

**Cementownia ODRA S.A.
ul. Budowlanych 9
45-005 Opole
POLAND**

Thionville, 10th October 2021

O/Ref.: P10551-1: Wear protection lining on 1 cyclone and ducts

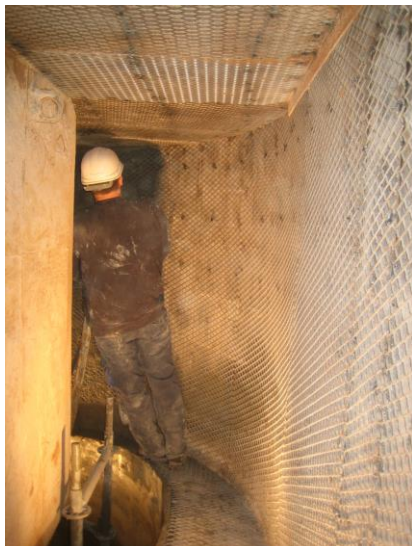
Y/Ref: your price request following the visit of 03/12/2020

Business followed by Baptiste BRUNEL (+33 7 83 94 57 11)

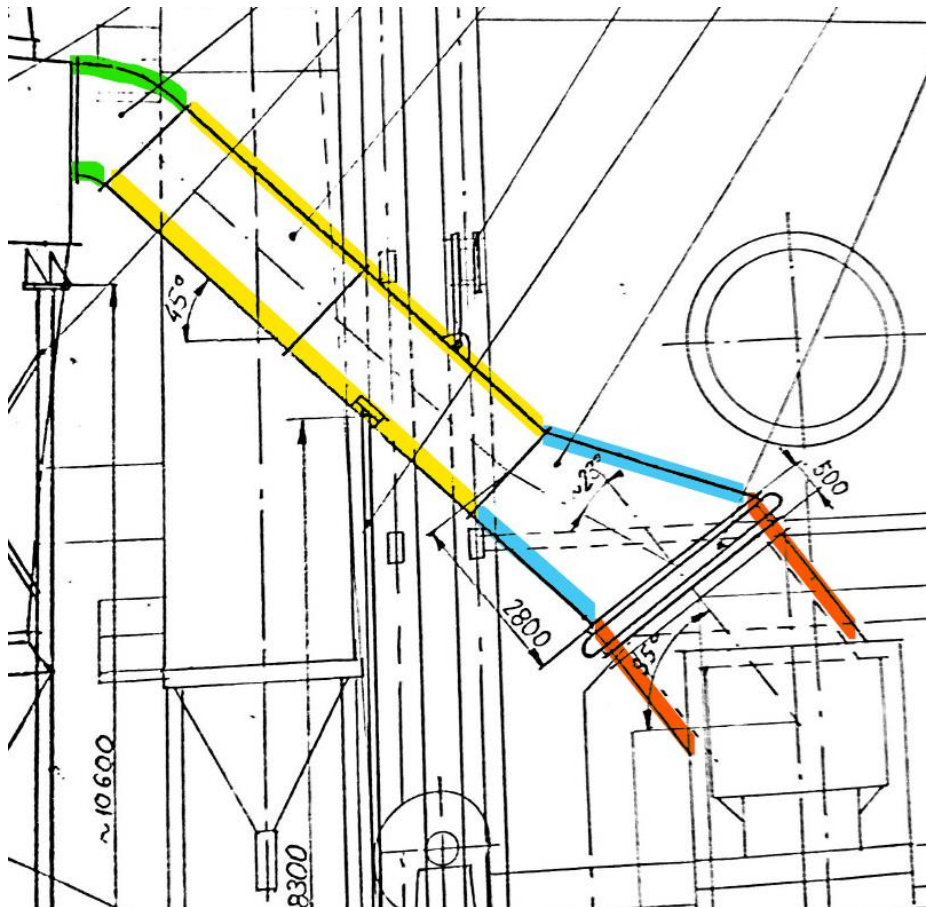
To the attention of M. Krzysztof Hartyn Leszczyński,

Dear sir,

We thank you for your request and we are pleased to show you our technic description about our offer of wear protection lining DENSIT 2000HT for the protection of your exhausting cyclones.



I – Area to be protected:



Equipemnts	Area (m ²)
One Cyclone	98
bend n°4 (with compensator)	13,70
Duct 3-1	25,70
Duct 3-2	25,70
Duct 2	32,70
Compensator	5,10
Cooler Duct	11,80
TOTAL	212,7

Total surface : ² = **212.7 m²**

The above areas have been estimated on extracts from the drawings transmitted, these area estimates require verification.

II – Process :

- cyclones of Cooler exit
- Clincker dust
- Temperature 350 - 450 degrees Celsius but the possibility of peaking at 750 °C
- Particle sizes: from 1m to 1mm

II – Technical proposal:

We do propose DENSIT WEARFLEX 2000 HT concrete on 25 mm thickness on cyclone and 30 mm for ducts.

III – Material needs:

To line 1 m² on 25 mm thickness, we need 74 kg of DENSIT WEARFLEX 2000 HT concrete (and 89 kg for 30 mm)

We apply 5 % of security

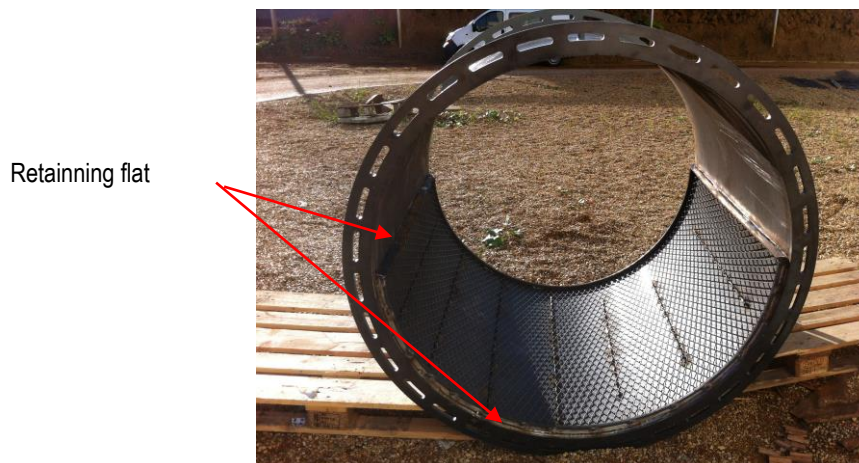
Equipemnts	Area (m ²)	Thickness	Volume (m ³)	Tonnage
One Cyclone	98	25	2,45	7600
bend n°4 (with compensator)	13,70	30	0,411	1275
Duct 3-1	25,70	30	0,771	2400
Duct 3-2	25,70	30	0,771	2400
Duct 2	32,70	30	0,981	3050
Compensator	5,10	30	0,153	475
Cooler Duct	11,80	30	0,354	1100
TOTAL	212,7		5,9	18300

IV – Procedure:

0°/ Break and clean all the existing lining

1°/ Placing retaining flat 5 x 25mm (lining thickness) over the entire periphery of the lining.

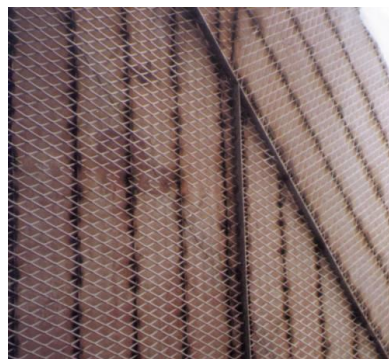
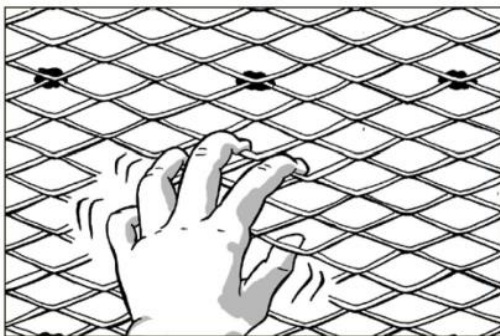
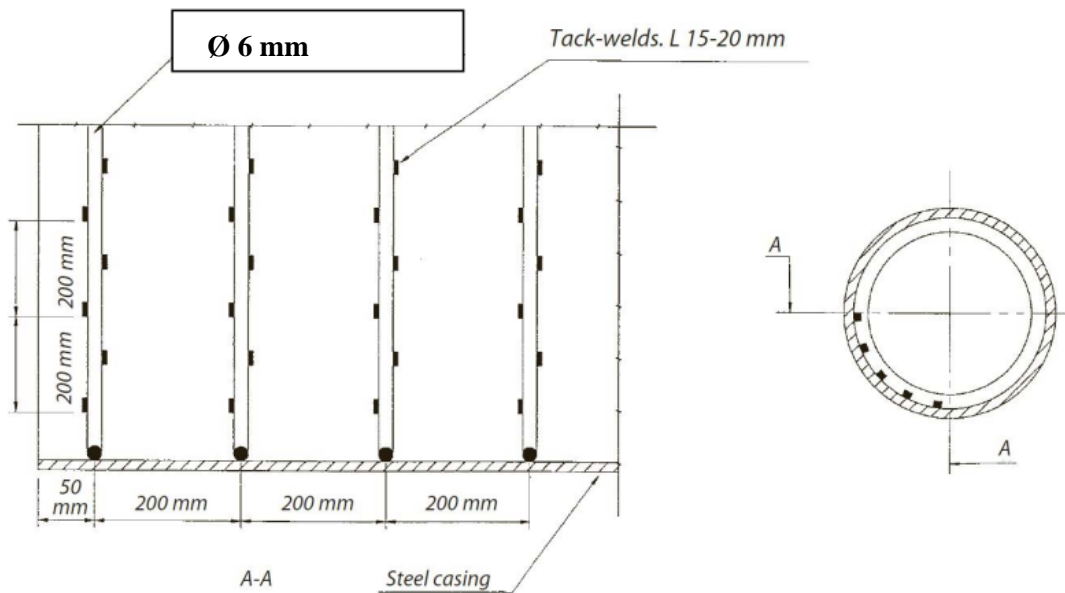
We recommend using AISI 304 retaining flat



2°/ Installation of an expanded metal sheet welded on 6mm meter steel rods.

- Cut the rods to the appropriate lengths. The rods must be able to be welded on the restraint dishes.
- Place the rods every 200mm.

- Welds should be done with about 200mm apart. ZIG-ZAG welds should be used. For constructions on curved surfaces, the rods must be placed to fit perfectly with the shape.



The mesh must be firmly anchored to the system so that the deployed metal does not move during the application of concrete.

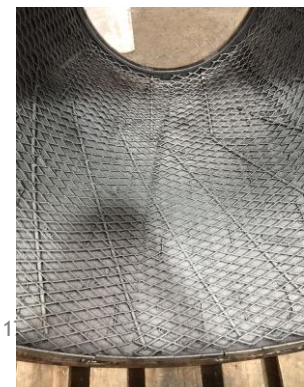
Make sure the deployed metal is properly secured by pulling on it.

The anchor points must not leave, and it must be impossible to remove the metal deployed from the installation.

3°/ Application of DENSIT bonding Compound

This product improves the hook of concrete on the metal deployed and makes a space for the expansion of the metal at high temperature.

Projection application: pneumatic pistol provided



4°/ DENSIT concrete mixing

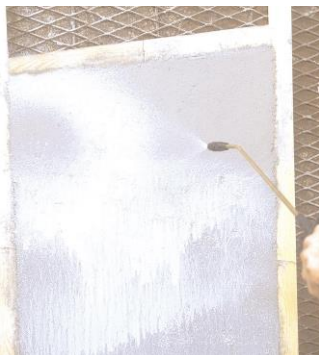
- Mix dry product for 3 minutes to homogenize
- Addition of water up to 5% of the dry weight
- Mix for 8 min
- Adding metallic fibres (4,5%)
- Mix for 3 min



5°/ Trowelling



6°/ Curing compound application



Immediately after applying and smoothing the concrete, a curing agent is applied in order to limit water evaporation. In fact, all water used for the implementation of this material is used for the hydraulic bonding of the concrete, which gives it a high density (as little porosity). It is therefore necessary that it retains its water to reach its characteristics.

V – Supplies:

Our operating:

- Material supply:
 - DENSIT WEARFLEX 2000 concrete : 18.750 Tons (bag of 25 kg and palets of 1250 kg)
 - Expanded mesh 255 sheets of 0.96 m² (1200 x 800mm) (or another formats)
 - Steel fibres 1000 kg (bag of 20kg)
 - Bonding compound + Gun 288 cartridges of 310 mL
 - Gun of Bonding Coumpund application
 - Curing compound 2 jar of 25 Liters
- Transport delivered to your place
- Supervision

Your operating:

- Ø6 mm rods and retaining bars 5 x 25 mm or 5 x 30 mm
- Installation under our supervision

VI – Conditions:

Supply: 6-8 weeks free delivered to our plant



We are disposed for any complementary information and hope our offer may retain your attention.

Best regards,

Baptiste BRUNEL
Project manager engineer

Bénédicte ANGUENOT
Commercial coordinator

Dariusz DUDA
TRB Partner

