TEPLOTECHNA DIS
OLOMOUC

TEPLOTECHNA DIS
your refractory lining supplier

Radomír Janisch

HISTORY

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- Company Teplotechna DIS s.r.o came into existence in 1998 from former employees of state company Teplotechna PKZ
- Teplotechna DIS is longstanding, stable, and has skilled employees, who have longtime experiences from the former state company Teplotechna PKZ in the field of design as well as in the fields of execution of all offered activities.
- Our experienced team is consisting of:
  - technical-administration stuff
  - designers
  - qualified workers of fireclay works ,welding works of auxiliary construction and others
  - according to a need we are able to provide on bigger projects others experienced bricklayers, carpenters and locksmiths.

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LOCATIONS

CUSTOMERS

- Cement plants

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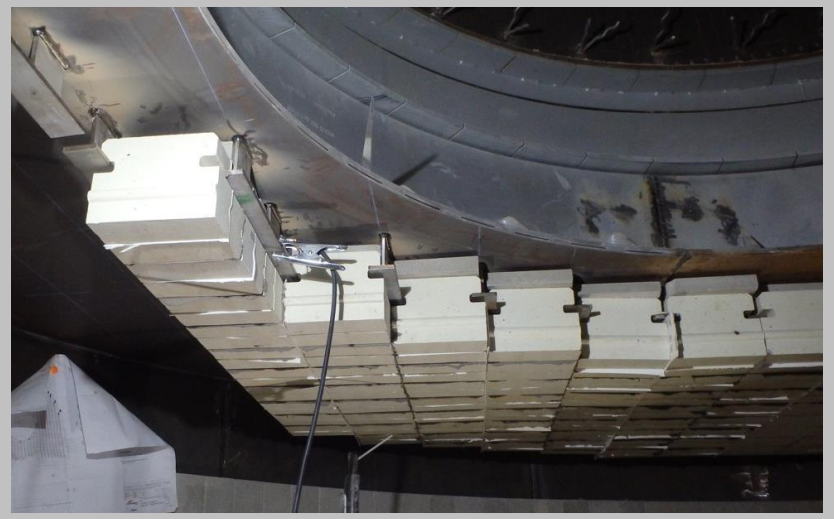
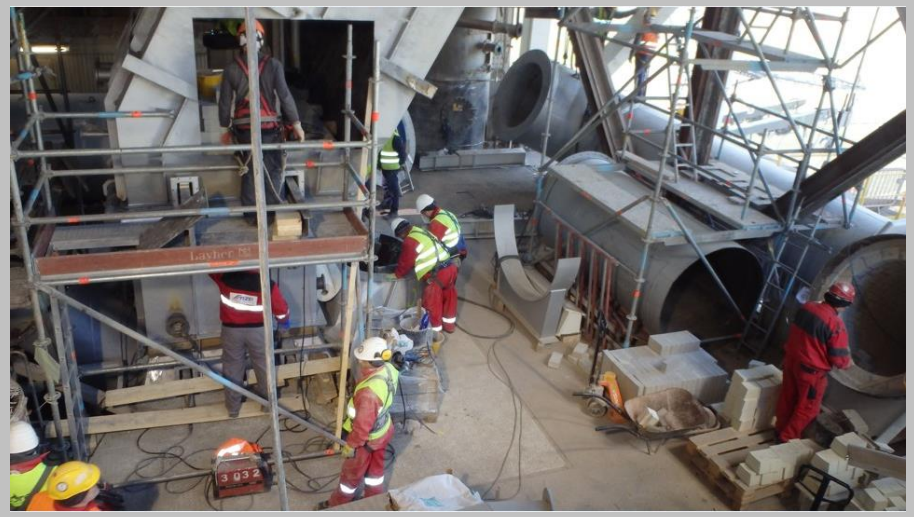
REFRACTORY LINING- CEMENT PLANTS





CUSTOMERS

- BOILERS

FOR ANOTHER 100 YEARS VYNCKE

kpa unicon

BÜTTNER

tts boilers

VEOLIA

EVECO Brno TRADICE OD ROKU 1996

ShaanGu EKOL

BRICK LINING- BOILERS

REFRACTORY LINING- BOILERS

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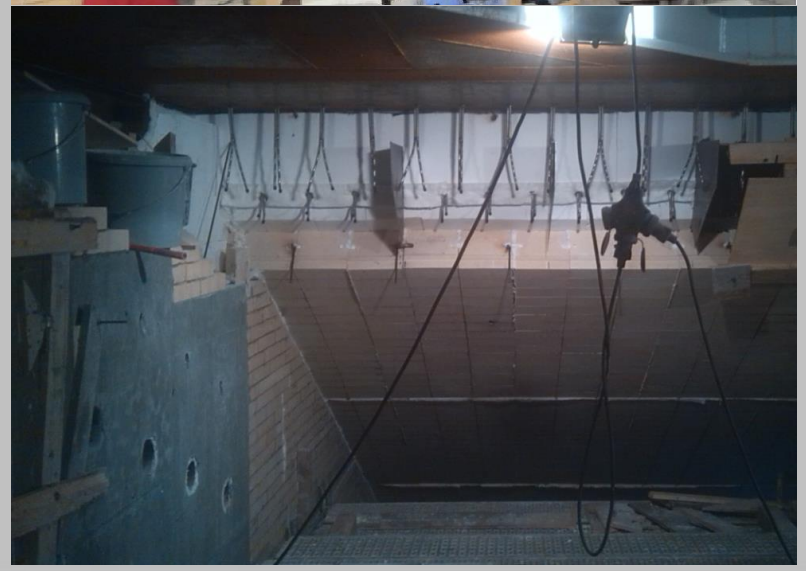

CASTABLE LINING- BOILERS

CUSTOMERS

- CHEMICAL APARATES

REFRACTORY LINING-CHEMICAL

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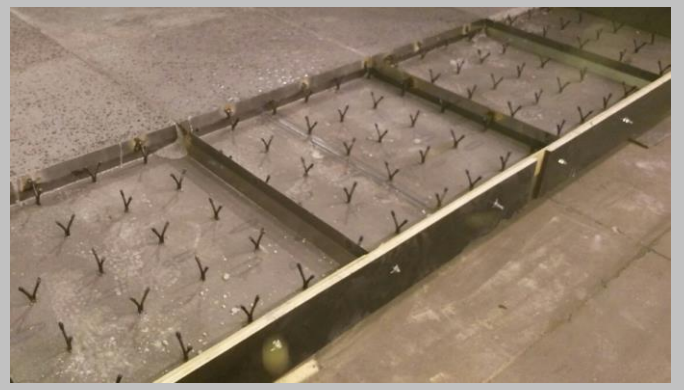

REFRACTORY LINING- CHEMICAL

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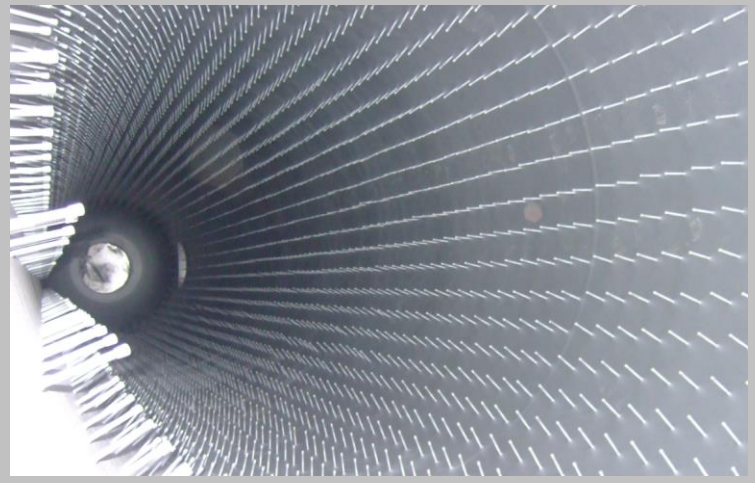
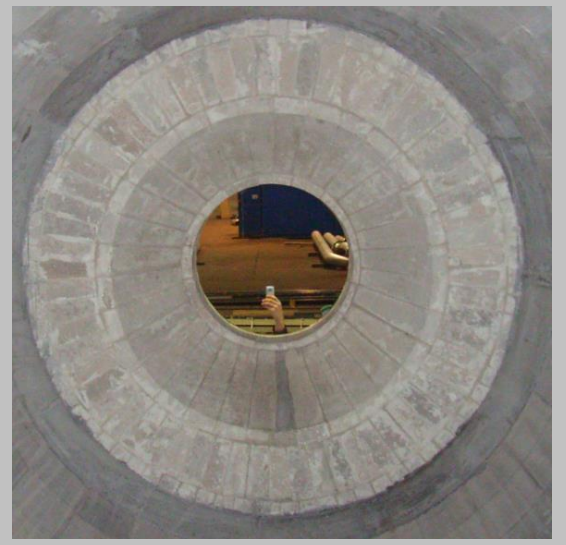


CASTABLE LINING

- Main suppliers:
  - Průmyslová keramika, spol. s r.o.
  - Calerys GMBH
  - Žárohmoty, spol. s r.o.
  - Others (Thermal ceramics, Gouda)
  - Closer cooperation with Průmyslová keramika- 60km from our headquarters, flexibility,

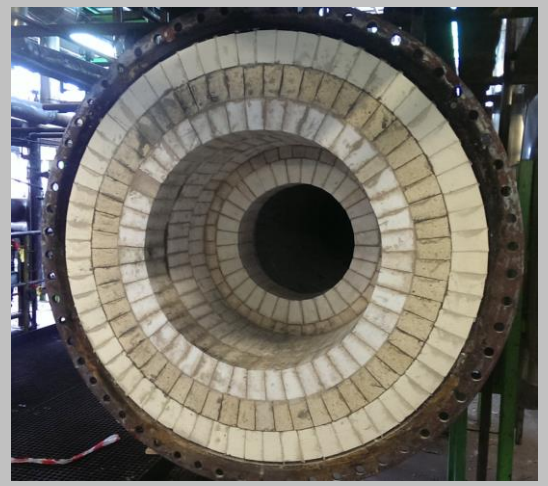
PRECAST SHAPE



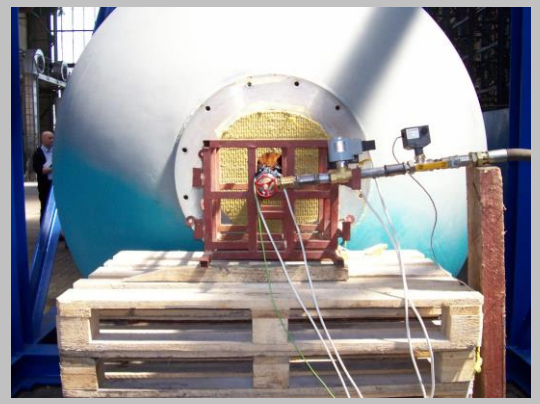
BRICK LINING

- Main suppliers
  - PD Refractories
  - Peril production/Mosconi
  - Slovmag

BRICK LINING

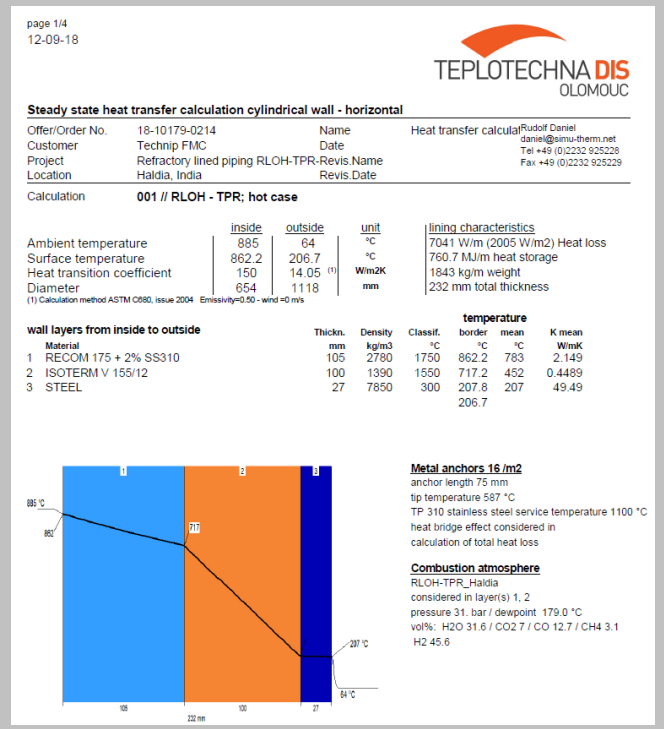


DRY OUT



OTHERS

- Thermal heat calculation- Simu-therm software
- Calculation of expansion joints



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Steady state heat transfer calculation cylindrical wall - horizontal

Offer/Order No.	18-10179-0214	Name	Heat transfer calcula
Customer	Technip FMC	Date	
Project	Refractory lined piping RLOH-TPR	Revis.Name	
Location	Haldia, India	Revis.Date	

Rudolf Daniel
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Tel +49 (0)2232 925228
Fax +49 (0)2232 925229

Calculation **001 // RLOH - TPR; hot case**

	inside	outside	unit
Ambient temperature	885	64	°C
Surface temperature	862.2	206.7	°C
Heat transition coefficient	150	14.05 (1)	W/m2K
Diameter	654	1118	mm

(1) Calculation method ASTM C680, issue 2004 Emissivity=0.50 - wind =0 m/s

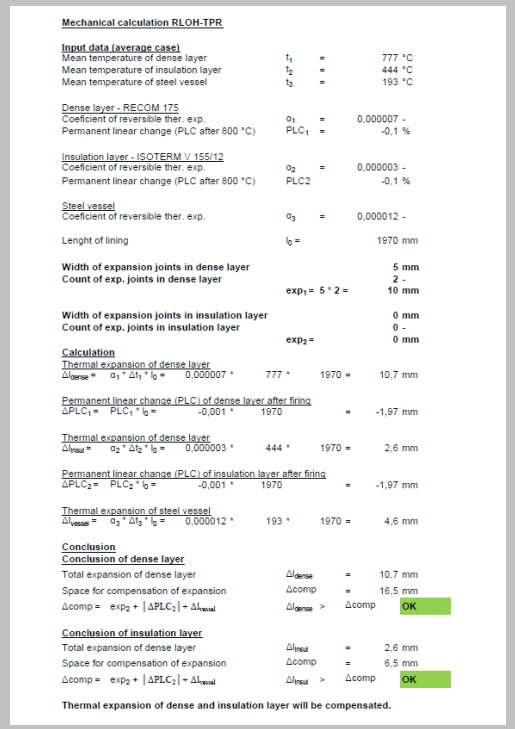
lining characteristics
7041 W/m (2005 W/m2) Heat loss
760.7 MJ/m heat storage
1843 kg/m weight
232 mm total thickness

wall layers from inside to outside

	Material	Thickn. mm	Density kg/m3	Classif. °C	temperature border °C	temperature mean °C	K mean W/mK
1	RECOM 175 + 2% SS310	105	2780	1750	862.2	783	2.149
2	ISOTERM V 155/12	100	1390	1550	717.2	452	0.4489
3	STEEL	27	7850	300	207.8	207	49.49
					206.7		

Metal anchors 16 /m2
anchor length 75 mm
tip temperature 587 °C
TP 310 stainless steel service temperature 1100 °C
heat bridge effect considered in calculation of total heat loss

Combustion atmosphere
RLOH-TPR_Haldia
considered in layer(s) 1, 2
pressure 31. bar / dewpoint 179.0 °C
vol%: H2O 31.6 / CO2 7 / CO 12.7 / CH4 3.1 H2 45.6



Mechanical calculation RLOH-TPR

Input data (average case)

Mean temperature of dense layer	t_1	=	777 °C
Mean temperature of insulation layer	t_2	=	444 °C
Mean temperature of steel vessel	t_3	=	193 °C

Dense layer - RECOM 175

Coeficient of reversible ther. exp.	α_1	=	0,000007 -
Permanent linear change (PLC after 800 °C)	PLC_1	=	-0,1 %

Insulation layer - ISOTERM V 155/12

Coeficient of reversible ther. exp.	α_2	=	0,000003 -
Permanent linear change (PLC after 800 °C)	PLC2		-0,1 %

Steel vessel

Coeficient of reversible ther. exp.	α_3	=	0,000012 -

Lenght of lining l_0 = 1970 mm

Width of expansion joints in dense layer **5 mm**
Count of exp. joints in dense layer **2 -**
exp_1 = 5 * 2 = **10 mm**

Width of expansion joints in insulation layer **0 mm**
Count of exp. joints in insulation layer **0 -**
exp_2 = **0 mm**

Calculation

Thermal expansion of dense layer
$\Delta l_{dense} = \alpha_1 * \Delta t_1 * l_0 =$ 0,000007 * 777 * 1970 = 10,7 mm

Permanent linear change (PLC) of dense layer after firing
$\Delta PLC_1 = PLC_1 * l_0 =$ -0,001 * 1970 = -1,97 mm

Thermal expansion of dense layer
$\Delta l_{insul} = \alpha_2 * \Delta t_2 * l_0 =$ 0,000003 * 444 * 1970 = 2,6 mm

Permanent linear change (PLC) of insulation layer after firing
$\Delta PLC_2 = PLC_2 * l_0 =$ -0,001 * 1970 = -1,97 mm

Thermal expansion of steel vessel
$\Delta l_{vessel} = \alpha_3 * \Delta t_3 * l_0 =$ 0,000012 * 193 * 1970 = 4,6 mm

Conclusion

Conclusion of dense layer

Total expansion of dense layer	Δl_{dense}	=	10,7 mm	
Space for compensation of expansion	$\Delta comp$	=	16,5 mm	
$\Delta comp = exp_2 + \lvert \Delta PLC_2 \rvert + \Delta l_{vessel}$	Δl_{dense}	>	$\Delta comp$	OK

Conclusion of insulation layer

Total expansion of dense layer	Δl_{insul}	=	2,6 mm	
Space for compensation of expansion	$\Delta comp$	=	6,5 mm	
$\Delta comp = exp_2 + \lvert \Delta PLC_2 \rvert + \Delta l_{vessel}$	Δl_{insul}	>	$\Delta comp$	OK

Thermal expansion of dense and insulation layer will be compensated.

OTHERS

- Article in magazine Cement review in 2014 and 2015
  - Monolithic lining
  - Suspended refractory ceiling

- Delivery of refractories in 2016: 1050t
- Delivery of Refractories in 2017: 1250t
- Delivery of Refractories in 2018: 950t
- Delivery of Refractories in 2019: foreseen 1400t