed of via a licenced waste disposal company. Data on water usage is collected throughout the factory and inputs and outputs are compared.

Housekeeping is of a high standard and is monitored regularly by the plant management team.

The site maintains certification to ISO 14001, ISO 45001 and ISO 50001. This means that we have internal audits from Continental Automotive on an annual basis and from an external body every three years. This ensures that our standards are maintained.

The opportunities for recycling water are limited to the zinc plating plant but the build-up of chlorides and organics, which are not eliminated in the effluent treatment plant, means there is a risk of contamination of the plating process. The re-use of water from the roof is a possibility that may be investigated but there is a high number of gulls and other birds that nest on the roof and contaminate this with their droppings.

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1. Introduction

1.1. Report Background

As part of its commitment under PPC approvals, Continental Teves is required by Natural Resources Wales to continue to monitor and report periodically on the use of water at the factory site in Ebbw Vale.
This audit report is in line with Section 2.4 of the PPC permit – Efficient use of Raw Materials.

1.2. Brief overview of operations

At the start of 2024, operations at the Ebbw Vale site include:

- Brake caliper machining
- Acid zinc, acid zinc nickel plating and associated wastewater treatment
- Brake caliper assembly and repair kits
- Warehouse storage
- Laboratory
- Offices
- Food vending facilities

However, since the Covid pandemic and the invasion of Ukraine, production volumes of calipers has been reducing steadily. Hence the decision was made in 2023 to end production of original equipment brake manufacture on site at the end of 2024. Production of OES calipers would remain and the air

suspension products currently being manufactured at a site in Germany would be transferred to the Ebbw Vale plant. It is not anticipated that this production will consume any significant volumes of water.

Water is used for processes; coolant makeup, process solution makeup, rinsing and for domestic purposes.

1.3. Brief overview of Supply

With the reduction of plating volumes in recent years, the water used on site is divided equally between meter M1 identified earlier, located at the northwestern corner of the site and meter M2, situated approximate halfway along the western perimeter of the factory.

Water from meter M1 is piped to a large storage tank which supplied process water to the plating plant and the fire sprinkler system. Water from meter M2 is used for domestic purposes and the makeup of machining coolant.

1.4. Brief overview of wastewater disposal route

Wastewater from plating is permitted to be discharged from the site to the public foul sewer under a trade effluent consent issued by Dwr Cymru- Welsh Water. Other point source emissions to the foul sewers include toilets, small kitchen areas and vending area facilities. Uncontaminated rainwater from the factory roof and yard areas is permitted to be discharged via interceptors through surface water drainage systems into the Gantre brook.

1.5. Housekeeping

Housekeeping on site is very good. External drains are painted to indicate whether they are surface water or foul sewer drains. Internally, surfaces are clean and in good condition with no evidence of spillages. Individual machines are bunded to contain any leaks or spillages that may occur. The effluent treatment room has been upgraded in recent years; the controller has been replaced by a new, modern system that gives better pH control resulting in reduced usage of the dosing chemistry; the bulk acid dosing tank has been replaced and a new scrubber installed to reduce hydrochloric acid fumes which in turn protects the fabric of the building. Repairs have also been undertaken to the roof of this building.

2. Water Supply

2.1 Water Quality, Sources and Usage

The water used on site is from the town's supply provided by Welsh Water. A small amount of this is deionised on site for the critical process solutions of passivation and sealant and for the rinses between these processes. Deionised water is also used for the salt spray corrosion chamber and in laboratory analysis procedures.

As described in 1.3 above, water is supplier via two meters M1 and M2. The water supply serviced by M1 supplies a large storage tank which supplies water for the following tasks:

- Fire fighting
- Factory sprinkler system
- Plating plant process water
- Plating tank cooling water (recirculated back to tank)

The water take-off point for the plating process water and cooling water is approximately halfway up the tank, whilst the firefighting water is taken off the bottom of the tank. This ensures that there is always sufficient water available for firefighting purposes.

The second supply pipe work that supplies via meter M2 is used for machining coolant and domestic purposes.

The sprinkler system is a pressurised system and is configured with a return pipe back to the storage tank. Each individual feed pipe is equipped with a manual valve allowing it to be isolated from the tank.

2.2 Records of water consumption

Meters M1 and M2 are read monthly by Welsh Water and the results are sent to Continental on the same basis. Continental also have real-time access to the telemetry of M1, this enabled Continental to discover a below-ground leak in January 2022 which they were then able to repair.

Internally, Continental have a water meter on the wastewater discharge (which is also used by Welsh Water for billing purposes). This meter is subject to MCERTS audits, the latest of which was in January 2024. There are also meters on the inlet feed to the plating plan, the feeds to the spray rinses on plating, the deionised water system and the water feed to the coolant mixing system in machining.

Records of these meter readings are maintained by the Head of Plating and Environmental Management and the overall water consumption has to be reported to Continental Automotive Central ESH department on a monthly basis.

2.3 Water Consumption

The largest consumers of water on site have historically been the plating plant and machining coolant. However, it is possible that with the changes in the business in the coming years, the balance between these and the domestic usage may change and greater focus may be needed on domestic usage.

2.3.1 Plating Process Water and Wastewater Treatment

Water is used in the make up of solutions, rinsing and the cleaning of tanks and other housekeeping. Losses in the system are either via displacement (rinsing), evaporation (heated tanks) or via disposal of waste solutions. The basic sequence is:

› Hot alkali cleaner
› Double counterflow rinse
› Hydrochloric Acid pickling
› Triple counterflow rinse
› Hot alkali ultrasonic cleaning
› Triple counter flow rinse
› Weak acid dip
› Rinse (in stage three of previous counterflow)
› Plating
› Double counterflow rinse
› Acid dip (not zinc nickel)
› Single rinse (not zinc nickel)
› Passivation
› Double counterflow rinse

› Sealant
› Dry

This process is in line with the Best Available Techniques as described in the BREF entitled Surface Treatment of Metals and Plastics August 2006.

The wastewater treatment plant uses water for the make-up of the polyelectrolyte and antifoam solutions and for cleaning the sand in the sand filter. There is also a small usage for cleaning the area. These processes use water from meter M2.

2.3.2 Machine coolant

Typically, a CNC machine will have a coolant sump of between 800 and 1,000 litres. The coolant is made up of 6% soluble oil and 94% water. Water losses are made up of evaporation, drag out on components and via disposal of spent solutions.

3. Scope

It is a requirement of Continental Automotive that each plant that is not in a water scarcity area reduce its water consumption by 2% per year based on a key performance indicator (KPI). For Ebbw Vale this KPI is m^3/1,000 pieces produced. This can be misleading as the product mix will affect this result; one seal kit is equivalent to one caliper, but the former uses no water for production where the latter does. For this reason, we also measure this KPI for plating only.

This audit focusses primarily on the permitted area but will also consider the other areas.

4. Findings

Figure 1 shows the site water consumption from 2021 to 2023.

Figure 1

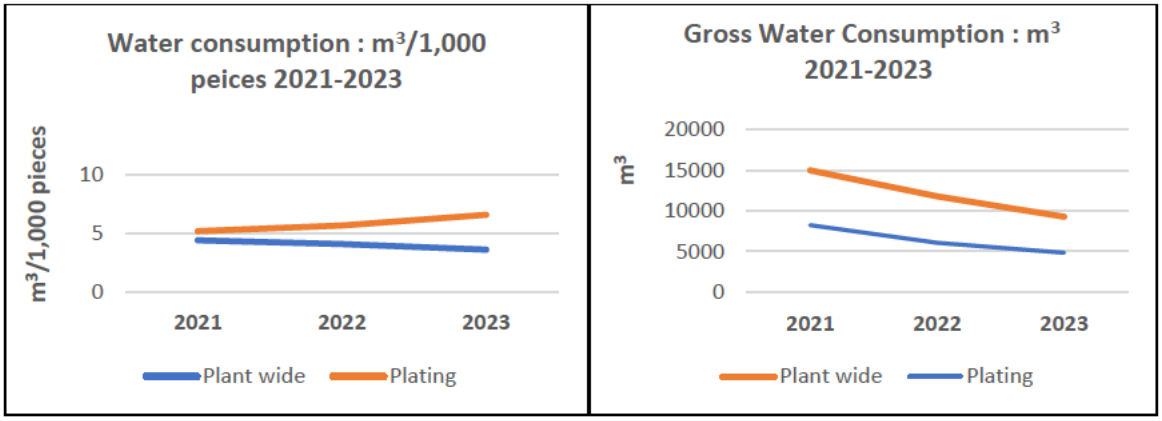

Table 1 below shows an estimation of the balance between incoming and outgoing water consumption in cubic metres for the period 2021-2023.

Table 1

	Volume in	Plating Out	Coolant out	Domestic	Cleaning	Fire Pump	Water in sludge*	Evaporation/ Unknown
2021	14973	8510	149	1136	125	180	19	4856
2022	11764	6038	132	1134	125	180	17	4139
2023	9275	4875	87	1131	125	180	16	3182

* Calculated as 70% of volume of sludge produce in wastewater treatment.

The Evaporation \unknown volumes remain a consistent part of the total water consumed at 30-35% of the total flow. Evaporation form plating and machining account for the largest amount of this and there will be drag-out losses and water in product that also contribute to this usage.

5. Conclusions

5.1 From figure 1, shows that the water consumption has been reducing during the period 2021-2023; a 38% reduction in total water used and an 18% reduction in consumption per 1,000 parts. This should be understood in the context of the product mix as described earlier but does show real reductions in water consumption which are not just product related.

5.2 The usage per part in plating is increasing. The reasons for this are production volume related. As production volumes drop, so process cycles increase, or cycles produce less parts. The flow meters on the rinse tanks are not sensitive enough to reduce the flow rates and so less parts are produced for the same volume of water. This needs to be addressed, see the recommendations below.

5.3 The water used by the fire pump has not been considered previously. The fire pump must be tested on a weekly basis as a requirement of our insurance company. Upon investigation, it was found that this pump provides water at a rate of 100-120 litres per minute and runs for 30 minutes. This water is pumped onto the roadway an into the surface water drain during testing. Again, this is a waste of resource and should be addressed. Ideally, this water should be returned to the water storage tank that it was removed from.

5.4 Many of the meters on the input side were either only installed in 2023 or were replaced in 2023 due to failure. This means that there is not enough data to perform a reasonable analysis of the input and output of the water consumption.

6. Recommendations

6.1 In the plating plant, flow rates on the rinse tanks need to be able to be adjusted to account for the lower production rates and in line with Continental Automotive's own standards. This may be achieved by either reducing the size of the water feed pipework to accommodate smaller, more sensitive flow meters or by fitting a conductivity meter to the rinse water and connecting these to a controller that maintains the required set point. The former of these is probably more cost effective and quicker to achieve.

6.2 The water used in fire pump testing should be returned to the storage tank. This should be in a way that maintains the cleanliness of the water. Therefore, a direct connection from the pump outlet to the top of the tank is best practice, an air gap should be maintained to prevent back-syphoning. Failing this, the water should be collected and used in other processes; the machine coolant would be best suited to this.

6.3 Collate input and output data on flow meters and analyse the results. If necessary, take the appropriate action to prevent usage that is not required.