

**WE ARE KAPP,
HEAT TRANSFER ENGINEERS.**

**OUR FOCUS IS THE BEST
SOLUTION TO YOUR
CHALLENGE.**



40% of energy of the Dutch process industry is used for heat, total 570 PJ



Heat Transfer is often bottleneck:

- **Fouling/reliability -> Kapp Solves**
- **Footprint/approach/CAPEX -> Kapp Enables**

Nationale Energiebesparings- en Efficiëntie event

*Warmteterugwinning uit vochtige lucht
Hoe Kapp pinch analyse inzet om het gasgebruik
van Lemoine te reduceren door restwarmte uit
wattenproductie te gebruiken als voorverwarming.*

- Over Kapp
- Casus Lemoine
- Elektrische luchtverwarming

KAPP



**OUR PARTNERS IN
HEAT EXCHANGE**

Kelvion



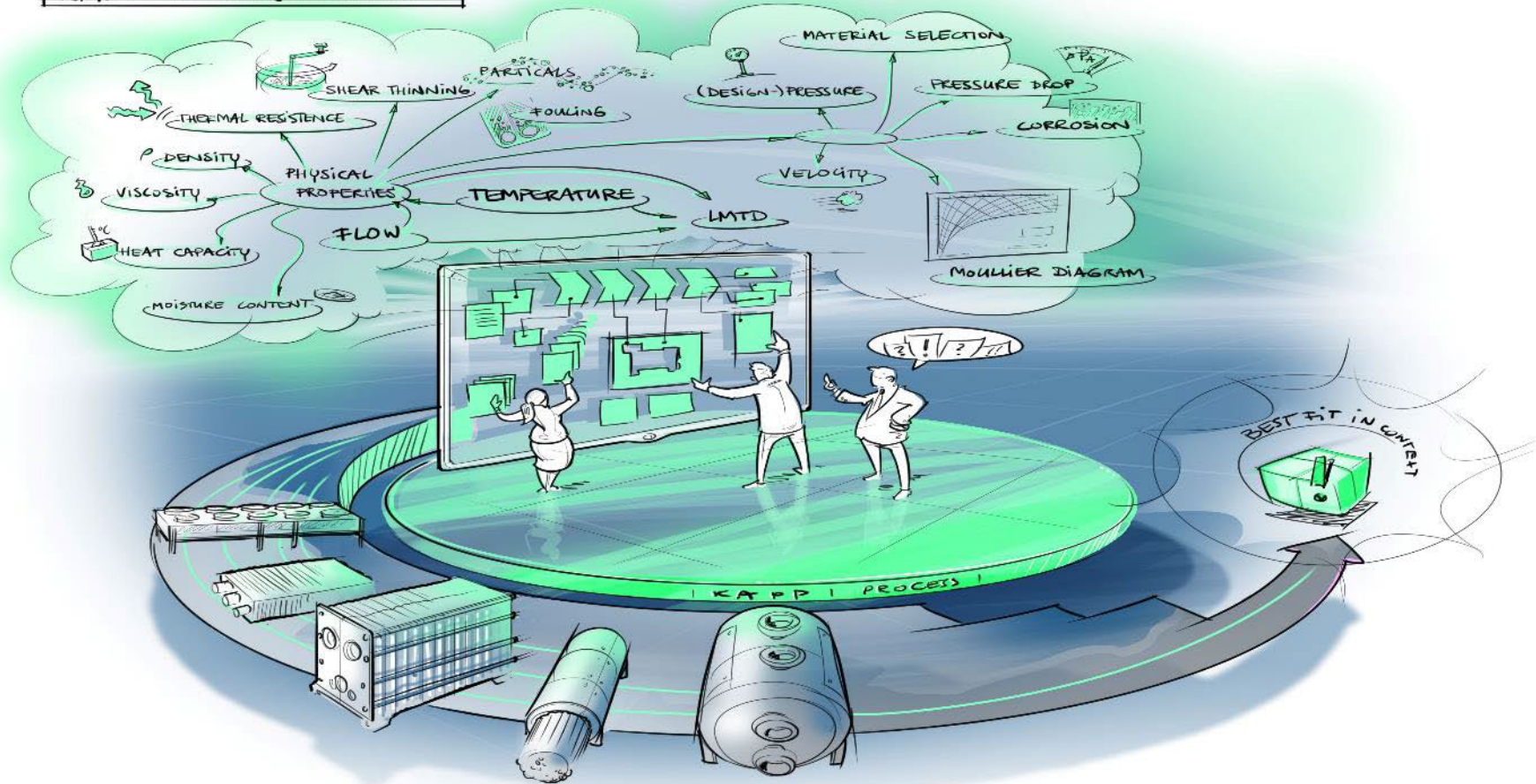
VAHTERUS

HRS^o
heat exchangers



HTRI

KAPP DESIGN PROCESS



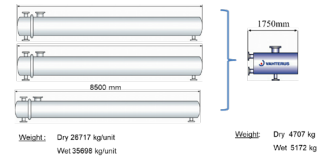
KAPP

OUR SCOPE OF SERVICES

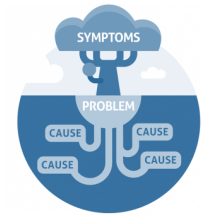
Heat Transfer Engineering

HTRI

**Selection, design
and rating of
ALL types of HE**



**Technology
Conversion
Studies**



**Root cause
analysis**

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OUR SCOPE OF HEAT EXCHANGERS

Standard Plate
Heat Exchangers



Gasketed Plate HE



**Semi Laser welded
Plate HE**



Brazed Plate HE

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OUR SCOPE OF HEAT EXCHANGERS

Welded Plate
Heat Exchangers



Welded Plate & Shell HE



**Welded Block
Plate HE**

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OUR SCOPE OF HEAT EXCHANGERS

Shell & Tube
Heat Exchangers



**Standard Shell &
Tube HE**



**Customized Shell
& Tube HE**



**Scraped Shell
& Tube HE**

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OUR SCOPE OF HEAT EXCHANGERS

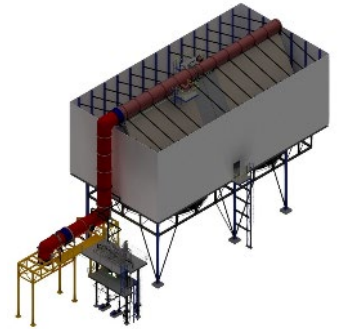
Finned Tube
Heat Exchangers



Finned Tube HE



Air coolers



**Air Cooled
Condensers**

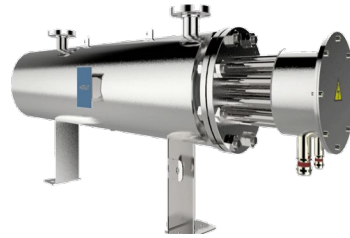
KAPP

OUR SCOPE OF HEAT EXCHANGERS

... and more types of
Heat Exchangers



Spiral HE



**Electrical
Process Heater**



**Printed Circuit
Heat Exchanger**

FROM SMALL ...



... TO LARGE

KNOWLEDGE



Kapp has **over twenty-five years of experience** and works with a compact team that gains **direct access to the R&D teams of our partners.**

DESIGN



Our major investment takes place during the offer process. We already provide insight in **various solutions and associated results** in that phase.

IMPACT

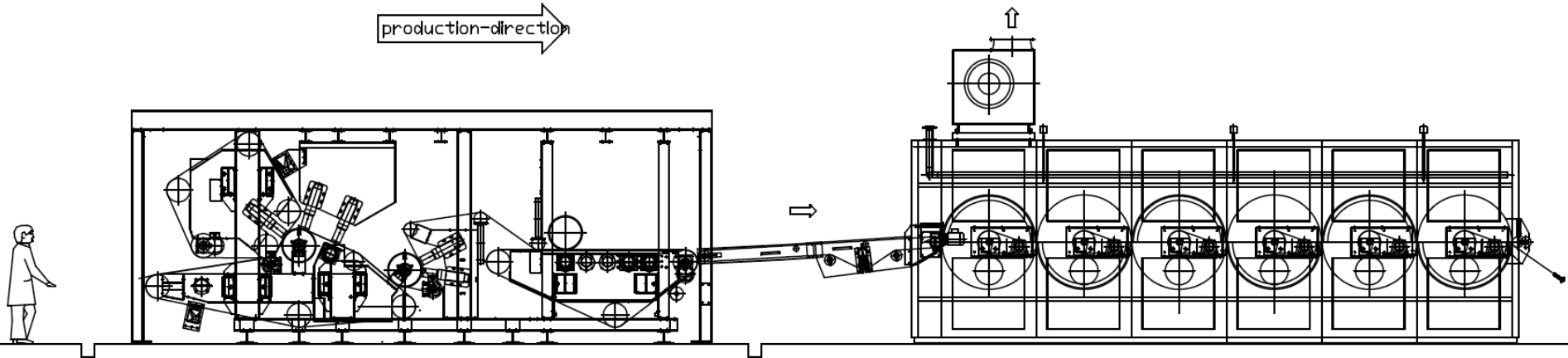


We substantially **contribute to our customers' energy saving and CO2 reduction.** We thus increase their lead on the competition.

KAPP



Onderzoek - warme recuperatie Lemoine

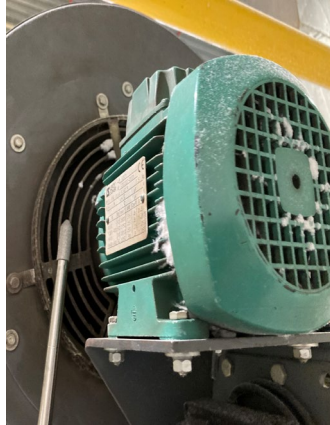


METINGEN

4 meetpunten (8 November 2022)



Lijn 3 uitlaat



Lijn 3 inlaat



Lijn 3 vacuüm



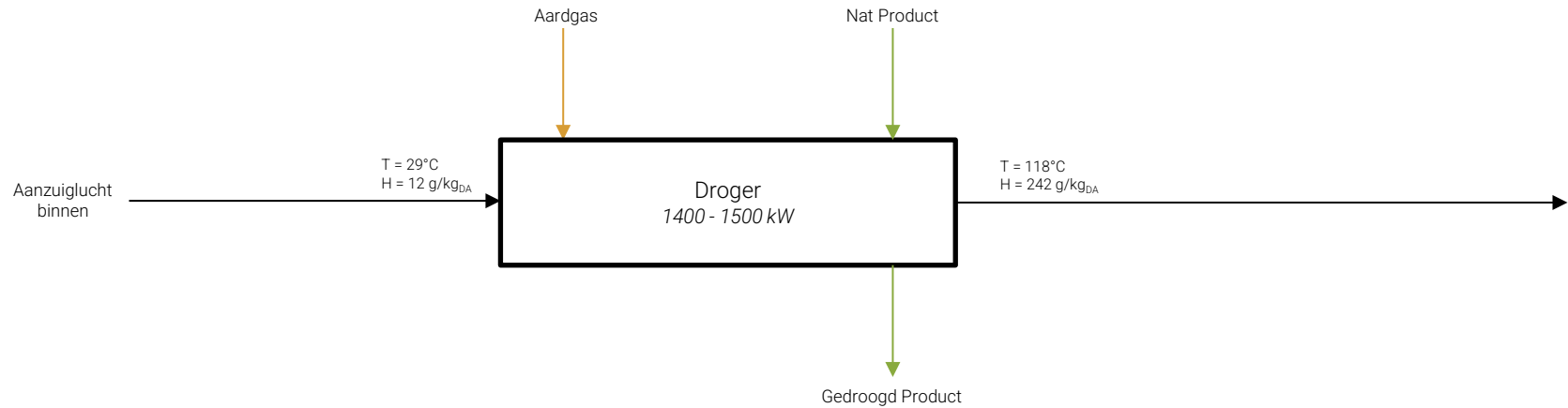
Lijn 2 uitlaat

METINGEN

Meetpunt en Condities			Metingen			Berekende	
Meetpunt	Bedrijf gewicht	Afvoer	Flow [m³/h]	Temp [°C]	Relatieve vochtigheid	Absolute vochtigheid [g/kg _{DA}]	Dauwpunt [°C]
Lijn 3 uitlaat	190 g	70%	10.600*	118*	15,0%*	242	67,8
=	220 g	65%	10.050*	124*	13,9%*	279	70,0
Lijn 3 inlaat	-	-	-	29,2*	47,4%*	12	16,8
Lijn 3 vacuüm	-	-	6.800	50,8	23,3%	19	24

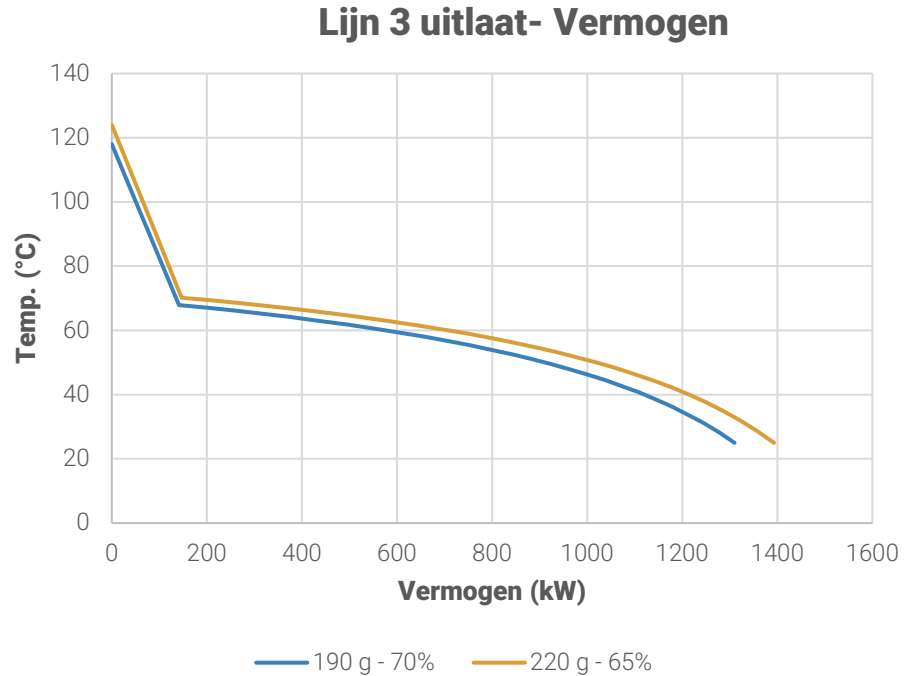
*Duplo-metingen

HUIDIGE OPSTELLING

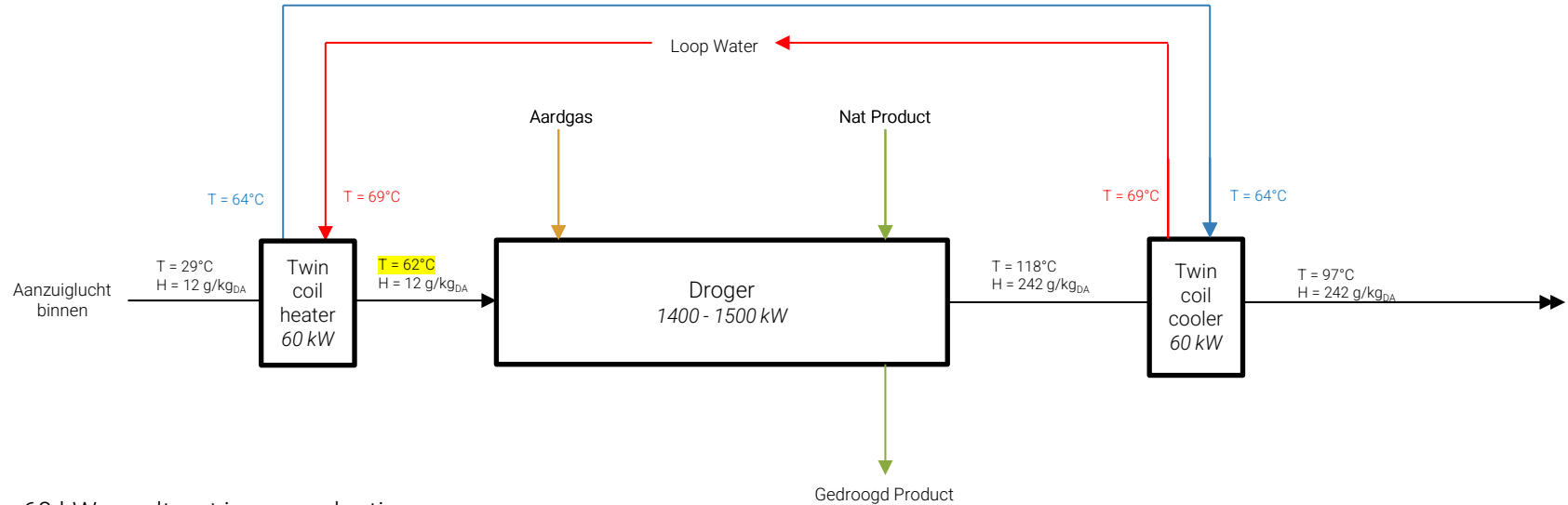


BESCHIKBAAR VERMOGEN

- ~90% Vermogen is verkrijgbaar uit condensatie
- Laagwaardige energie <67°C



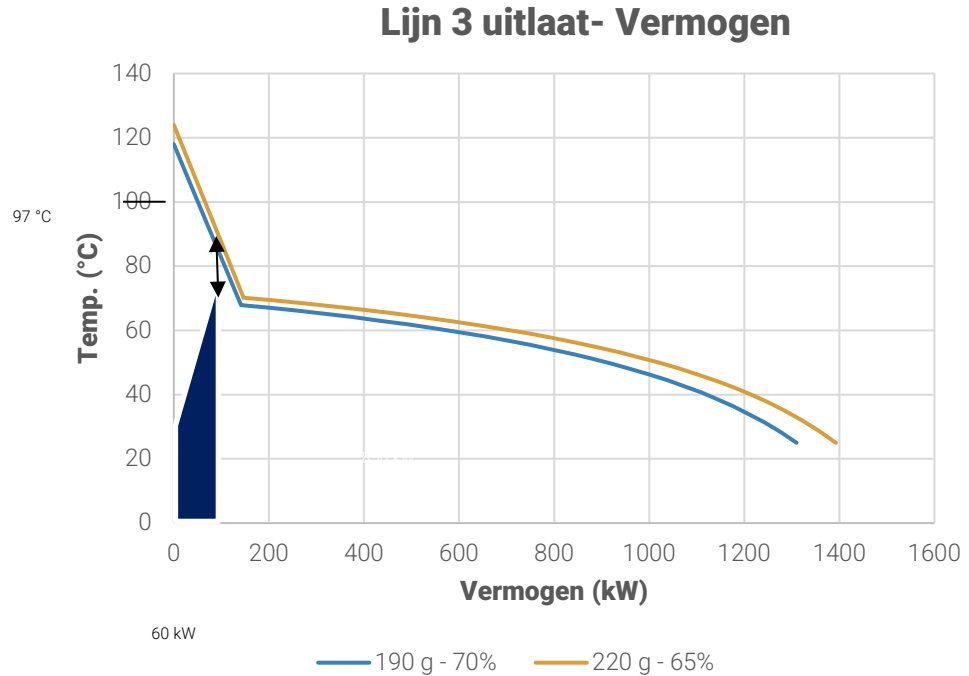
#1 - TWINCOIL WARMTE TERUGWINNING



- 60 kW resulteert in een reductie van gasgebruik van ~4%

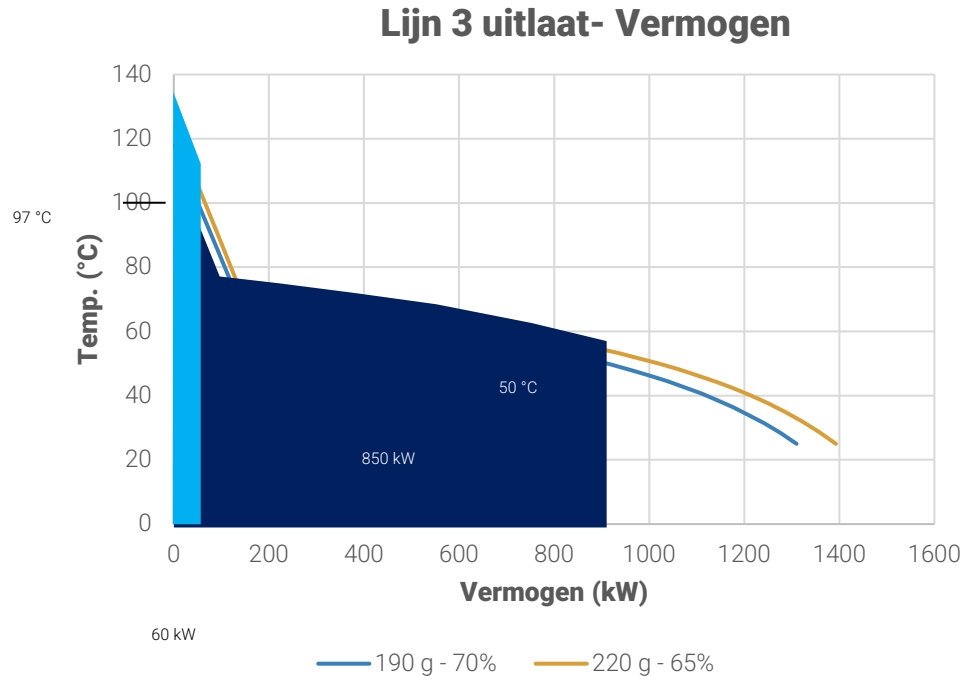
#1 - TWINCOIL WARMTE TERUGWINNING

- Condensator voor toegang tot de grootste hoeveelheid warmte energie

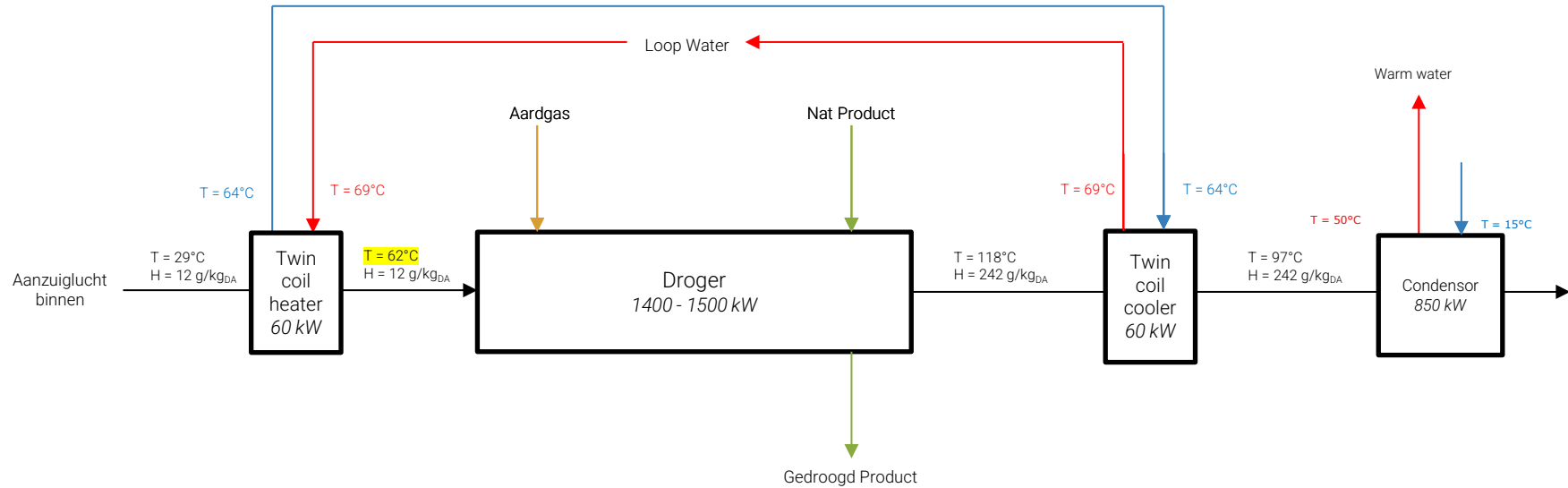


#2 CONDENSOR

- Condensator voor toegang tot de grootste hoeveelheid warmte energie



HUIDIGE OPSTELLING



Realisatie:

- Besparing 4-5% op gasverbruik dmv Twin Coil
- Hal verwarming dmv condensatiewarmte

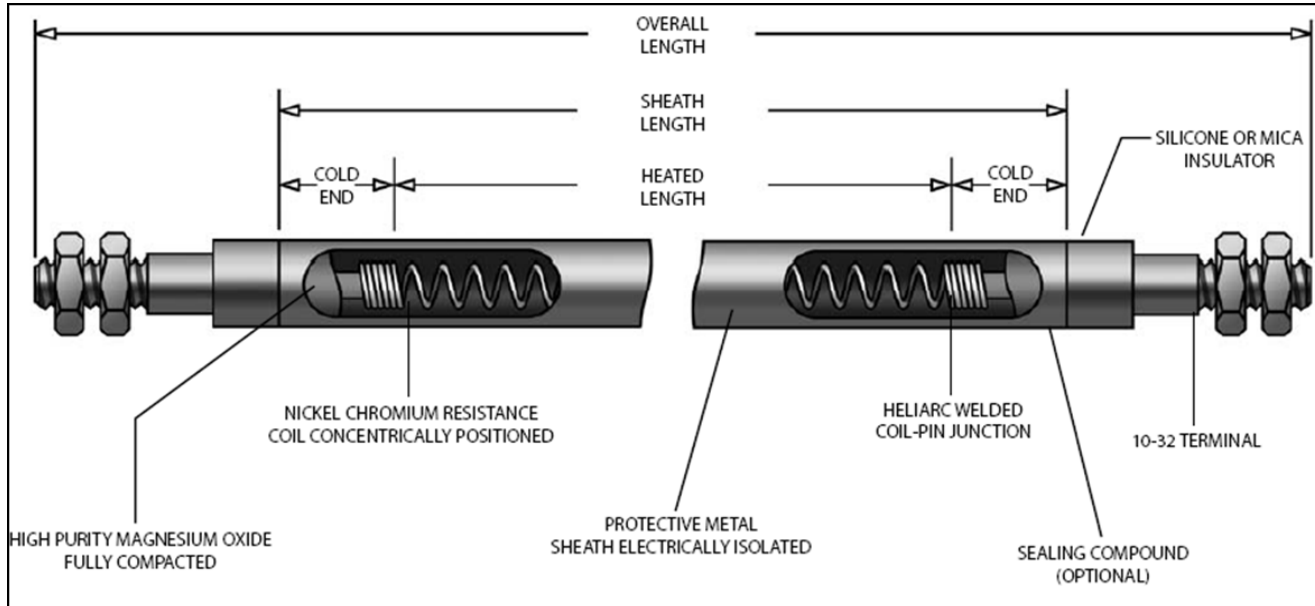
Mogelijke afnemers overige condensatiewarmte?

- Lijn 2 voorverwarming
- Overige gebouwverwarming
- Toekomstige warmtepomp

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Elektrisch verwarmen

- Duty staat vast (watt dichtheid)
- Elementen moeten worden gekoeld!



Elektrische
Luchtverwarming

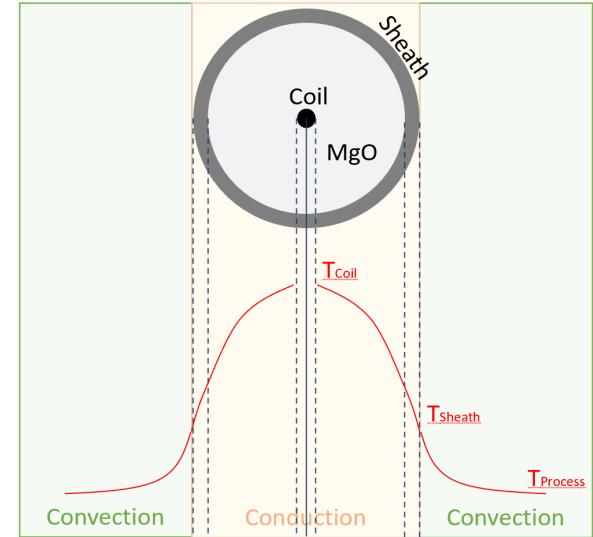
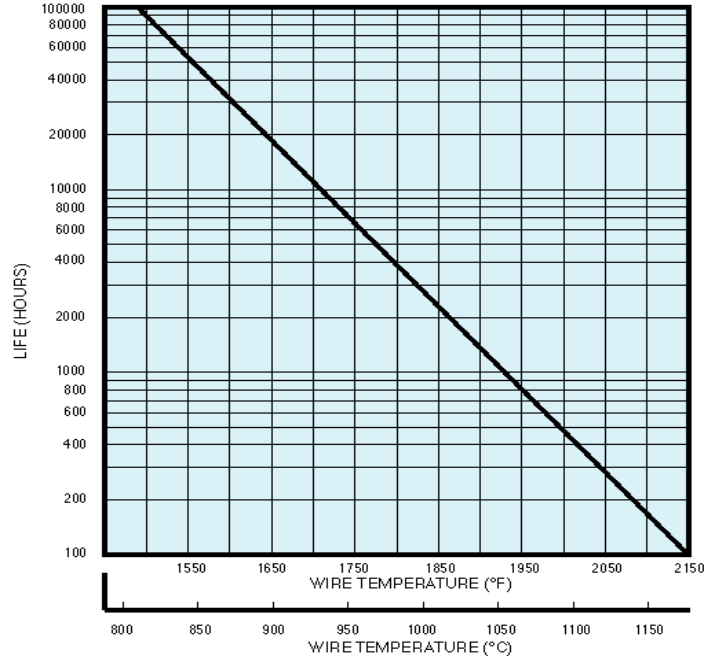
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Element constructie

Huidige beperkingen:

Sheath (incoloy) : 870 °C

Coil : 1200 – 1400 °C



Elektrische
Luchtverwarming

KAPP

Lucht is een slecht koelmedium

*Minimale
luchtsnelheid 1.6 m/s*

*Maximale
wattbelasting 2.3 W/cm²*



**Elektrische
Luchtverwarming**



> 5000 HEAT EXCHANGERS

We've helped tons of customers to reach their goals, over 5000 heat exchangers in operation!



HEAT TRANSFER RELATED CHALLENGES? GET IN TOUCH!

Kapp Nederland B.V.

Veerplaat 102 – 3313 LJ Dordrecht - The Netherlands

E: contact@kapp.nl - T: +31 (0) 78 611 73 50