PWTAG Compliance

Waterplay and Dry Plaza Water Features

The purpose of this document is to clarify the requirements for compliance with PWTAG guidelines on Interactive Water Play features and Dry Plaza water features and most importantly to differentiate between both types of feature and the associated requirements as they are radically different.

We should be clear that PWTAG differentiate between 'Interactive Water Play' features and 'Decorative' water features.

Interactive Water Play features are interactive features utilising water play elements where users, primarily children, are "positively encouraged to enter and interact with the various features". Such features do require special consideration and design requirements are onerous.

Decorative water features may be a fountain within a pool or a dry plaza style feature across which the public may walk freely in normal outdoor clothes. It is not realistic to restrict access to such features although their use as play areas should be 'discouraged'. Such features have a less onerous design requirement although PWTAG suggest that, particularly with dry plaza features, the designers should 'consider' filtering and treating the water as in an interactive feature.

PWTAG set out quite clearly what is required for each type of feature both in terms of filtration and water treatment but also in respect to positively limiting access to the interactive water play features for animals by the use of fencing.

Interactive Water Play Features

It is important for us to make clear from the outset with the architect/client that for a feature to be considered as an 'Interactive Water Play' feature the design as a whole must comply with PWTAG guidelines. This is important for us as the PWTAG requirements for the interactive feature are largely rigid and therefore if the architect/client is not sticking to the PWTAG requirements throughout we can similarly consider the feature to be a 'Decorative' feature. In that case we would argue that whilst we can design a high quality filtration and treatment (and we generally would in any case) the design need not necessarily comply 100% with the PWTAG guidelines as the feature as a whole won't. In that case we would advise the architect/client not to describe or market the feature as an interactive water play feature. It is really important for both us and the client to have this agreed as early in the design process as possible.

The PWTAG requirements for an 'Interactive Water Play' feature are as follows: (items marked in BLUE relate to FDL design, items in RED are primarily related to the architect/client design)

1. User load is limited to nominally 1 user per $1m^2$ of feature area at any one time. User loads must be monitored and controlled.
2. Water treatment is to be based upon the number of users and not the system volume. Typically the design should be based upon a circulation rate of $0.5m^3$/user/hr, which should yield a turnover period of around 20 minutes.
3. 'Ideally' there should be 1 tank for returning dirty water from the feature and 1 tank for the treated water, from which the feature pumps draw their water. In practice this means that the filtration system must be rated at above the total demand for the water feature, which may be onerous

depending upon the scale of the feature. Water would be drawn from the dirty water tank, passed through the filtration a sterilisation system and discharged to the clean water tank. As the filter flow is greater than the feature flow the clean water tank should constantly operate on overflow back into the dirty water tank.

4. Filtration and water treatment should be 24 hours per day.
5. Overflow would come off the dirty water tank
6. Water level sensing would be in the dirty water tank as this tank will reflect any water loss through evaporation and filter backwash.
7. Disinfectant residual levels may need to be higher than typical features – nominally 5ppm for Chlorine and 6ppm for bromine.
8. Chemical values should be checked and logged every 2 hours and also 1 hour before use. Water samples should be taken from the fountain jet rather than a sample point and bacteriological testing must take place once per month.
9. Medium rate sand filtration should be used.
10. Automated pH and disinfection control should be used.
11. Flow meters should be installed to confirm flow through filters. Pressure gauges should be fitted to determine when backwashing is required.
12. Access to plant room space is a primary consideration given that this type of feature requires very regular monitoring of the plant. Therefore a below ground plant room access via a manhole is unlikely to be acceptable.
13. Animals and their contamination must be excluded, directly and through warning notices. Effectively this means that the feature area must be fenced off and gated in such a manner that the gates may not be left open.
14. Footwear should be removed and footwash facilities provided that go direct to drain.
15. Adequate signage must be provided advising against the drinking of water, and running and advice must be given against the use of the feature by people who have suffered stomach upsets (vomiting and diarrhoea) within the last 14 days.

As can be seen from above, for a feature to be truly considered an 'Interactive Water Play' feature the design constraints are considerable. It is most unusual for us to be involved in a feature that is designed entirely in accordance with the above PWTAG guidelines and therefore most features that we are involved with are largely 'decorative' water features and this crucial design basis must be explained to the client as early as possible in the design process.

In order for us to comply with the above recommendations relating to water treatment we must follow the following design guidelines as well as the general design requirements above:

User Load

This is a straight forward calculation based upon surface are of the feature as set out above. We must then do a cross check to determine whether the system turnover period of 20 minutes is achieved through the filtration/treatment system. If the 20 minute period is not achieved then the system circulation rate must be adjusted accordingly.

Separate Dirty Water and Clean Water Tanks

As the reason for having separate tanks is to completely separate the clean water from the dirty water and ensure that only clean water is projected from the nozzles, there is no halfway house in this in a truly 'Interactive Water Play' feature. Due to the fact that this type of system requires the filtration flow to

exceed the feature flow, the client must be made aware at an early stage of the project what this entails. Factors to consider are:

- Plant room space to house a double storage tank system
- Total turnover rate of feature – we should design the filtration system for system turnover rate +10% minimum (note requirements also of user load).

Medium Rate Filtration

A maximum 20 minute turnover period of system volume is required. In Dry Plaza type features that are typically low volume this should not be an issue if we are filtering at system flow + 10% minimum but cross check in any case.

Medium rate filtration differs from our standard systems in that we normally use high rate filters. Medium rate filters filter water at a rate of 10 to 25m³/hr per m² of filter surface area. However the issue with this rate of filtration is that a rate of 30m³/hr per m² is still required for backwash. You therefore require a system that can operate at 2 flow rates, one for filter flow and one for backwash flow. The simplest way to achieve this is to have a by-pass before the filter directing water back to the dirty water storage tank (not to the feature). During normal filtration the by-pass is open therefore reducing flow through the filter. During backwash the valve is closed to direct full flow through the filter. Clearly this is wasteful of energy as a proportion of the flow is simply returned to the dirty water storage tank. Variable speed drives may be considered with a simple speed selector switch on the panel door for 'filter' or 'backwash' flows.

Flow meters should be installed to confirm the flow through the filtration system meets expectations and pressure gauges (either separate filter inlet and outlet gauges or a single differential gauge) should be fitted to monitor filter pressure to determine when backwash is necessary.

In practical terms we can still use our traditional Lacron filters but flow rates have to be adjusted accordingly. The following table may be used.

Filter Model	Hi Rate Manufacturer's Data	Medium Rate Based upon 25m³/hr/m²	Backwash Rate (min) Based upon 30m³/hr/m²
LSR 16	6m³/hr	3.3m³/hr	4.05m³/hr
LSR 18	8.5m³/hr	4.1m³/hr	4.98m³/hr
LSR 24	14.5m³/hr	7.5m³/hr	9m³/hr
LSC 30	22.5m³/hr	11.5m³/hr	13.8m³/hr
LSC 36	31m³/hr	16.5m³/hr	19.8m³/hr
LSC 42	43m³/hr	24.25m³/hr	29.1m³/hr
LSC 48	56m³/hr	28.25m³/hr	33.9m³/hr

Decorative Features

We should make it policy to make the client aware of the PWTAG requirements and have his requirements in relation to PWTAG documented from the outset of the design process so that there can be no comebacks later.

PWTAG clearly define the features that we normally deal with i.e. those not specifically designed for water play, as decorative features. Whilst there is a suggestion that, where there is a likelihood that children will play within a feature, the designer 'consider' treating the feature as if it were an 'Interactive Water Play' feature there may be limitations about what we can practically achieve and should be expected to achieve.

Where the client accepts the fact that the feature is not entirely in accordance with PWTAG recommendations but wishes to go as far as practically possible towards PWTAG compliance we need to set out how far we can practically go. Obviously this will be a project specific decision based upon a wide range of factors. The client must be fully involved in the process and the outcome of the agreement must be documented. The details below set out the considerations that we must make and the possible solutions.

Separate Dirty Water and Clean Water Tanks

Due to the fact that this system requires the filtration flow to exceed the feature flow we must make a value judgement upon the practicalities of this requirement. In features that are simply Dry Plaza fountains we have the best chance of complying with this requirement but it will depend upon the total system flow. If the overall feature has both fountains and cascades it is unlikely that in practical terms we can comply due to the very high system flows that are likely. Like the 'Interactive Water Play' features, the biggest issue on decorative features is likely to be space but we must follow the same design.

- Filtration rate = Total turnover rate of feature +10% minimum

Medium Rate Filtration

A maximum 20 minute turnover period of system volume is desirable. In Dry Plaza type features that are typically low volume this should not be an issue if we are working on the separate dirty and clean water tank system and filtering at system flow + 10% minimum, but cross check in any case. Where we are not using the separate dirty and clean water tanks we should go for our typical 1 hour turnover but use a medium rate sand filter following design/selection information above.

General Design Criteria

For all features there is no reason why, where required or where there is any form of PWTAG compliance issue, we can't adhere to the basic design requirements of the following in addition to those listed above for 'Decorative Features':

1. Filtration and water treatment should be 24 hours per day.
2. Automated pH and disinfection control should be used.
3. Flow meters should be installed to confirm flow through filters. Pressure gauges should be fitted to determine when backwashing is required.
4. Adequate signage should be provided advising against the drinking of water, and running. Advice must be given against the use of the feature by people who have suffered stomach upsets (vomiting and diarrhoea) within the last 14 days.