PureSure® System used in PURELAB® Chorus 1

Ensures removal of weakly ionized impurities

Organic compounds and silica are among the species least strongly held by the ion exchange resins. After a period of use, the ion exchange capacity of a purification pack starts to be used up and these compounds are released first, even before the resistivity has fallen much below 18.2 MΩ-cm. This is shown in Figure 1 where the TOC and silica content of the water rises rapidly as the product water resistivity starts to fall. These problems are avoided in the PURELAB Chorus 1 as any organics and silica released from the primary purification pack as it exhausts, are retained on the second, polishing pack which is still highly regenerated.

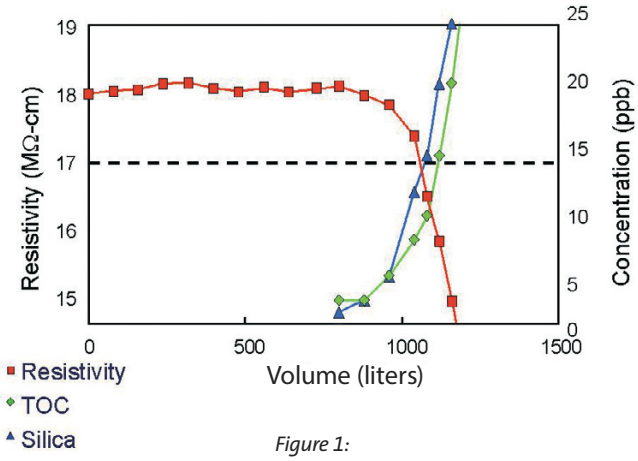

Figure 1:

Increased security

PURELAB Chorus 1 product water purity is not dependent on accurate resistivity and temperature measurements. Even the best meters are only accurate to ± 0.2 MΩ-cm and those used in the laboratory water purifiers are more typically ± 0.4 MΩ-cm. A conventional water purifier relies on changing the purification packs as soon as the output resistivity drops below 18.2 MΩ-cm in order to maintain the highest water purity.

Any error in the resistivity or temperature will seriously threaten the water purity from the unit. This could result in organics or silica release as shown in Figure 1 above, or the presence of other ions as in Table 1. In the PURELAB Chorus 1 any minor errors in the measurements will only affect the change-over point of the packs and have no effect on the output water purity.

Table 1 **Impurity Levels in Purified Water of Different Resistivities**

Impurity	Concentrations in µg/l which could be present at resistivity of			
	18.2 MΩ-cm	18.0 MΩ-cm	17.5 MΩ-cm	15.0 MΩ-cm
Na^+	0.8	1.3	1.8	3.6
Cl^-	<0.1	0.15	0.5	2.1
Fe^{2+}	2.0	2.4	3.0	5.4
$Na^+ + Cl^- + SO_4^{2-}$	<0.1	0.3	1.1	5.4
NaCl	<0.1	0.2	0.9	5.0

Advanced warning of usable purification pack life

A further advantage lies in the security provided by the PURELAB Chorus 1 system. If the 'Intermediate Purity' alarm warning is ignored, the PURELAB Chorus 1 will continue to produce 18.2 MΩ-cm water for another 1000 liters or more with a 35 µS/cm feed. This is due to the polishing pack which is virtually unused when the primary purification pack needs to be changed.

Where regular logging of water purity is required the security provided by the PURELAB Chorus 1 system offers the advantage that, even with very heavy usage, daily recording is sufficient to guarantee that the product water will be maintained at ultrapure purity, 18.2 MΩ- cm, throughout the whole day. This would be the case even if the intermediate purity fell below 1 MΩ-cm early in the day.

In a conventional water purifier, if the resistivity drop is not detected or ignored, serious contamination can result as shown in Table 1 and frequent logging and validation of resistivity monitors would be needed.

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