

"Encuentros de Innovación, Tecnologías y Desarrollo del Agua en Canarias"

Organiza:

Consejería de Transición Ecológica, Lucha contra el Cambio Climático y Planificación Territorial

***Dirección General de Planificación Territorial,
Transición Ecológica y Aguas***

Dirección General de Planificación Territorial, Transición Ecológica y Aguas (DGPTEA)

REPARACIÓN Y REJUVENECIMIENTO DE MEMBRANAS



TECNOLOGÍA KURIVERTER

“Encuentros de Innovación, Tecnologías y Desarrollos de Aguas en Canarias”

Uno de los grandes problemas de las tecnologías de membrana es el deterioro químico de su superficie.

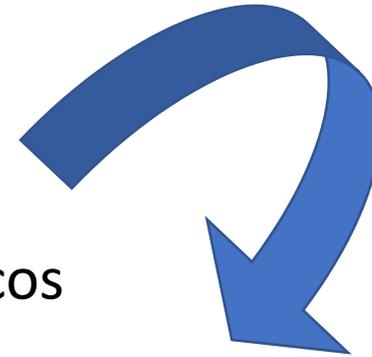
Empeoramiento de la calidad del permeado

Pérdidas de producción

Empeoramiento de la operativa de planta

Reducción de la vida de la membrana

Incrementos de los costos operacionales y energéticos



SUSTITUCIÓN DE MEMBRANAS

Costes de inversión

Costes de producción

Costes humanos

..... Y en poco lapso tiempo

LA SOLUCIÓN:

TECNOLOGÍA KURIVERTER RC

- MEJORA LA CALIDAD Y PRODUCCIÓN DEL PERMEADO
- RETRASA LA SUSTITUCIÓN DE MEMBRANAS
- BAJO IMPACTO MEDIOAMBIENTAL DE LOS QUÍMICOS EMPLEADOS
- APROBACIÓN FDA PARA AGUA DE CONSUMO HUMANO
- FACILIDAD DE APLICACIÓN
- REDUCCIÓN DE LOS COSTOS DE OPERACIÓN

HERRAMIENTA



TRES PRODUCTOS:

RC 200

RC 300

RC 400

**1 CAJA POR CADA m³ DE
AGUA DEL CIP**

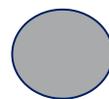
CONCEPTO

El procedimiento

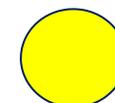
RC-200 ; **RELLENA** la membrana
RC-300 ; **CUBRE** la membrana
RC-400 ; **ESTABILIZA** el RC-200 y RC-300



RC-200

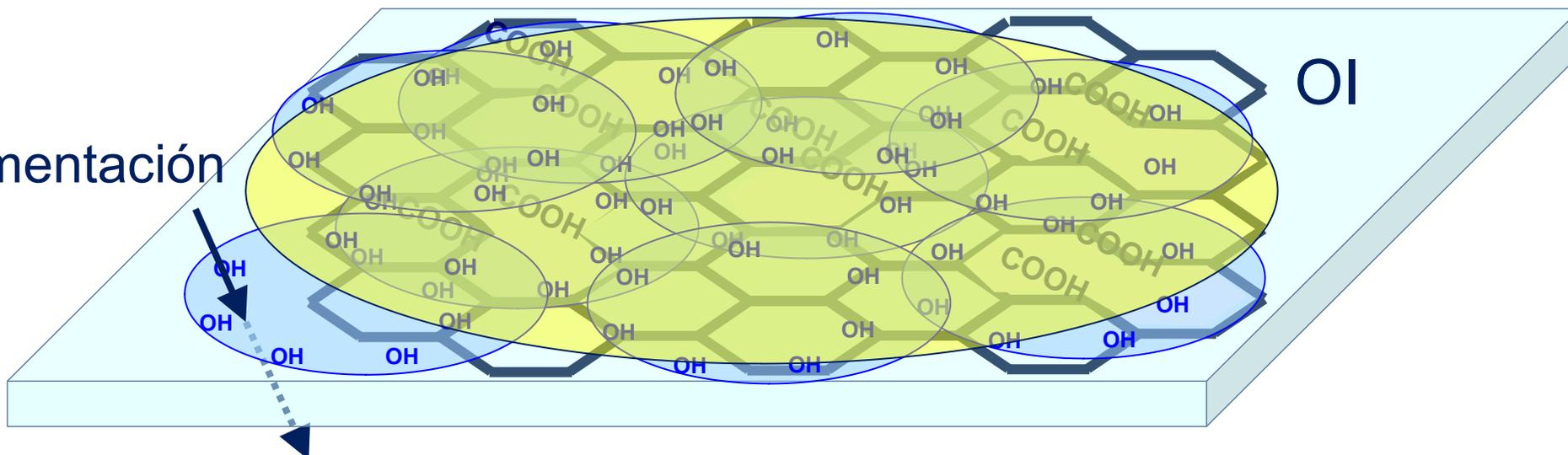


RC-300

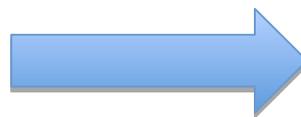


RC-400

Alimentación



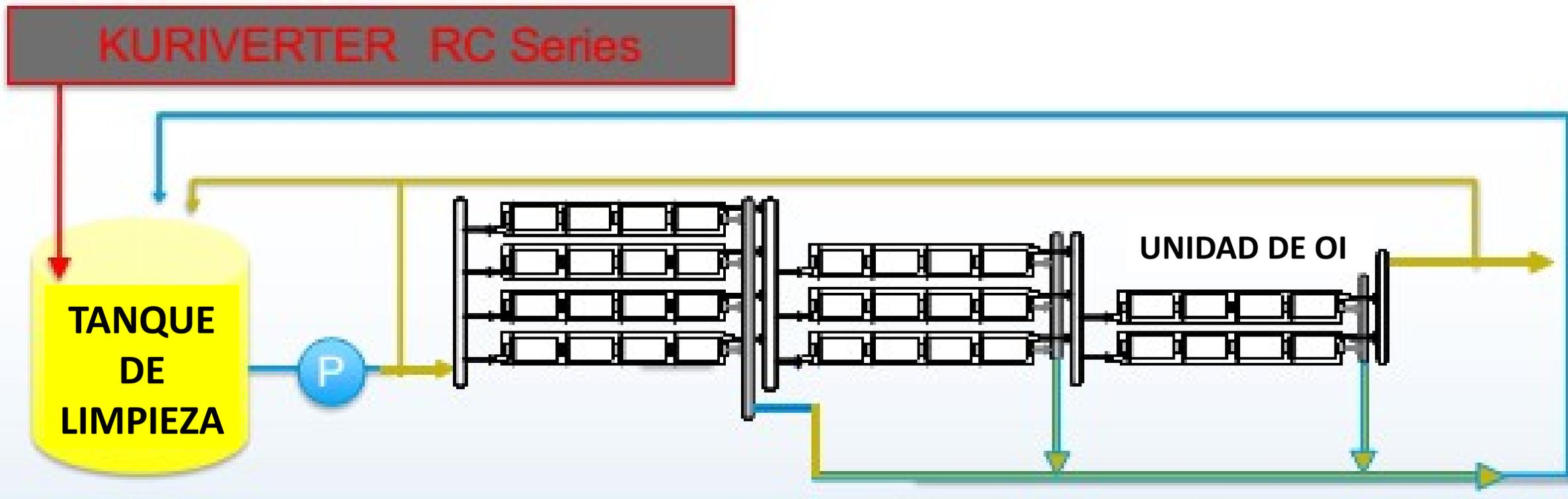
Permeado

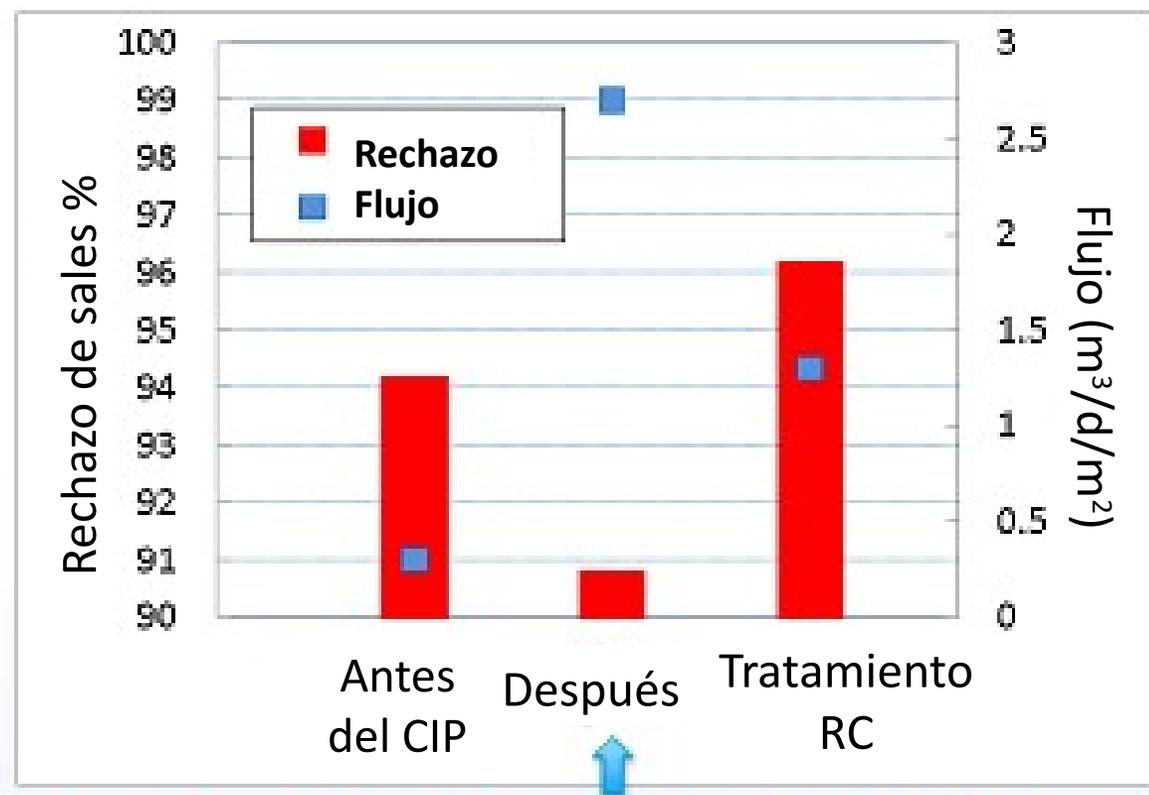


Recuperación del rechazo de sales

PROCEDIMIENTO IN SITU

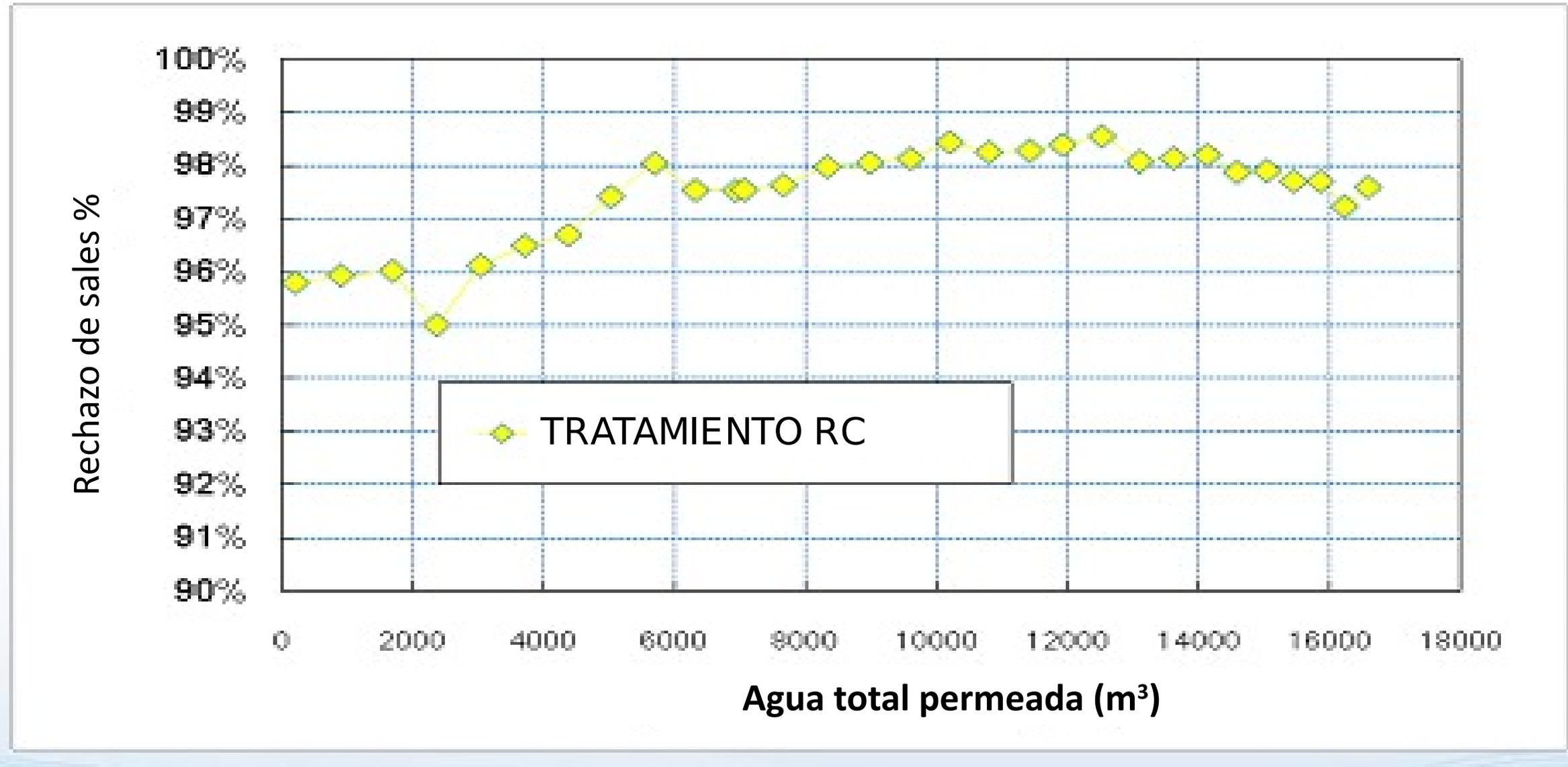
1. LIMPIEZA DE MEMBRANA
2. DOSIFICACIÓN DE LA SERIE RC AL TANQUE DE LIMPIEZA



RESULTADOS DE CAMPO**OI EN Terciario**

Típica situación de
deterioro

MEMBRANA DE POLIAMIDA
CONVERSIÓN: 50-70 %
MEJORA EN EL RECHAZO DE SALES:
DEL 94 AL 96 %





- Recupera la calidad el permeado y su producción
- Retrasa la sustitución de membranas
- Bajo impacto medioambiental del uso de químicos
- En la lista FDA de químicos aptos para agua de consumo humano
- Fácil de aplicar
- Patentado
- Reduce los costes de operación: ahorro de químicos, energía

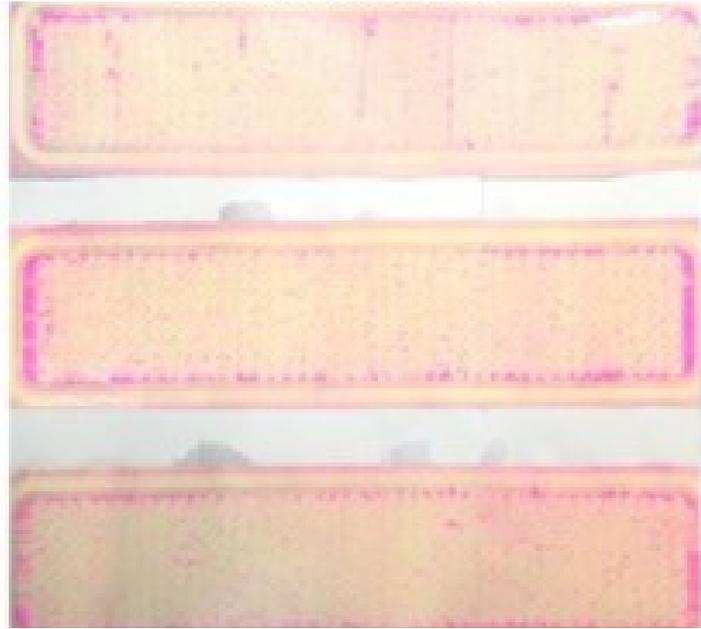


CASOS DE ESTUDIO: ACUAMED (LEVANTE)

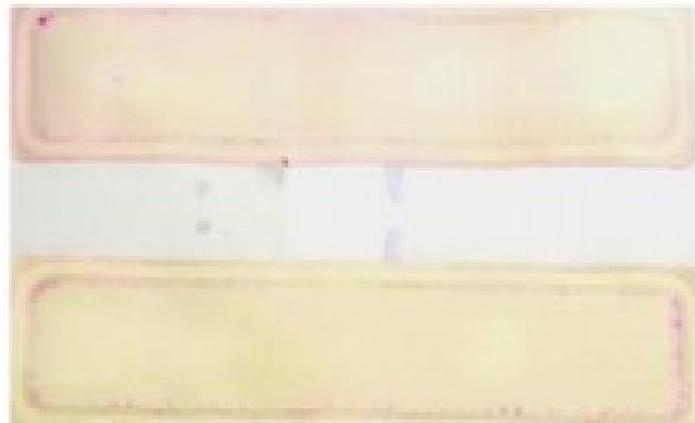
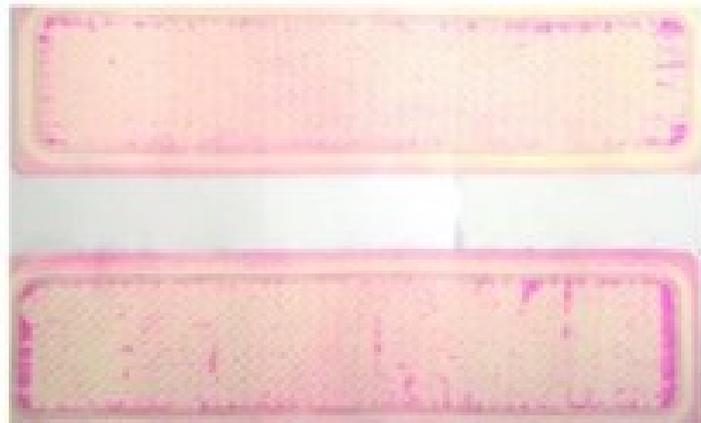
Desaladora de agua de mar
Experiencia con éxito desde 2.015
Producción: 160.000 m³/d



SIN KURIVERTER™ RC



CON KURIVERTER™ RC



Se procede a la aplicación de Kuriverter RC el 01/10/15

- Bastidor con conductividad sobre 900-1000 μS

Agua de aporte oscila 55-67 mS

- Tras aplicación baja a 615 μS
- Pero no se mantiene en el tiempo. Se valora la posibilidad de que limpieza previa no fuera muy buena (resistencia de calentamiento averiada)

CRITICIDAD DE LIMPIEZA PREVIA

Visualizador gráfico de parámetros de procesos

SELECCIONE UN PARÁMETRO O DOS A REPRESENTAR GRÁFICAMENTE DE ENTRE LOS MOSTRADO EN EL DESPLEGABLE

PARÁMETRO 1: Presión diferencial Bastidor 6-B (kg/cm²)



MENU

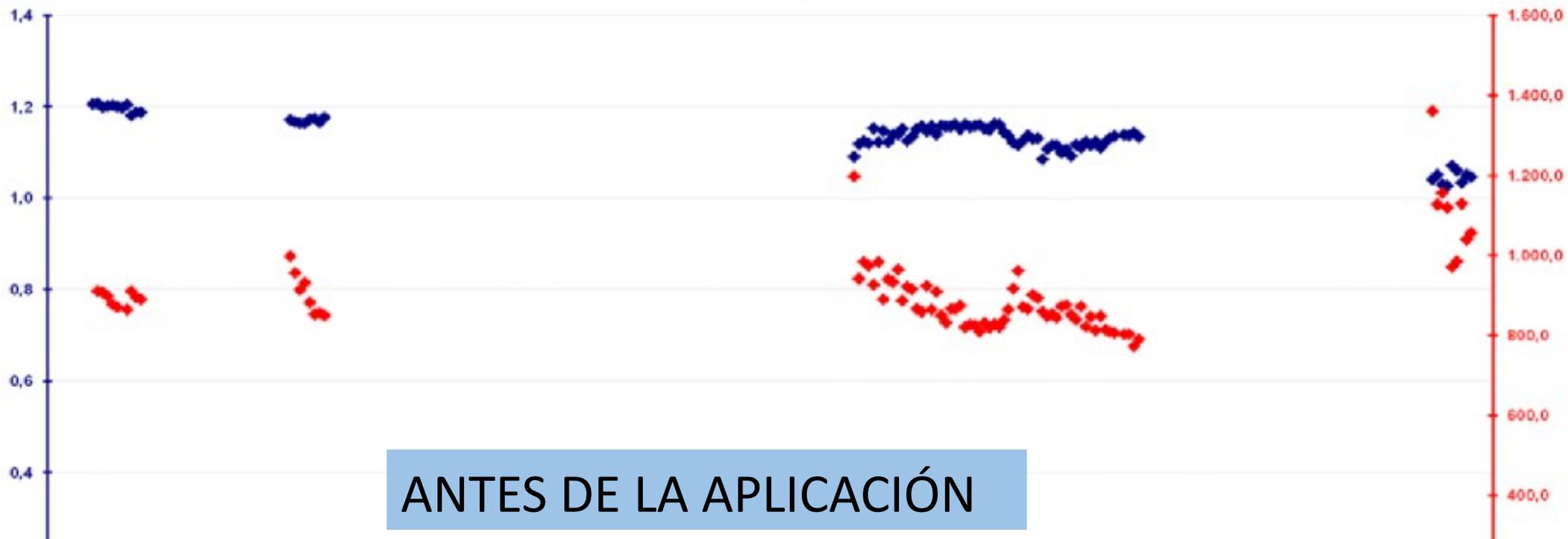
PARÁMETRO 2: Conductividad Permeado Bastidor 6-B - Laboratorio (µS/cm)



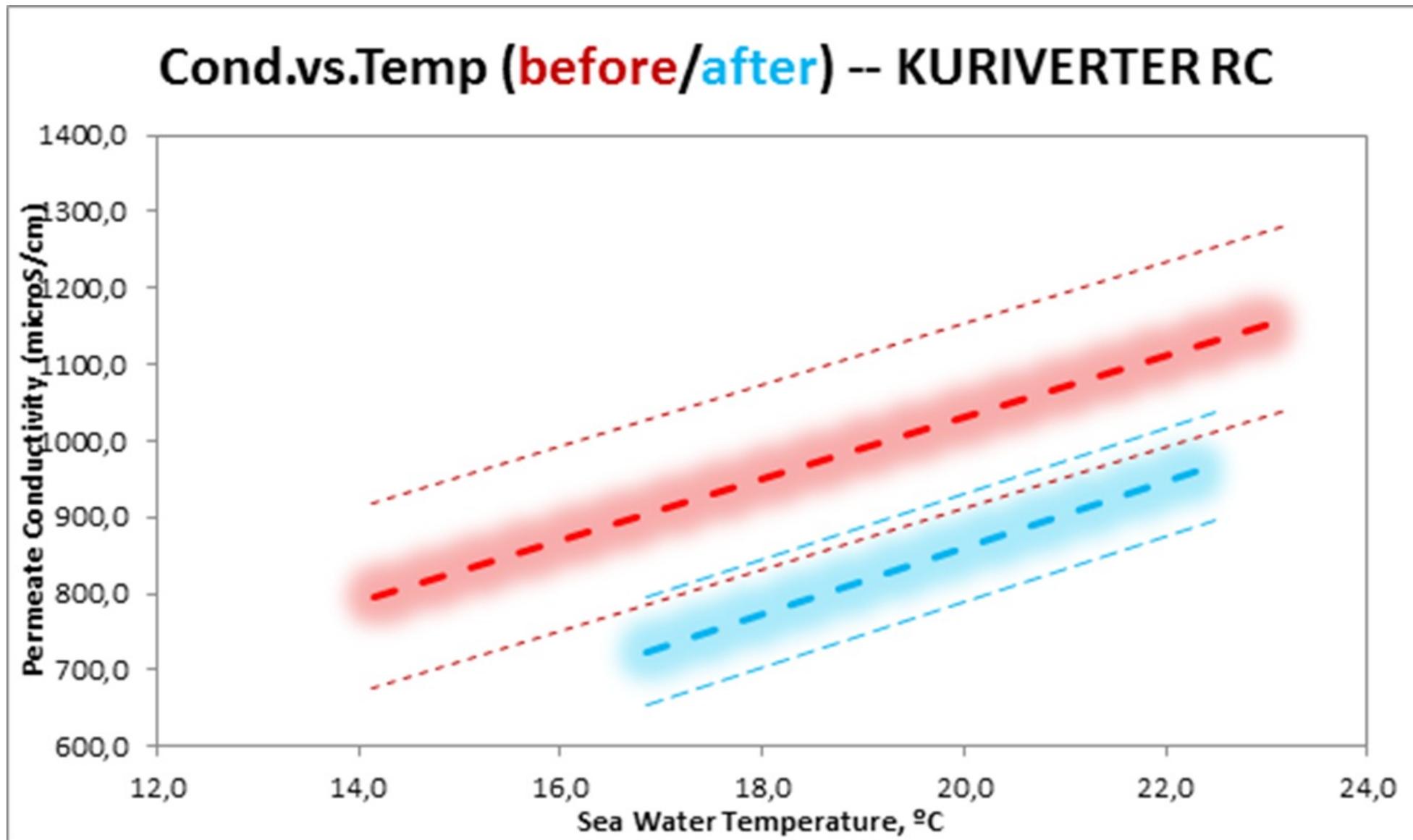
Bastidor de ósmosis Inversa 6-B Desaladora de Carboneras

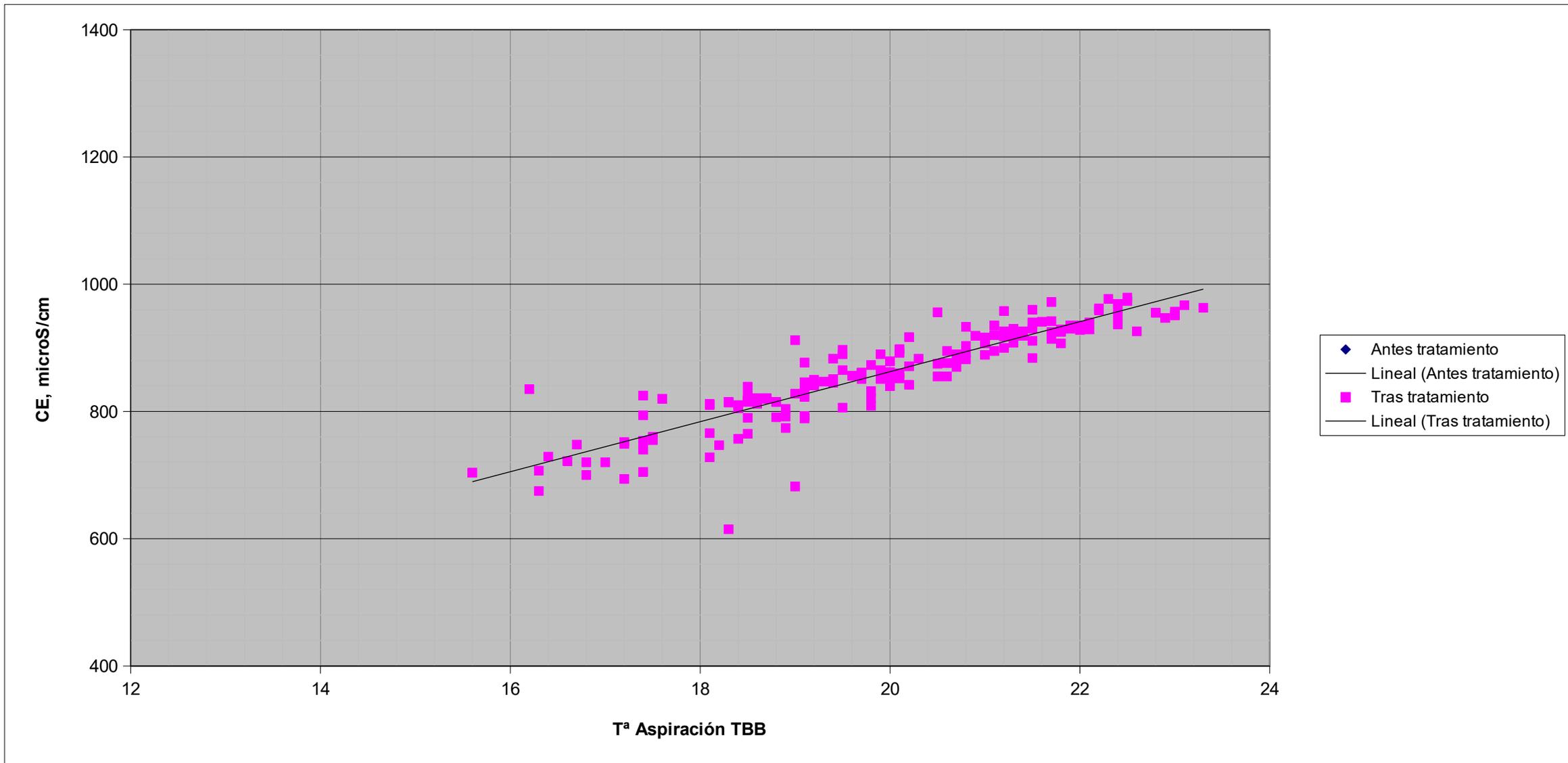
• Presión diferencial Bastidor 6-B (kg/cm²)

• Conductividad Permeado Bastidor 6-B - Laboratorio (µS/cm)



ANTES DE LA APLICACIÓN





SOS DE ESTUDIO: OSMOSIS EN REFINERÍA

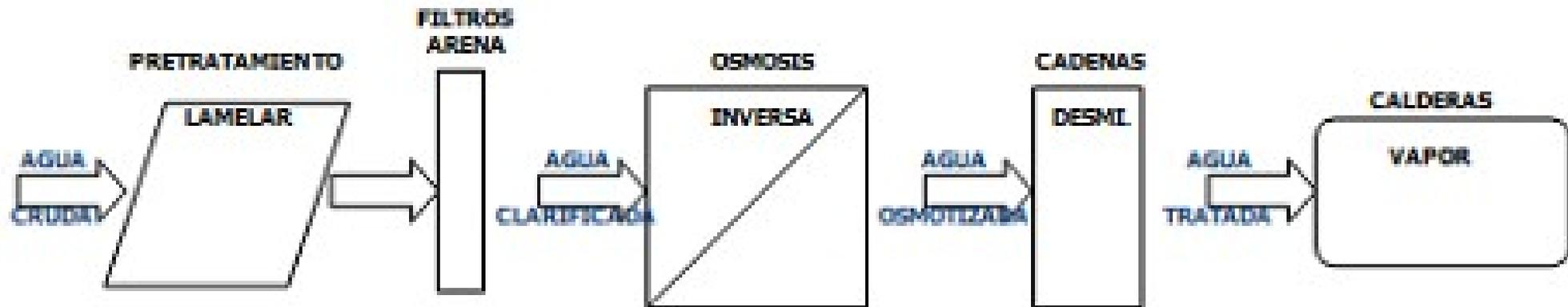
Calidad de agua: agua superficial pretratada

Filtros de arena

Conversión en torno al 60%

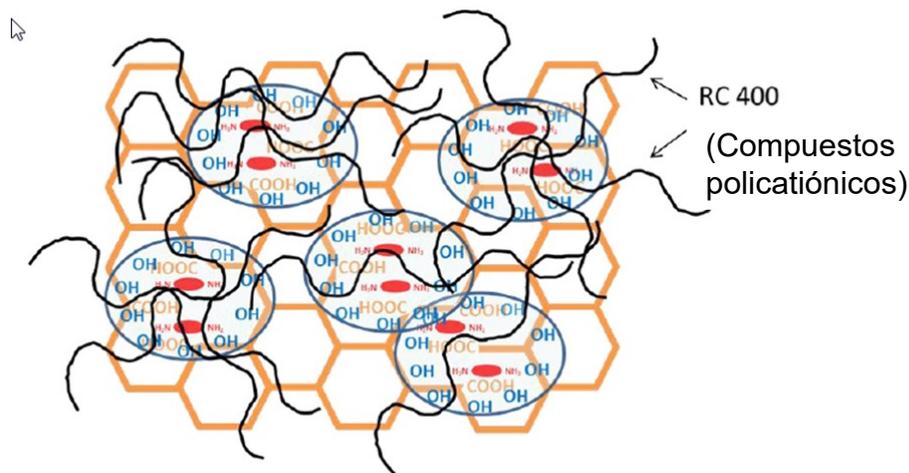
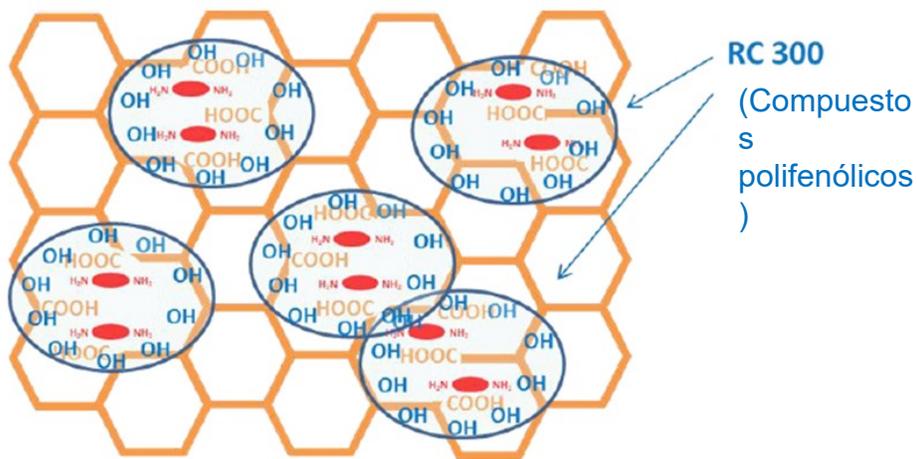
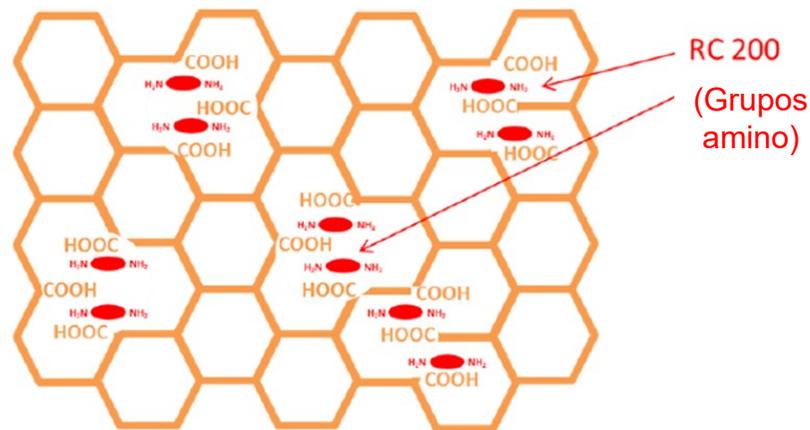
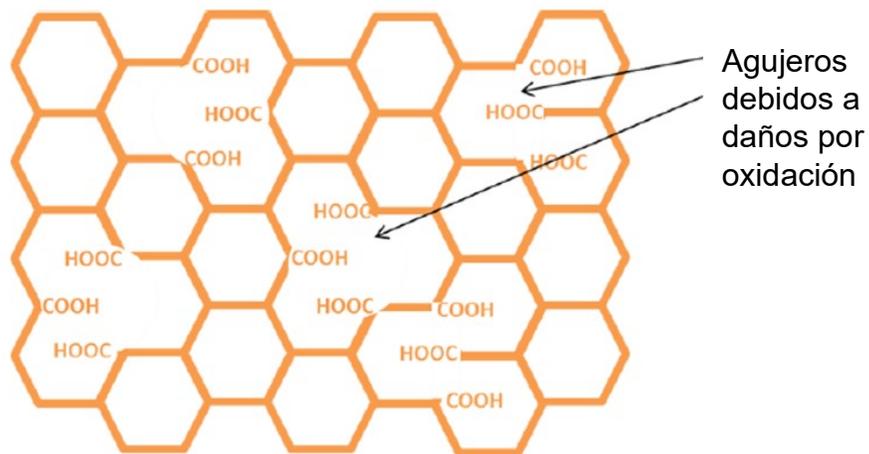
Agua de alimentación para cadenas de desmineralización

Posteriormente a caldera



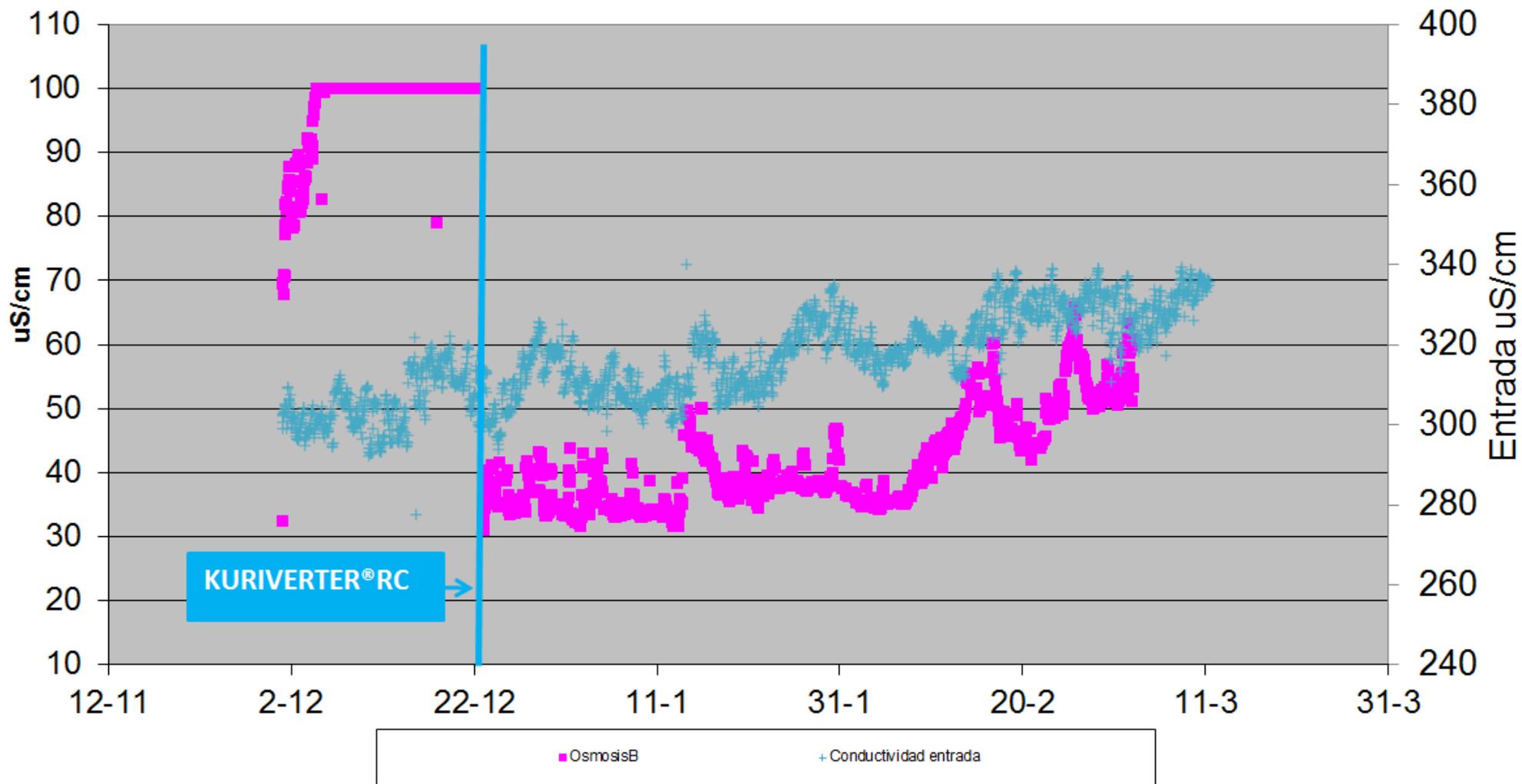
Kuriverter® RC

Regeneración de las membranas de ósmosis inversa con Kuriverter RC después de la limpieza química (ácida y alcalina)

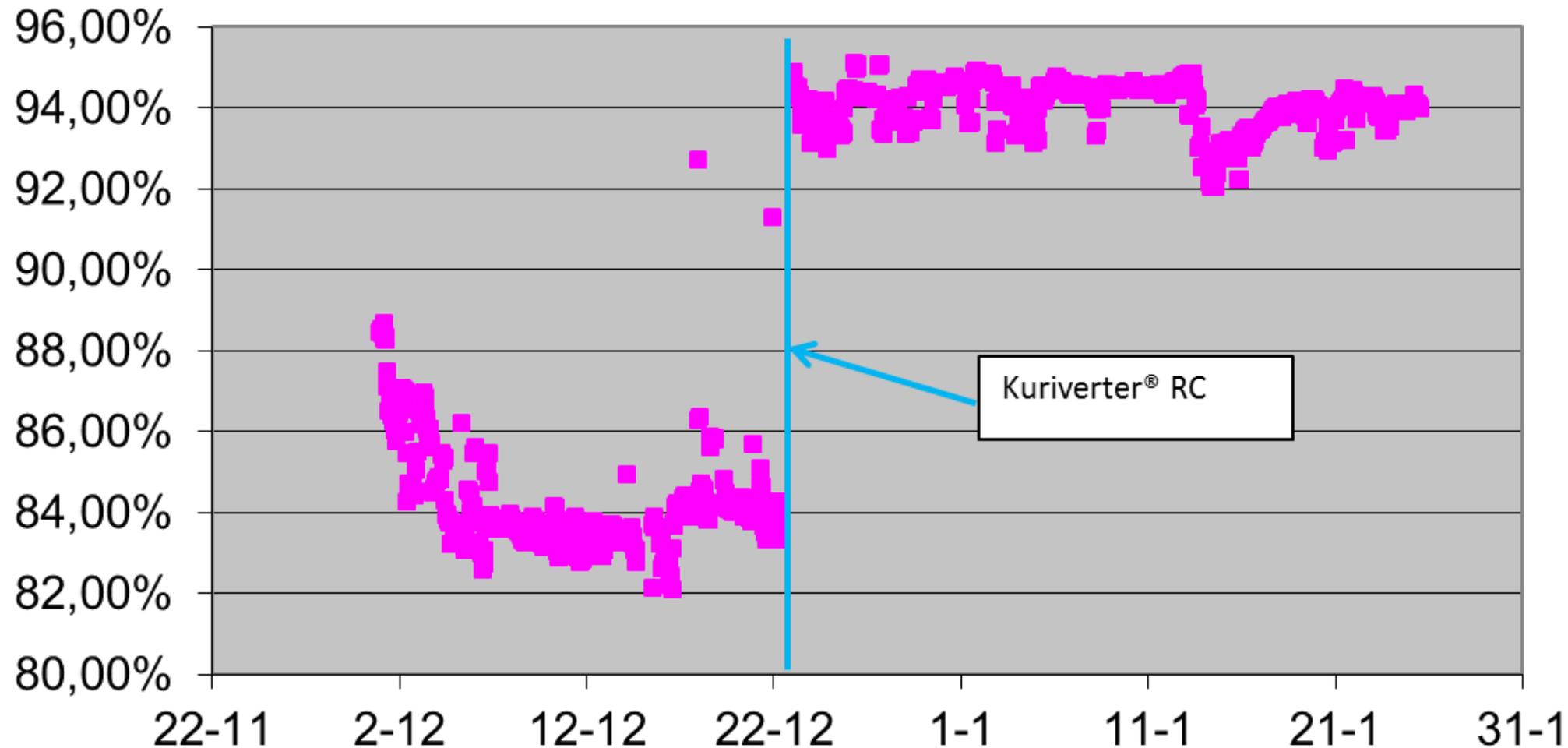


Área del gráfico

Evolución de la conductividad Osmosis

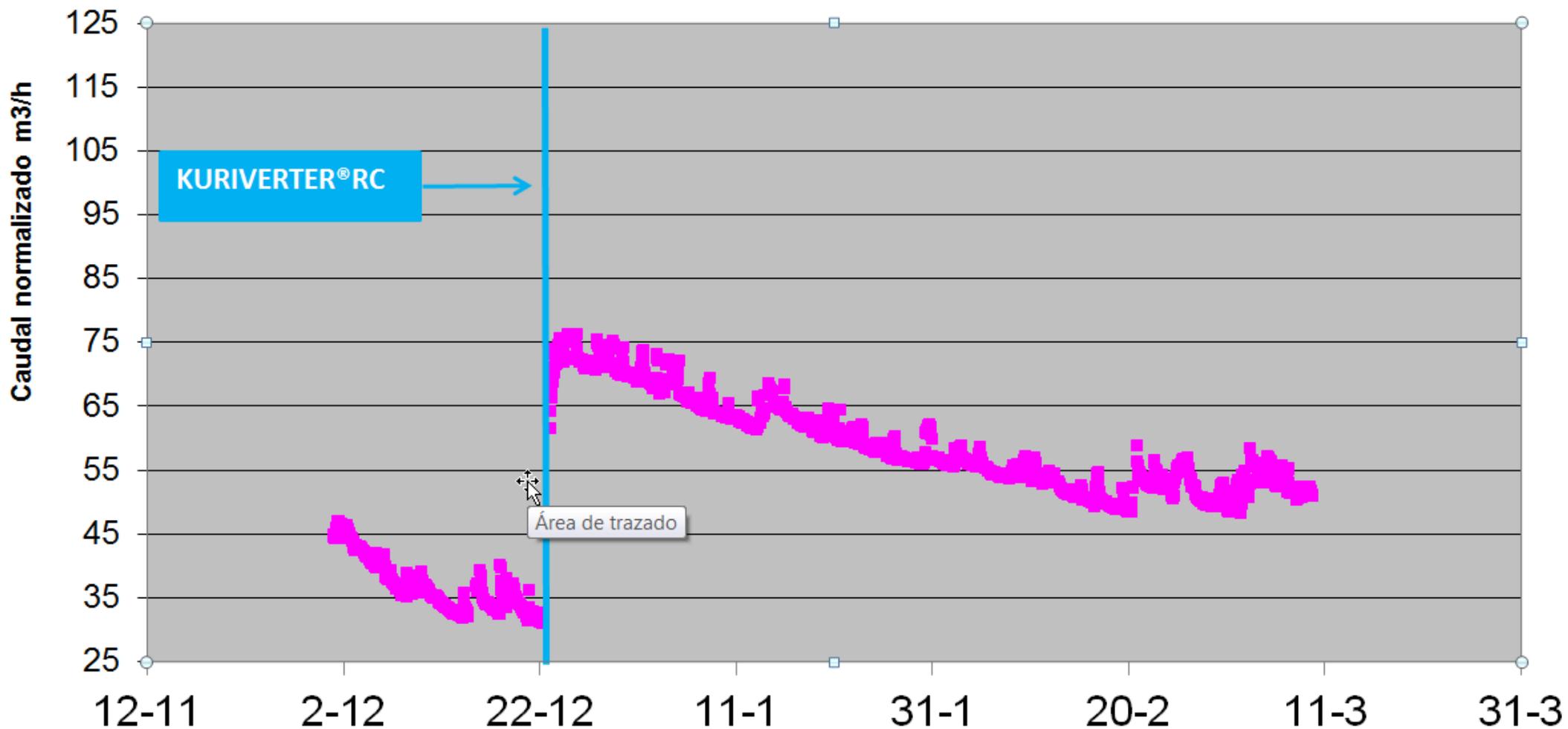


Evolución del % retención de sales

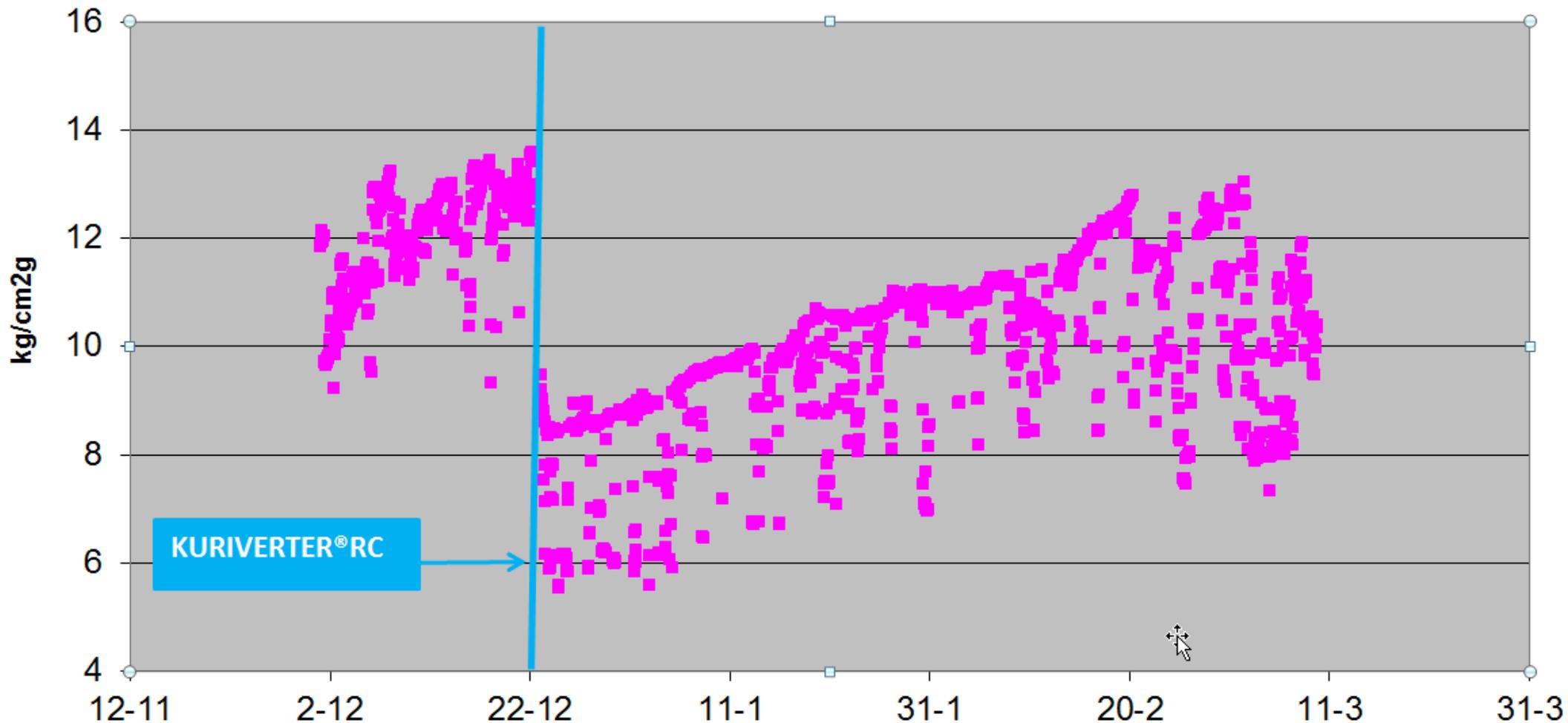


Kuriverter® RC

Evolución del caudal normalizado en osmosis



Evolución de la presión de entrada a la osmosis



New life for RO membranes thanks rejuvenation treatment
Innovative approach and treatment with Kuriverter® RC and Osmotech cleaners



1. Keywords

Kuriverter® RC, rejuvenation, Recovery, salts passage, oxidation, EDI, RO membranes, membrane substitution.

2. Background

A potential Kurita customer of combine cycle had problems with the RO membranes. Especially in summer times when the temperature goes up to 30-40 °C, they observed higher conductivity values (>30-40 µS/cm) which a direct adverse effect on the EDI behind the RO plant.

The most significant disadvantage of the problem is the number of cleanings necessary to keep the EDI running and consequently production downtimes and extra cost.



Kurita offered as solution RO cleaning products and Kuriverter® RC as a differentiation product and improve lifetime membranes in good working conditions.

3. Action/Approach

Kurita carried out a test with RO cleaners and two boxes of Kuriverter® RC, a product for 40 membranes

4. Objectives

- Improvement of cleaning protocols.
- Reduction of cleaning times.
- Increase the production of osmosed water.
- Lengthen the membranes life at least four extra months, duplicating the total lifetime.

5. Achievements

The application of Kuriverter® RC treatment and Kurita cleaning products delivered the following results;

1) Improve the membrane recovery rate:
After kuriverter® RC application, the recovery switch from 70% with a conductivity close to 20 µS/cm to 80% recovery conductivity around to 16 µS/cm.

The improvement in the recovery rate and conductivity results in the water production, guarantee water and energy saving and better efficiency during the daily work.

2) Cleaning RO products:
It was proposed a new cleaning protocol adjusted to the customer needs. The result was a 50% reduction in cleaning time with higher performance. From two working days shutdown to one, reducing cost, workforce time and increasing plant availability.

Kuriverter® RC – Impressive salt rejection recovery
Successful membrane rejuvenation in Steel industry



1. Keywords

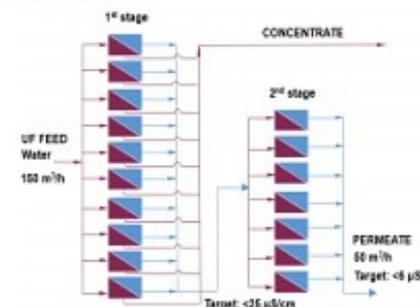
Reverse osmosis, membrane cleaning, Kuriverter® RC, rejuvenation, salt reject restore

2. Background

An important European stainless steel company installed a RO for the industrial water preparation for boiler feed water. In the pretreatment chlorine is used and neutralized before the RO with sulfite. Monthly an acid cleaning is applied and yearly an alkaline CIP is performed. After 3 years of membrane lifetime, the customer suspected oxidation problems in the first stage and requested Kurita support in order to restore the quality of permeate and decrease the permeate conductivity. As a solution Kurita offered Kuriverter® RC treatment.

3. System description

Plant scheme:



The plant is designed to produce 50m³/h from 150m³/h of feed water:

1 st stage	10 vessels	6 membranes per vessel
2 nd stage	7 vessels	6 membranes per vessel

- Standard Cleaning procedure applied in the first stage:
 - Monthly acid cleaning
 - Yearly alkaline cleaning

4. Objectives

Target of the plant is to obtain the following water quality:

- Conductivity 1st Stage < 25 µS/cm
- Conductivity 2nd Stage < 6 µS/cm

The real water quality before the treatment:

- Conductivity 1st Stage < 81 µS/cm
- Conductivity 2nd Stage < 13 µS/cm

5. Action/Approach

Membrane cleaning with 2% of Osmotech 2691
Working Temperature: 30°C
Recirculation time: 1h

Conservation of the system for 3h

Acid cleaning with 2% of Osmotech 2575
Working Temperature: 30°C
Recirculation time: 1h

Conservation of the system for 2h

Rejuvenation with Kuriverter® RC

PRODUCT DECLARATION

**KURIVERTER RC 200, 300 and 400 - Safe for Use in Reverse Osmosis Units
Producing Drinking Water for Human Consumption.**

To whom it may concern,

We hereby declare that according to our formula the product KURIVERTER RC 200, 300 and 400 contains components that meet the following standards :

KURIVERTER 200 : According to FDA Title 21 section 172.804 and 582.5145

KURIVERTER 300 : According to FDA Title 21 section 184.1097

KURIVERTER 400 : According to FDA Title 21 section 582.5411 and 184.1277

KURIVERTER RC 200,300 and 400 : Certified by NSF for use in RO units producing drinking water

<http://info.nsf.org/Certified/PwsChemicals/Listings.asp?CompanyName=kurita&>

Therefore we declare that KURIVERTER RC 200, 300 and 400 when used in accordance with the recommended applications and dosages set by Kurita, would be suitable cleaning and preventing biofouling in reverse osmosis units producing drinking water for human consumption.

The information provided is sensitive propriety information and should be treated with strict confidentiality at all times.

Kurita Europe APW GmbH

May 2015



Dave Johnson
Technical Manager - Water



Anna Icart
Technical Product Manager – Membrane
Technology and Cleaners



Kurita Europe GmbH
V.le Piero e Alberto Pirelli 6
20126 Milano (Mi)
Italy

Reference letter concerning the Membrane Rejuvenation performed by Kurita Europe GmbH

To whom it may concern

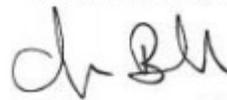
We, Marcegaglia, with the present, wish to express satisfaction with the results achieved with the application of the "Membrane Rejuvenation" technology of Kurita Europe GmbH.

Furthermore we would like to underline the following:

- Osmotech 2691 and Osmotech 2575 have proven very effective in cleaning the membranes;
- The Membrane Rejuvenation process, by means of Kuriverter RC package, has proven effective in restoring the functionality of the membranes previously damaged by oxidative agents.

Ravenna 10/07/17

Stefano Bardella
Water treatment Manager




Dirección General de Aguas del Gobierno de Canarias

“Encuentros de Innovación, Tecnologías y Desarrollos de Aguas en Canarias”



**CONTACTO:**

Pere Izquierdo
Business Director South Europe
pere.izquierdo@kurita.eu

Justo García
Chemical Engineering Canarias
jgarcia@lolagua.es

www.kurita.eu



Office IT: Kurita Europe GmbH, Viale Piero e Alberto Pirelli 6, 20126 Milano

Office ES: Kurita Iberica S.L, Avda. Alcalde Barnils 64-68, 08174 Sant Cugat del Vallés (Barcelona)

Office Canarias: León y Castillo 11, 5ºB (Las Palmas)