# Saving Energy With A Conveyor

# The Railtechniek van Herwijnen Group

- Head Office Tiel – The Netherlands
- Founded in 1983
- Production And Engineering Resources In The Netherlands, Germany, Belgium, France, England, Italy, Turkey and Moldova
- Management: Jürgen van Herwijnen & Menno van Herwijnen
- Employees: 250
- Annual Turnover Of Entire Railtechniek Group: 45 million
- Industries: Surface treatments, Logistics, Automotive, Woodworking, Food Industry and Laundry

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SPECIALISTS IN OVERHEAD CONVEYORS

# The Railtechniek van Herwijnen Group

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TFX RAILTECHNIK GmbH
SPEZIALISTEN FÜR FÖRDERSYSTEME

RAILTECHNIQUE FRANCE

RAILTECHNIEK BELGIË BV
SPECIALISTS IN OVERHEAD CONVEYORS

TELEFLEX BV

DUNNEWOLT B.V.

SGC
Stewart Gill Conveyors

STAM

flowlink

RAILTECHNIQUE SRL MOLDOVA

RAILTECHNIEK LTD BULGARIA

VALDO MANUTENTION
CONVOYEURS AERIENS

RAILTECHNIEK TÜRKIYE
KONVEYÖR SISTEMLERINDE UZMAN

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# Our Products

- Manual Overhead Conveyors
- Monorail Chain Conveyors
- Power & Free Conveyors
- Floor Conveyors
- Bridge Cranes And Lifting Solutions
- Controls
    - Industrie 4.0
    - Track & Trace
    - Quality Data
    - Etc.

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# Manual Overhead Conveyors

- Oven Cassette System
- Bridge Crane
- Ergonomical
- Compact Design
- Light Weight Profile
- Expendable With Automatic Movements

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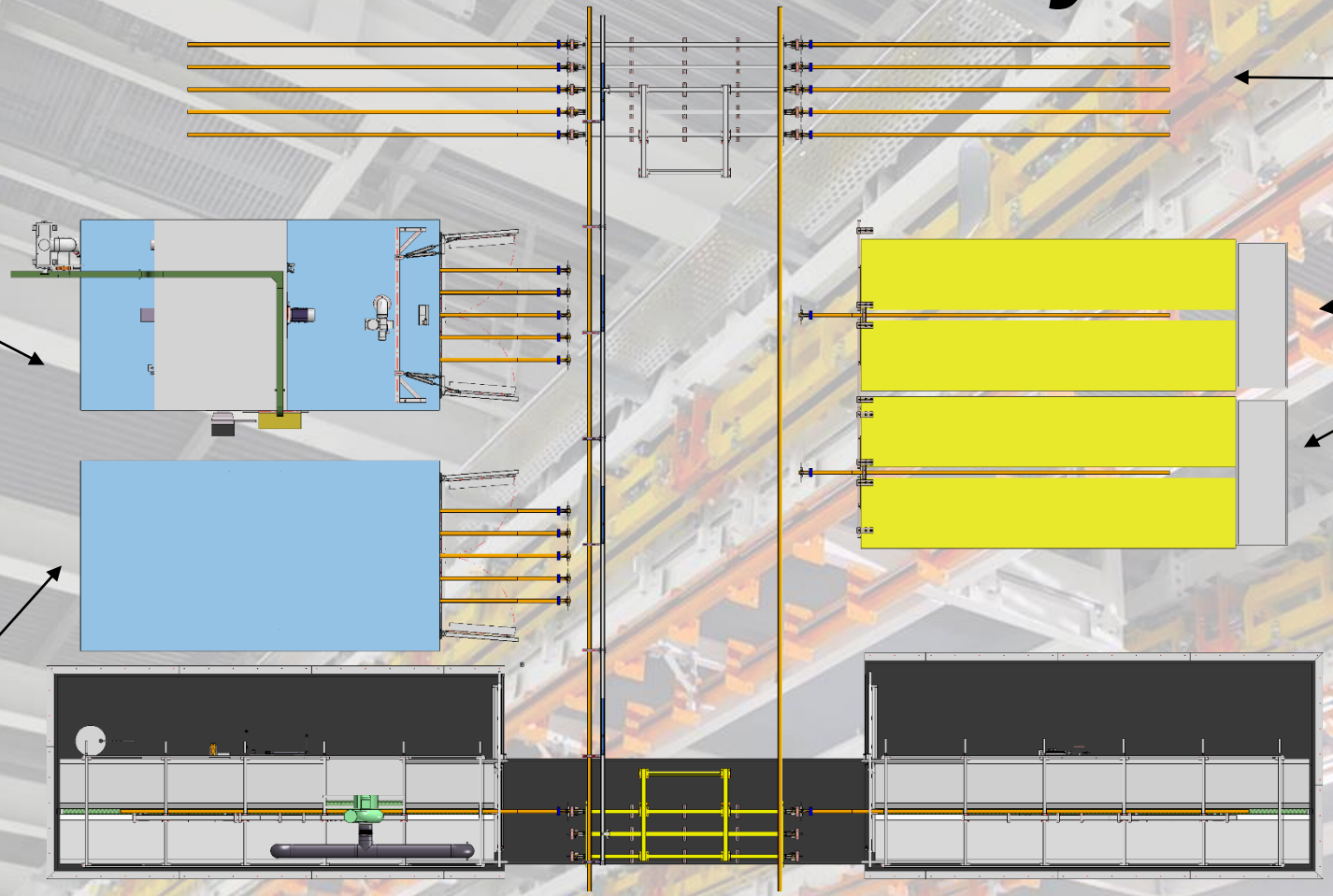
# Manual Overhead Conveyors



Curing Oven

Loading and Unloading

Powder Cabins

Drying Oven

Tact Pre-Treatment Rooms

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# Monorail Chain Conveyors

- Continues Running
- Different Hanger Pitch Available
  - More Products In The Oven (Smaller Oven Possible)
  - Less Energy Needed
- Heavy Duty Chain With A Small Profile
- Camel Back Ovens Possible
- Well Build Oven Air Locks
- Ovens Placed On Top Of Each Other For Heat Transfer
- Ovens Placed Next To Each Other For Heat Transfer
- High Temperature Bearings

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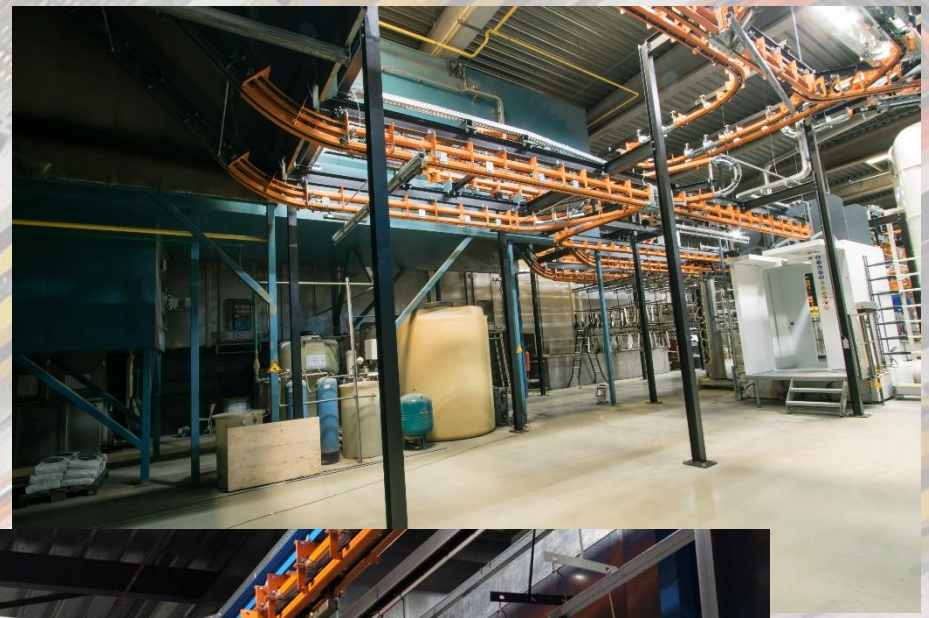
# Power & Free Conveyors

- Stop and Go (Buffering In The Ovens)
- Oven With Own Chain
  - Only One Time Heating Up
  - Saving Energy
  - High Speed
- Possibility For Oven With Doors
- Well Build Oven Air Locks
- Ovens Placed On Top Of Each Other For Heat Transfer
- Ovens Placed Next To Each Other For Heat Transfer
- High Temperature Bearings



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# Ways To Save Energy Use

- Use Minimum System Height
    - Minimum Use Of Steel
    - Minimum Use Of Steel For The Loadbars
    - Minimum Use Of Oven Sizes
- Chain – Light But Not Too Light.
- Power & Free Can Heat Up Separate Oven Chain And Keep It At Temp
- Lighter Hooks / Hangers and Loadbars / Flightbars
- Different Type Ovens
    - Placed Next To Each Other
    - Camel Back Ovens
    - Well Build Oven Air Locks

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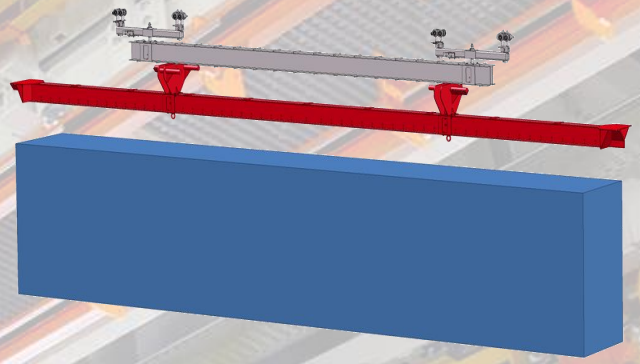
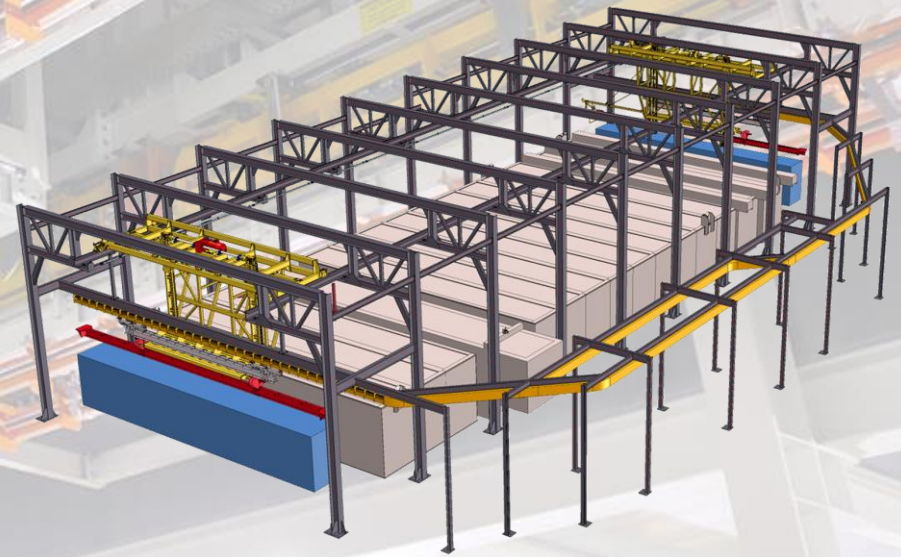
# Working With A Dipping Crane

- Use Crane Systems Above Dipping Tanks
- Half Flight Bar Off
  - Travels To Dipping Tanks
  - Hang Back
- Reliable System
- Cons: Lose Height And Bring Lot Of Mass Into The Ovens
- Fixed Programming
- More Square Meters Of Space Needed For Empty Load-bars
- Extra Heavy Steel Construction In The Oven





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Transfer Of Flight Bar From P&F Conveyor To Dip Pre-Treatment Crane

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Transfer Of Flight Bar From Dip Pre-Treatment Crane Back To P&F Conveyor

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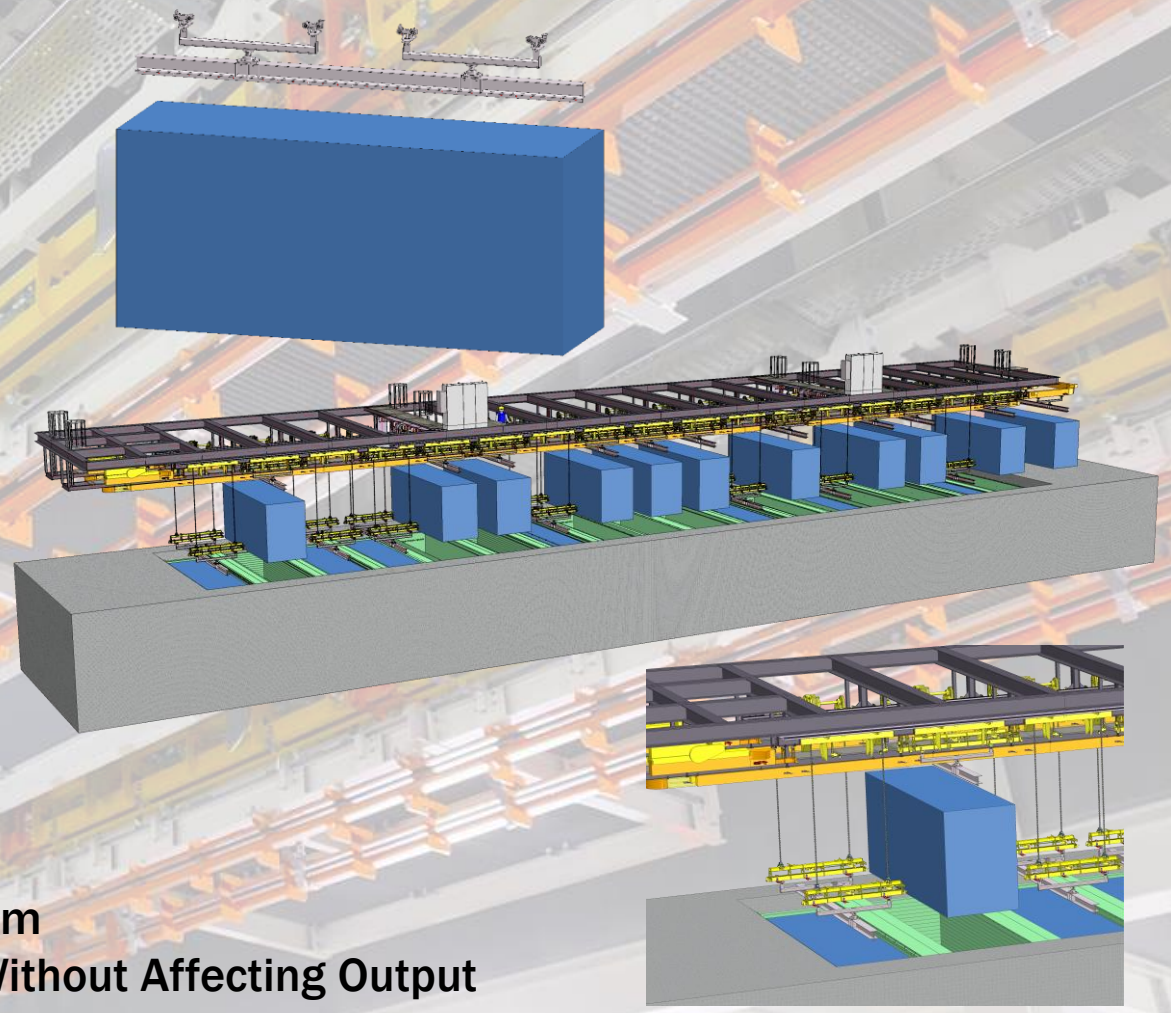
# New system – Drop Section Dipping system

- Out Of The Box Thinking – NEW DESIGN
- Flight Bar Design
  - Hang Product Directly
  - Use Same Flight Bar Trough The Whole System
- Dipping System With Drop Sections
  - Lower
  - Dip
  - Rise
- Advantages
  - Higher Output With The Dropsection Dipping System
  - Dipping Times Are Independent And Easy To Set Without Affecting Output
  - Easy acces because of walk paths next to the baths



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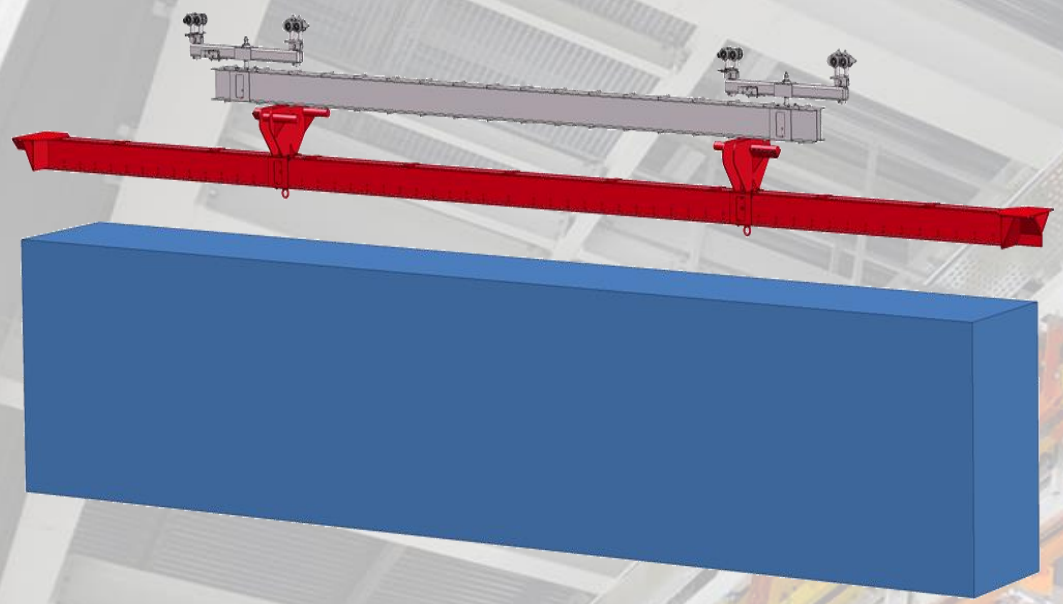
# Old Load bar Design & New Load bar Design



Old Design

New Design

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# Old system – Crane System

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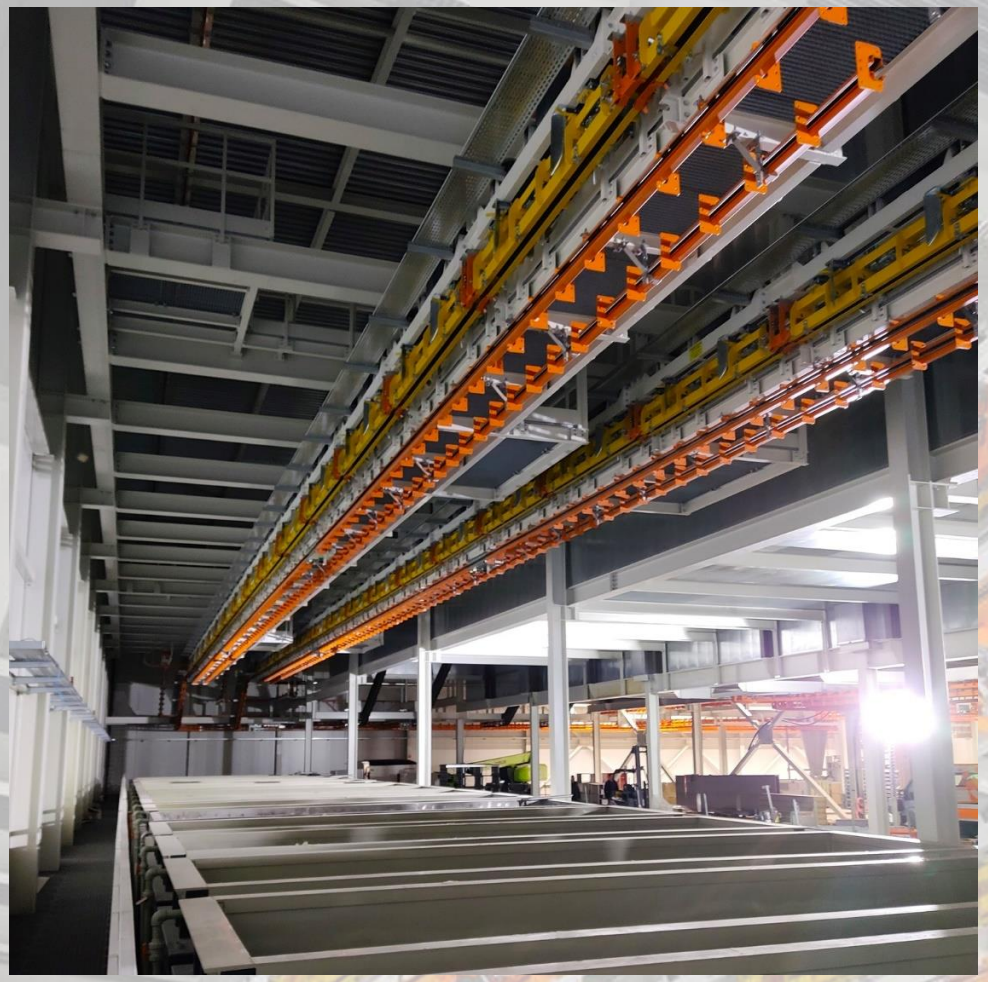
# New system – Drop Section Dipping system



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# Calculations

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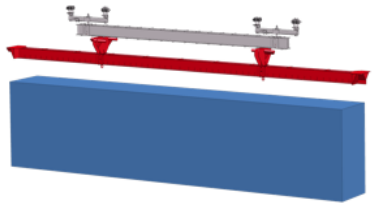
## Oven Calculation Old System

| Results | | |
|---|---|---|
| Product loss | 2794500 | kJ |
| Convection loss | 48,16216 | kW |
| Exhaust loss | 22,7025 | kW |
| Convection + exhaust loss | 70,86466 | kW |
| Time in seconds | 3600 | s |

| Required power oven (180°C) | 847,115 | kW |
|---|---|---|

1 KW = ca. 0,1 m3 Gas



**To be filled in**

| General | | |
|---|---|---|
| Temperature outside | 18 | °C |
| Temperature oven | 180 | °C |
| Time needed | 60 | min |

| Convection loss | | |
|---|---|---|
| Rc-value sandwich panel (180 | 1,85 | m^2*K/W |
| Surface area sandwichpanel | 550 | m^2 |

| Product loss | | |
|---|---|---|
| Specific heat cast iron (Cp) | 0,46 | kJ/kg*K |
| Max weight to be heated | 37500 | kg |

| Exhaust loss | | |
|---|---|---|
| Specific heat air (Cp) ( 180°C ) | 1,009 | kJ/kg*K |
| Volume exhaust air | 500 | m^3/h |
| Density air (80°C) | 1 | kg/m^3 |

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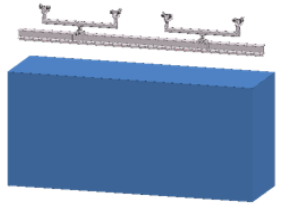
## Oven Calculation New System

| Results | | |
|---|---|---|
| Product loss | 2049300 | kJ |
| Convection loss | 45,5351 | kW |
| Exhaust loss | 22,7025 | kW |
| Convection + exhaust loss | 68,2376 | kW |
| Time in seconds | 3600 | s |

| Required power oven (180°C) | 637,488 | kW |
|---|---|---|

1 KW = ca. 0,1 m3 Gas



**To be filled in**

| General | | |
|---|---|---|
| Temperature outside | 18 | °C |
| Temperature oven | 180 | °C |
| Time needed | 60 | min |

| Convection loss | | |
|---|---|---|
| Rc-value sandwich panel (180 | 1,85 | m^2*K/W |
| Surface area sandwichpanel | 520 | m^2 |

| Product loss | | |
|---|---|---|
| Specific heat cast iron (Cp) | 0,46 | kJ/kg*K |
| Max weight to be heated | 27500 | kg |

| Exhaust loss | | |
|---|---|---|
| Specific heat air (Cp) ( 180°C ) | 1,009 | kJ/kg*K |
| Volume exhaust air | 500 | m^3/h |
| Density air (80°C) | 1 | kg/m^3 |

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# Calculations

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## Oven Calculation Old vs New System

| Results | | |
|---|---|---|
| Required Power Oven New System / Hour | 637 | kW |
| Required Power Oven Old System / Hour | 847 | kW |
| Difference Between Required Power / Hour | 210 | kW |

| | | |
|---|---|---|
| 1 kWh = ca. 0,1 m3 Gas | 210 | kW |
| Gas saving for 1 Oven / Hour | 21 | m3 |
| Gas saving for 2 Ovens / Hour | 42 | m3 |

2 Shifts, with 2 Ovens = 3.000 production hours per year 126000 m3 gas less needed

Total money saving with 2 Ovens with 2 Shifts New Design € 138.600,00

Gas Price € 1,10 euro / m3

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