A RESILIENT FOOD SYSTEM

Process-water circularity

Every stream has a purpose.



PROCESS / MATERIAL / DUTY

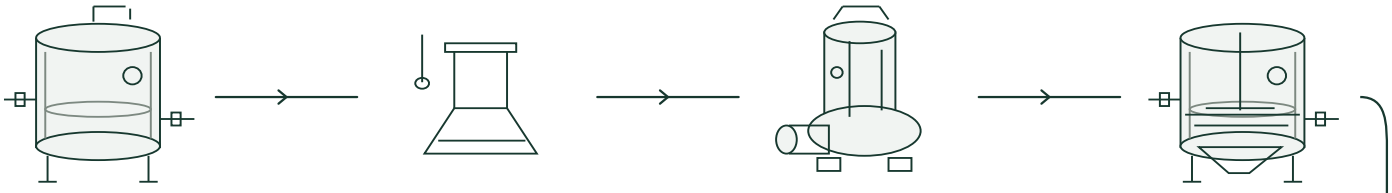
Water study.

Photo / Jamie Street

MATERIAL ROUTE / EQUIPMENT / BRANCHES

From separate water streams to verified reuse.

Segregated industrial effluent / fit-for-purpose reuse



Separate collection

Product, utility and effluent circuits

Water analysis

Organic load, salts, solids and variation

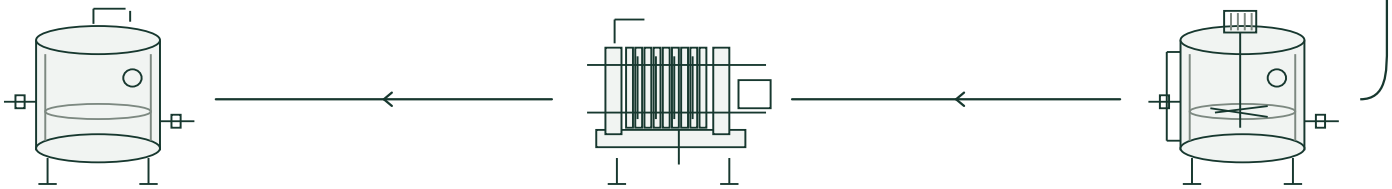
Effluent transfer

DanPumps S-WP2 family study

Primary treatment

Specialist removal of suspended load

Main product route / follow the connected material path.



Secondary treatment

Site-selected biological or other process

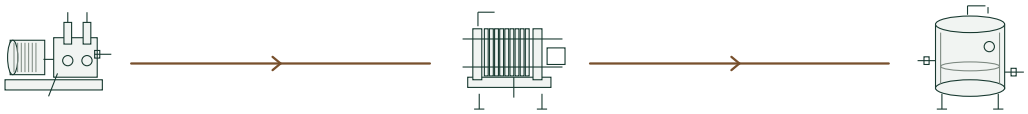
Polishing and verification

Barrier train matched to receiving duty

Permitted reuse

Acceptance limits; reject management

Sludge from treatment follows a separate dewatering route.



ABEL CM feed

Filter press

Cake / filtrate

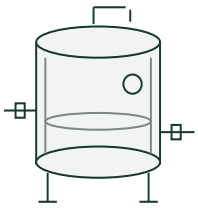
DanPumps / industrial effluent; ABEL CM / filter-press feed; SonFlow / heat exchange across separate circuits.

PROCESS STUDY / 01

Separate water before treating it

Map water by its source and intended destination. Product-bearing rinses, cooling water, condensate, sanitary wastewater and chemical cleaning returns differ in composition and risk. Keeping them separate can make recovery simpler. Screening and equalisation can protect downstream treatment from large debris and abrupt changes in flow or pH. Measure both pollutant concentration and total load: a small concentrated stream may dominate the treatment duty. A DanPumps wastewater transfer selection belongs at collection or equalisation, where solids passage and installation conditions matter. It does not make the water suitable for reuse. Treatment design starts with the water-quality specification at the next point of use.

OPERATION STUDY / SELECTED PROCESS DETAILS



Map and segregate

Separate food-contact, utility and wastewater streams at their origin.



Characterise the water

Measure temperature, solids, chemistry and variability before equipment selection.

Explanatory equipment studies / configuration, controls and treatment conditions follow the selected product route.

PROCESS STUDY / 02

Build barriers around the intended use



Drinking-water treatment plant; a reference for the dedicated water-treatment duty.

Photo / Eric Vance / US EPA

The required treatment depends on the receiving duty. Clarification, biological treatment, membrane separation and disinfection have distinct functions and should be selected by a water-treatment specialist. Utility reuse and direct product-contact reuse cannot share an assumed specification. Identify a monitoring point after each relevant barrier, and establish how water is diverted when a limit is exceeded. Recovery may need storage because production and demand occur at different times. Storage changes the microbiological and hydraulic assessment. A separate heat exchanger can recover sensible heat where temperature and fouling conditions are favourable, while keeping source and receiving circuits physically distinct.

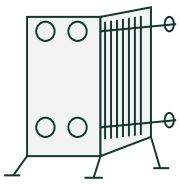
Reuse suitability is determined by water quality, the intended application and the plant's approved hygiene controls.

PROCESS STUDY / 03

Sludge is part of the water route

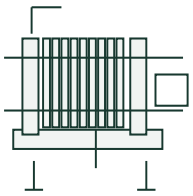
Treatment concentrates some pollutants into sludge, which must leave the system reliably. Thickening reduces the water carried forward; dewatering produces a cake for an identified disposal or recovery route. If a filter press is chosen, its feed pressure rises during the cycle and the pump must respond as flow falls. ABEL CM or HM can be assessed for that duty according to solids, abrasiveness and pressure. An ABEL CM is a separate candidate for lower-pressure sludge transfer. The press, not the pump, separates water from solids. Collect filtrate according to its quality and return it only to a suitable treatment point; otherwise contaminants can accumulate within the loop.

OPERATION STUDY / SELECTED PROCESS DETAILS



Recover useful heat

Exchange heat across physically separate circuits where duties allow.



Manage residual sludge

Feed a separate dewatering process and collect its filtrate.



Monitor reuse

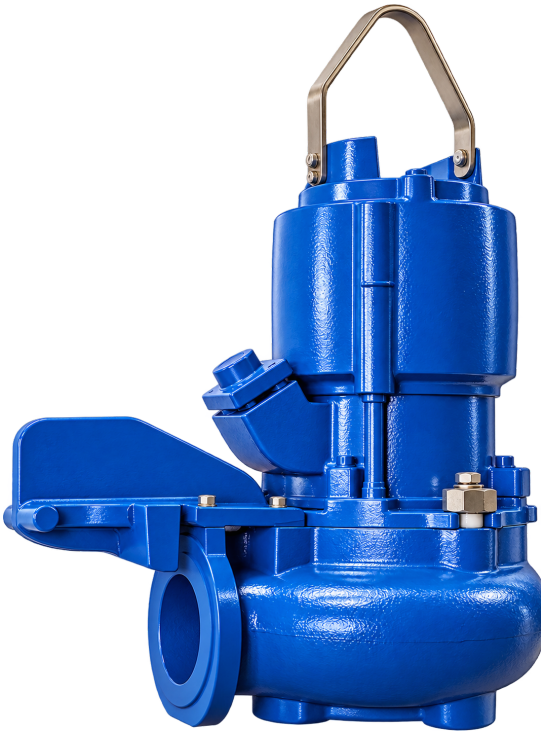
Track consumption, return quality and operating conditions over time.

Explanatory equipment studies / configuration, controls and treatment conditions follow the selected product route.

DANPUMPS / S-WP2 / WASTEWATER FAMILY STUDY

Effluent transfer

The S-WP range is intended for industrial wastewater duties. In this route it serves the wastewater side, with the impeller chosen for the solids present. Check temperature, materials, suction conditions and actual duty before selection.



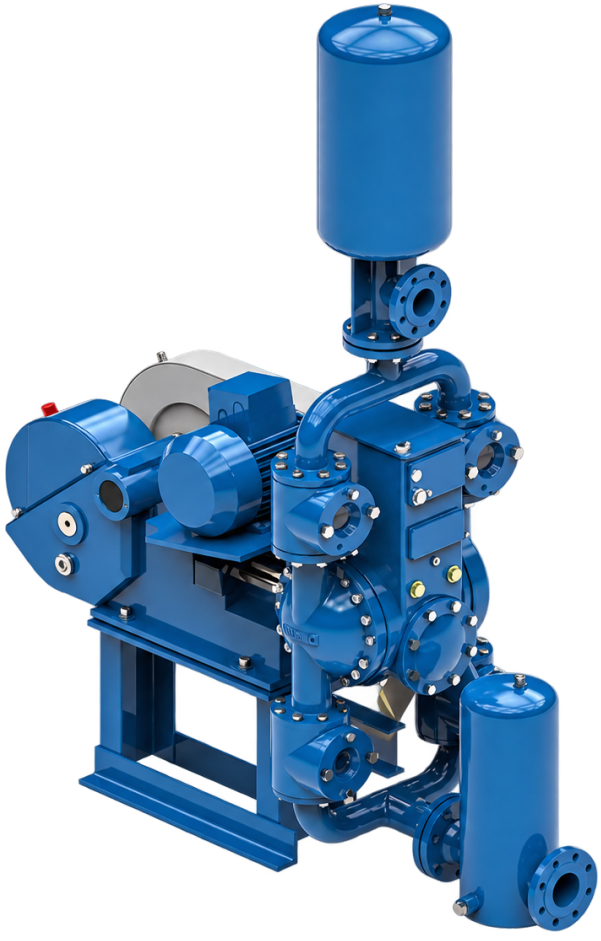
DANPUMPS / S-WP2 WASTEWATER FAMILY STUDY

The cutout depicts S-WP2. The exact size, impeller and installation must be selected from actual wastewater flow, head, solids and operating conditions. It is not assigned to the food-product path.

EXPLORE DANPUMPS /

ABEL / CM / FILTER-PRESS FEED

Feed the dewatering cycle.



Where the site selects filter-press dewatering, an ABEL CM can be assessed as the feed pump. The pressure and flow change through the filling and pressing cycle.

ABEL / CM COMPACT DIAPHRAGM FAMILY

The press performs separation. Specify solids, abrasiveness, chemistry, suction and the pressure cycle; do not substitute this auxiliary duty for product clarification.

EXPLORE ABEL /

SONFLOW / GASKETED EXCHANGER / RECOVERY STUDY

Recover heat across separate circuits.

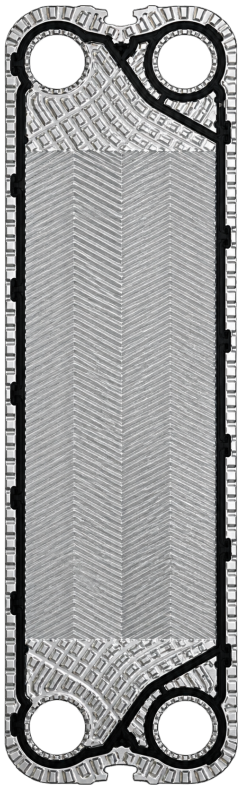


PLATE / FLOW PASSAGE



FRAME / COMPLETE UNIT

Assess warm treated water or another defined source against a compatible receiving-water duty. Keep the circuits physically separate and select the exchanger for fouling, corrosion, pressure drop and cleaning access.

A heat exchanger does not make wastewater suitable for reuse. Water treatment, receiving-duty acceptance, separation integrity and temperature demand require their own verification.

EXPLORE SONFLOW /

CONTROL THE PROCESS OUTCOME

Define the reuse boundary.

Use a source-to-destination water map with clear acceptance criteria, sample locations and diversion logic. Trend conductivity, suspended solids and the chemical or microbiological parameters relevant to the selected use. Check cleaning chemicals and allergen carryover where applicable. Recovered water should never be labelled potable or food-contact suitable solely because it looks clear. Validate treatment and storage together under the operating and regulatory requirements of the site.



Water at the point of use.

Photo / Andrea Davis

VERIFY AT THE RELEASE POINT

A practical route begins by segregating streams at source. Characterise flow, temperature, solids and cleaning chemicals before choosing a treatment train. Screening, biological treatment, membrane filtration or disinfection may be needed; these are specialist treatment stages. Keep reusable water in a dedicated circuit and confirm its quality against the intended use. Recover heat where a suitable source and demand coincide. Collect treatment sludge separately for dewatering. Record the water balance through normal production and cleaning periods so that any proposed improvement can be checked after installation.

THE AUXILIARY ROUTE

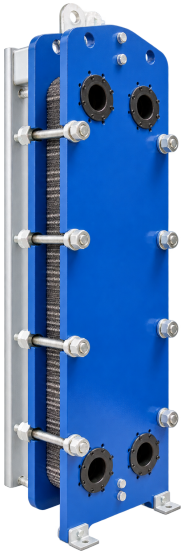
Measure volume and load.

Report fresh-water intake, recovered volume, reject volume and sludge production for the same operating period. Reducing a discharge volume can increase its concentration, so examine both flow and pollutant load. Match warm-water recovery to a simultaneous heat demand or suitable storage. Include circulation power, membrane cleaning and reject handling in the comparison. A smaller water bill alone is not a complete resource assessment.



Water discharge at Tereos Syral, Aalst; a reference for the residual-water branch.

Photo / AnonymousUnknown author / CC0 / cropped & resized



FREE FLOW / PLATE AND EXCHANGER STUDIES

EXPLORE THE RELATED EQUIPMENT /

TURN THE ROUTE INTO A USEFUL ENQUIRY

Specify the material. Define the duty.

Begin the discussion with a stream map and representative analyses. Provide minimum, normal and peak flow, temperatures across production and cleaning, solids characteristics and the proposed reuse destination. Identify existing treatment equipment, available space and the sludge-dewatering cycle. Include the current intake and discharge volumes so the project has a baseline. Review changes with the site's hygiene and wastewater specialists before setting acceptance criteria.

01 Source-by-source water analysis

02 Receiving-use specification

03 Peak flow and pH variation

04 Sludge solids and filter-press cycle

05 Storage, monitoring and diversion strategy

RESEARCH BASIS / SELECTED PRIMARY REFERENCES

Category framing: water availability and circularity / Treatment/reuse context and distinction between recovery and pumping / DanPumps / S-WP / SonFlow / Free Flow / ABEL / HM / ABEL / HM

PHOTOGRAPHIC REFERENCES

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BEGIN THE CONVERSATION

From a precise brief to a considered choice.

Tell us about your stream, the operating conditions and the result you want to achieve.

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Process-water circularity / A resilient food system