SECO
Desiccant/enthalpy/ dehumidification rotors

KLINGENBURG
ENERGY RECOVERY

Desiccant/enthalpy/dehumidification rotor SECO

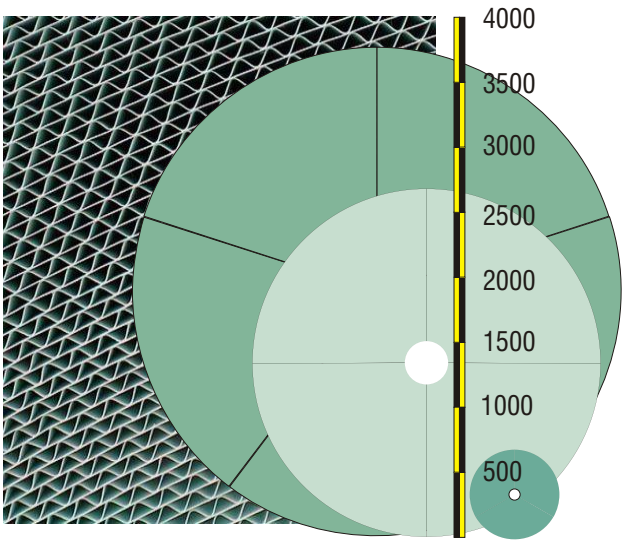
Desiccant rotor SECO

for dehumification and total energy recovery

The desiccant rotor SECO is a further development of the traditional energy recovery rotor. The matrix is constructed of cellulose. It has a very high capacity for moisture absorption.

It absorbs moisture from the process air which flows through the matrix. By rotation the moisture is transfered by the counterflow principle.

SECO is characterised by a very high sorption and desorption speed and a high specific capacity while the sorption energy heat capacity is low.



The advantages of sorption-based air conditioning

Reduction of installed electrical load.

Recirculation of air not necessary - purely outside-air mode is possible.

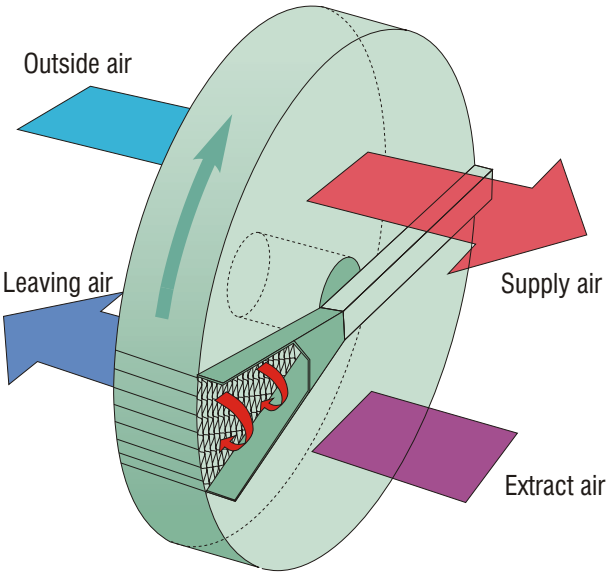
Simple, energy-efficient integration of compression-type refrigeration systems possible.

The SECO can be used as a sorption regenerator at low speeds (max. 20 rph) for air dehumidification with heater.

- Utilization of cheap surplus heat, e.g. unused transmitted heat or solar energy in the 40 to 70°C (104 to 158°F) temperature range.

The SECO can be used as an enthalpy regenerator at higher speeds (max. 10 rpm)

- Moisture recovery economizes on humidifier output.



Separation of cooling and dehumidification

In summer, the SECO drying rotor can be used in combination with compression-type refrigeration systems for dehumidification of outside air.

- The evaporator in the intake air flow is used only for cooling of incoming air.
- In summer, incoming air is not dried by means of temperatures below the dewpoint at the evaporator, thus achieving higher evaporation temperatures, higher performance figures (up to 25 %) for the refrigeration set, and permitting smaller refrigeration systems in the air-conditioner.
- Energy-savings thanks to reduction of installed electrical load.
- No need for additional incoming-air reheat.
- Improved conditions for the use of space-cooling surfaces, e.g. cooling blankets.

Advantages

The SECO sorption/enthalpy regenerator is safe in health terms.

The lithium chloride used as the sorbent has a bactericidal effect, perfect from the hygienic point of view.

Cellulose-based rotor matrix / no migration of fibres - therefore no materials damaging to the human lung.

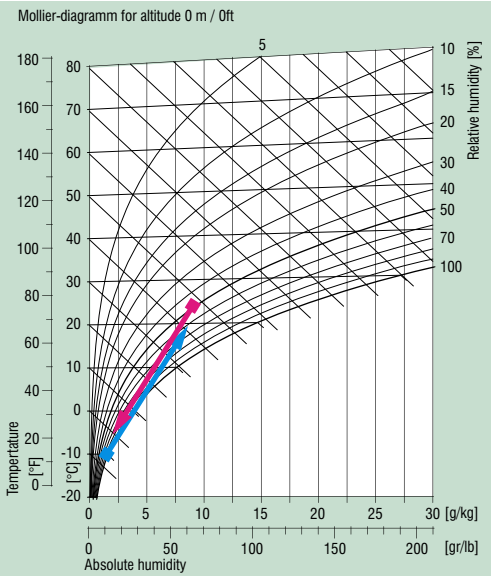
No danger of icing up

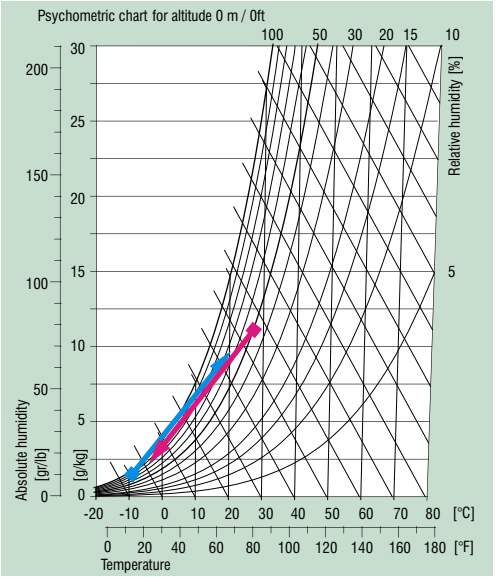
Absorption, thus no formation of odours.

Desiccant rotor for both applications: total energy recovery and dehumidification with - or without additional regeneration air heating.

Moisture transfer up to 740 kg/h / 1600 lb/h (SECO 3000 with 35000 m^3/h (20600 cfm) at 22°C(72°F)/40%r.H. extract air, 35°C(95°F)/80%r.H. outside air)

Applications of the SECO



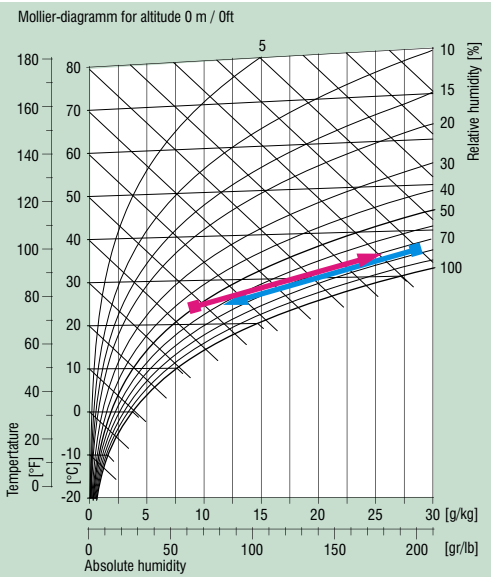


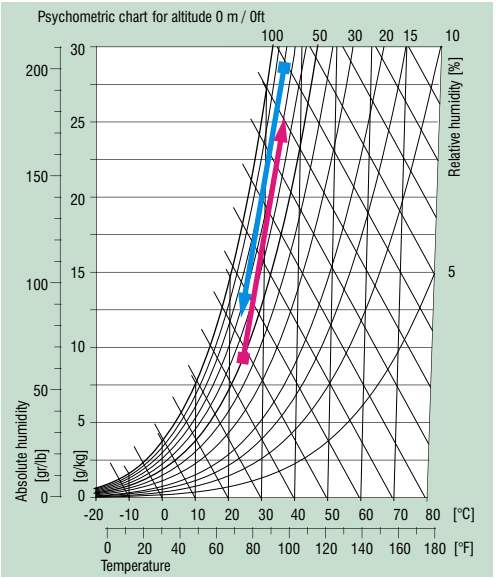
Enthalpy recovery / total energy recovery

Energy recovery with high efficiencies in heat and moisture transfer.

Total efficiency up to 85%

Operation with speed 10rpm



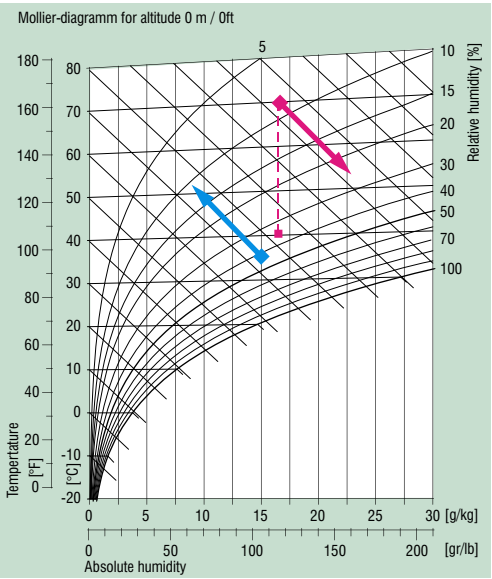


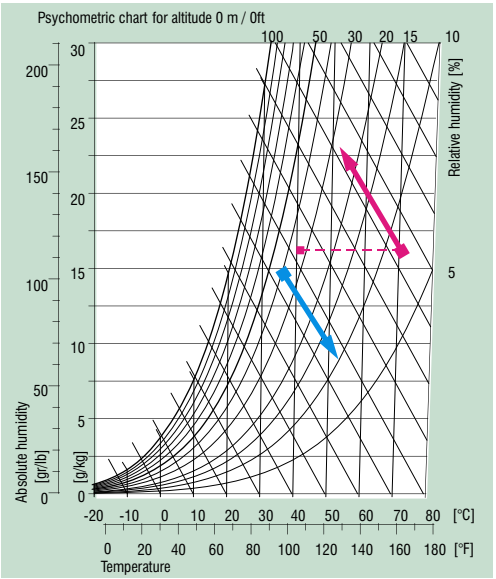
Enthalpy exchange / dehumidification

At high outside humidities, high dehumidification capacity without any additional heat requirement

Total efficiency up to 85%

Operation with speed 10rpm





Dehumidification

Dehumidification at low differences of absolute entry humidity with additional heater.

High dehumidification capacity with low additional heat requirement, temperatures up to 70°C (158°F) are sufficient.

Operation with speed 20rph

Technical informations

The matrix

Ends protected by means of syntetic-resin-based edge reinforcements.

The utilisation of waste heat and district heat for the heating of regeneration air is possible.

The matrix material cellulose is a natural product, which has a natural shrinkage and extensibility.
Thus temporary irregularities may occur. This effect has no influence on function and stability of the rotor matrix.

Frame structure

Low weight combined with high stability thanks to tried and proven corrosion-resistant rectangular-section aluminium frame structure.

Frames available in all sizes to permit individual matching with system dimensions.

Horizontal or vertical division of air flows possible as required.

Sealing system

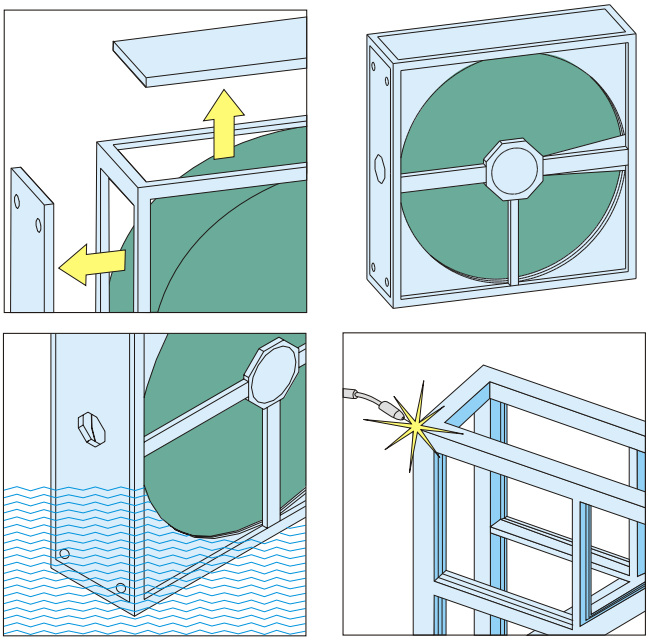
A special flexible contact-sealing system guarantees minimum leakage.

The purge section

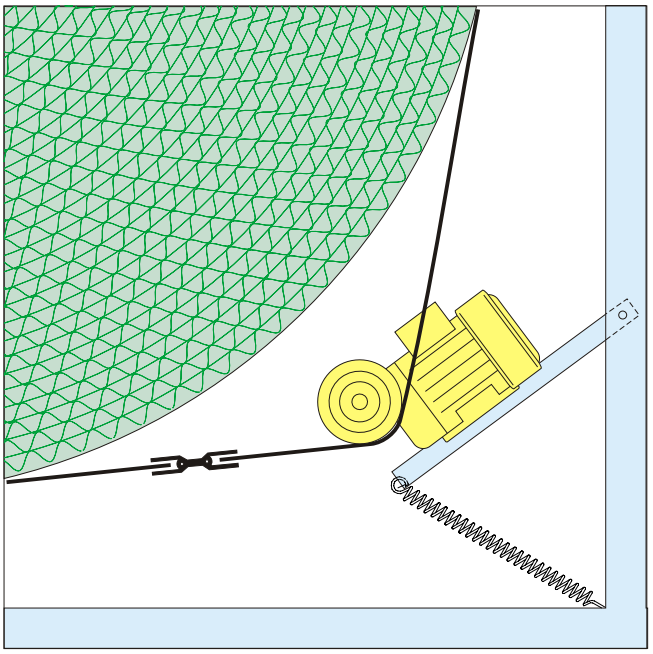
To prevent the transfer of waste air to the fresh air supply through simultaneous rotation, the SECO can be equipped with a purge section.

In order to guarantee the correct function of the purge section, a lower pressure from the exhaust air into the supply air in the system has to be taken into consideration.

The housing



Drive



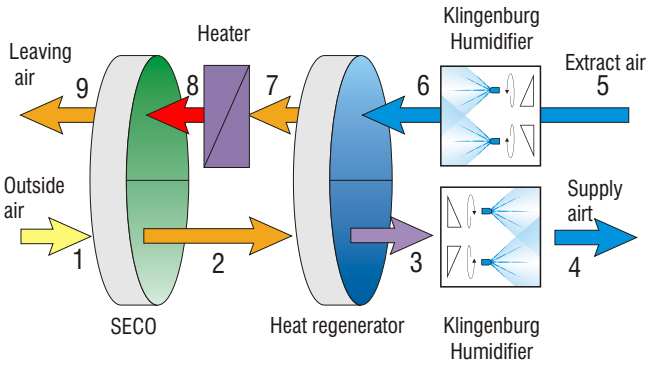
Rotor is driven by a three-phase asynchronous motor the rotational speed of which is adjusted by means of a frequency inverter.

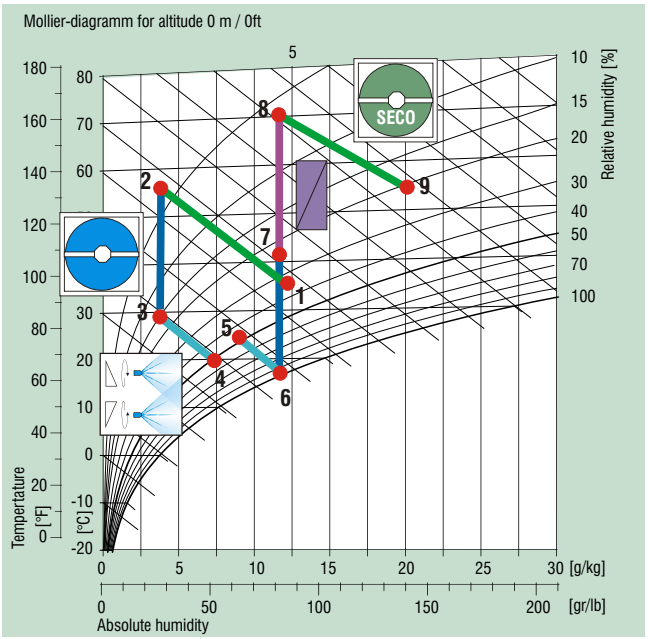
Drive can be changed over to dehumidification operation with heater (max. 20 rph rotational speed) or enthalpy operation (max. 10 rpm).

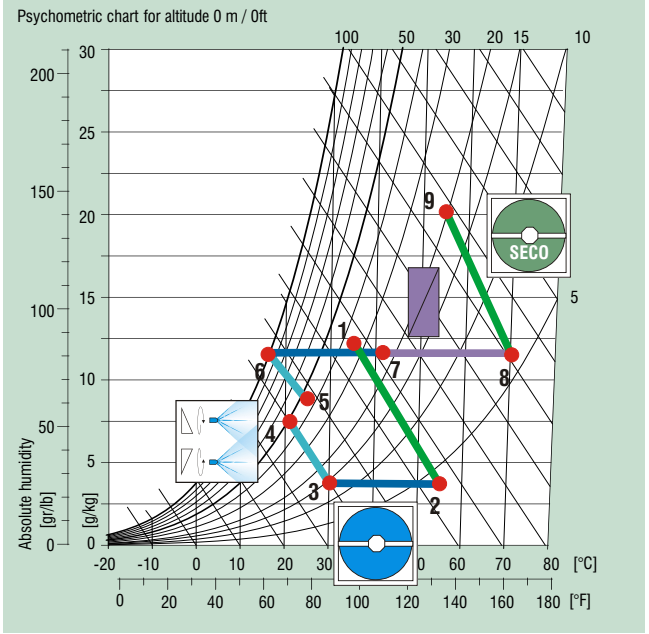
Self-tensioning V-belt through motor rocker plate for rotor drive.

Further informations

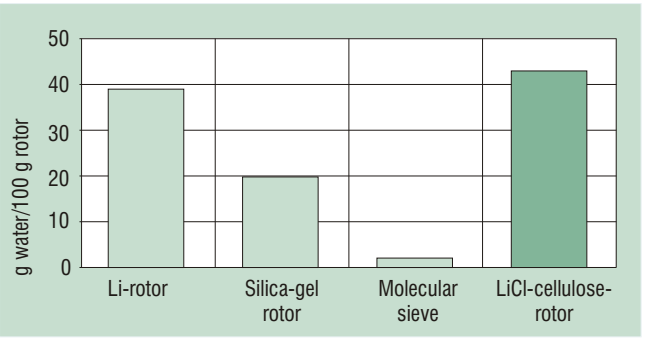
Diagram in principle of a DEC system

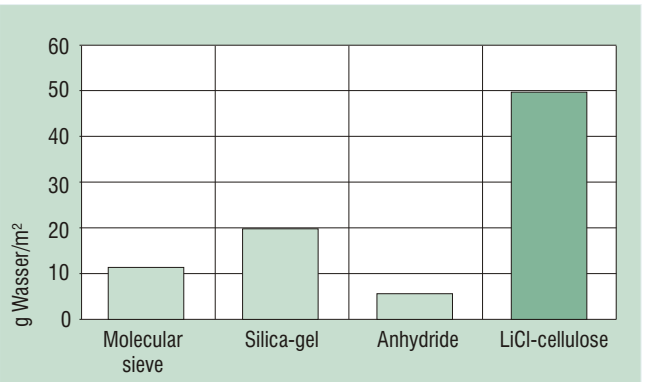






The water-absorption of various base materials





Economic benefits

The SECO improves cost/benefit ratio, despite the fact that it is a high-investment component.

Energy-savings all over the year, due to recovery of cooling thermal energy and moisture transfer.

Lower regeneration temperatures than most other rotors.

Primary-energy efficiency better than in conventional air-conditioning systems.

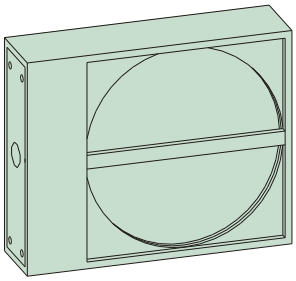
At high outside-air humidities ("sultry" weather), SECO achieves high dehumidification without additional heat.

Layout

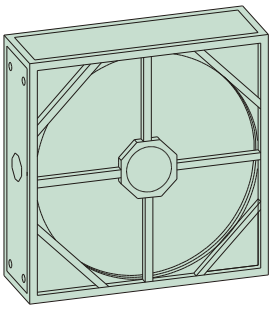
Comprehensive measurements were performed at the institute for Air and Refrigeration Engineering in Dresden/ Germany, to determine and optimize the system's performance; the results were used for development of our computer software. Please contact our quotation department to obtain a calculation.

SECO sizes

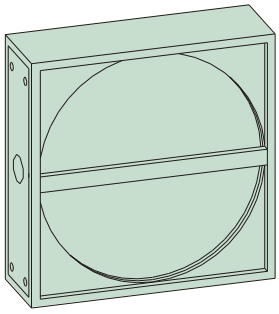
SECO 600-800



SECO 2000

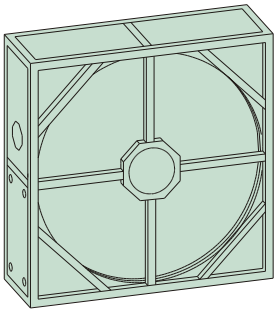


SECO 1000

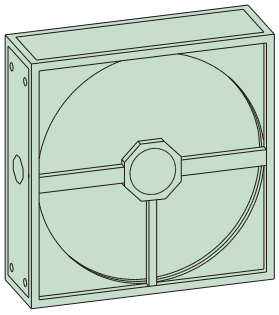


SECO 2250

SECO 2500 undivided

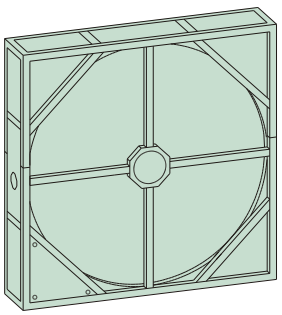


SECO 1250-1750



SECO 2500-3000

divided



We would be glad
to perform a computer design
and economy calculation to
DIN standards for you.
Just contact us!

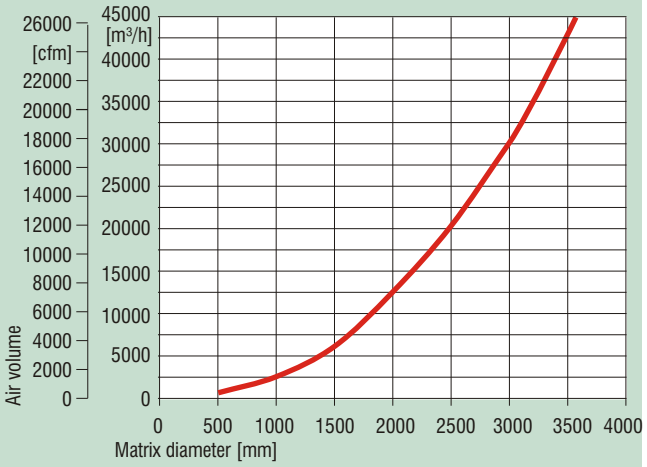
SECO sizes

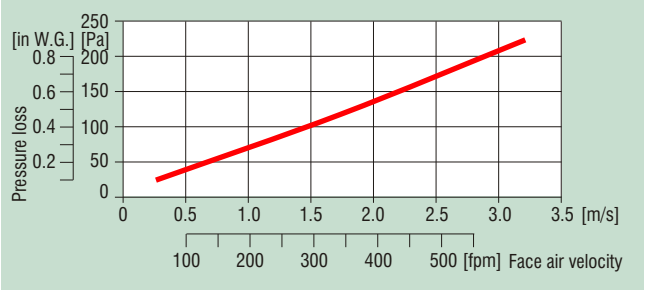
SECO-type	Rotor dia. [mm]	Height [mm]	Width [mm]	Depth [mm]
600	495	600	750	450
800	695	800	900	450
1000	895	1000	1000	450
1250	1160	1250	1250	450
1500	1410	1500	1500	450
1750	1660	1750	1750	450
2000	1910	2000	2000	450
2250	2120	2250	2250	490
2500	2370	2500	2500	490
2750	2630	2750	2750	490
3000	2800	3000	3000	560

Note: Above SECO size 2500 matrix and housing are divided

Further sizes on request!

Diagram for selection of a suitable SECO size





We reserve the right to introduce technical changes and alterations without prior notice / 11-2008

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