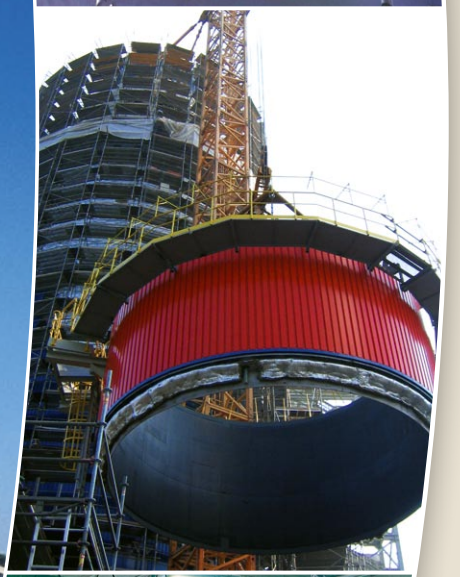
Flue Gas Desulphurisation Plants

CORROSION PROTECTION

Industrie



REMA TIP TOP

Lining systems for Flue Gas Desulphurisation Plants

REMA TIP TOP

As a result of increasing environmental protection regulations, Flue Gas Desulphurisation (FGD) Plants have been installed on power plants worldwide since the early 1980's. The predominant technology utilised is based on wet scrubbing which produces widely varying corrosive environments within the process equipment and flue gas ducting. Such an FGD Plant may require more than 4 different types of corrosion protection systems (see typical fields of application).

REMA TIP TOP today provides the most reliable and advanced corrosion protection systems for FGD Plants, combined with competent consultation services to owners, plant operators, engineers and application companies.

In order to provide the best corrosion protection available, our products have been developed based on extensive performance testing, and further by duplicating actual service conditions with a wide variety of chemicals under different temperature gradients.

Our detailed experience and knowlegde of the systems characteristics and their response to the service conditions form the basis for the most reliable and cost effective solutions which can be found in this market. **REMA TIP TOP** offers state-of-the-art materials and services to provide long term trouble-free installations.

REMA TIP TOP lining materials provide excellent resistance against permeation, chemicals, abrasion and of course – corrosion.

Our quality programme forms an integral part of our application process; in view of the critical nature of the lining work required in FGD installations. Working independently of our application teams, our quality control inspectors strictly follow the QC parameters parallel to the lining installation. Lining inspection may seem excessive and overbearing; but it is a vital necessity to achieve the best possible end product.

The reliable solution

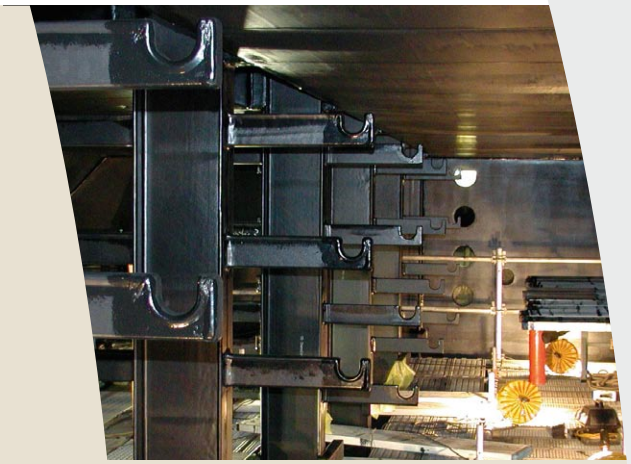
REMA TIP TOP

In FGD Plants, **REMA TIP TOP** rubber lining materials are installed in areas where temperatures do not exceed 100° C. The combination of their excellent chemical resistance, together with equally good resistance against abrasion, allow them to be used for corrosion protection in absorbers, tanks, circulation and distribution pipes. In addition to chemical and mechanical resistance, the **CHEMOLINE** product range has very low permeation coefficients and water absorption values.

CHEMOLINE 4A, CHEMOLINE 4B and **CHEMOLINE 4/CN**, all based on Bromine Butyl Compounds, are the primary rubber products offered for lining in FGD Plants. **CHEMOLINE 4B** (Self Curing) and **CHEMOLINE 4/CN** (Pre-Cured) have been developed for the site application processes, whereas **CHEMOLINE 4A** is the product for conventional lining of vessels and pipes, where the vulcanisation process requires either hot air or steam under pressure.

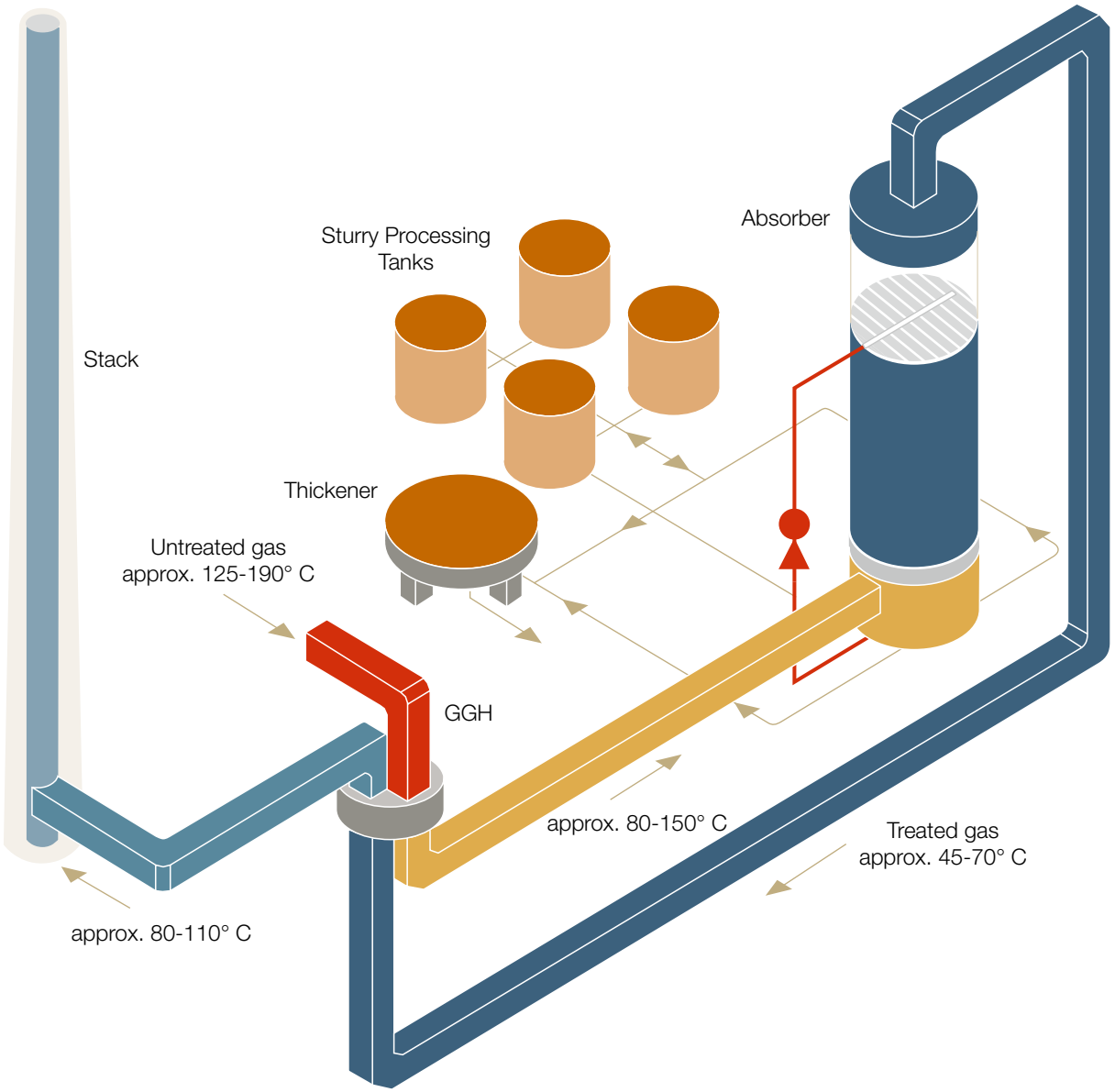
The **COROFLAKE** range of lining and coating systems provide exceptional chemical resistance at a broader temperature range than rubbers and are typically used within FGD Plants for the lining of flue gas ducting, gas/gas re-heaters and tanks. The **COROFLAKE** lining range consists of synthetic resin based products incorporating different types of fillers as reinforcements. **COROFLAKE** coatings can be used in applications with temperatures of up to 230° C. By the addition of selected and graded fillers as reinforcements, the permeability of the **COROFLAKE** range is reduced to the lowest levels possible.

We do not just stand by our products, we take responsibility for their performance. We are able to do so because of our years of experience in site management. Our technical service department is ready to train applicators personnel in the techniques of installation, safety requirements and quality control procedures associated with our lining systems.

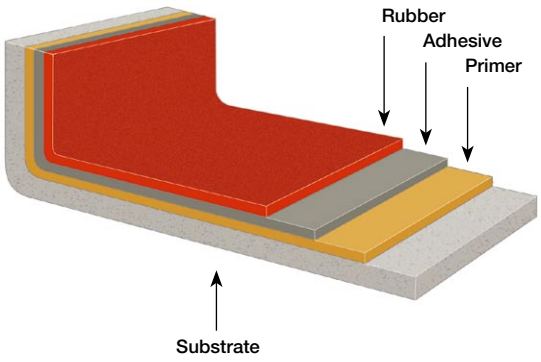


Flue Gas Desulphurisation Plants

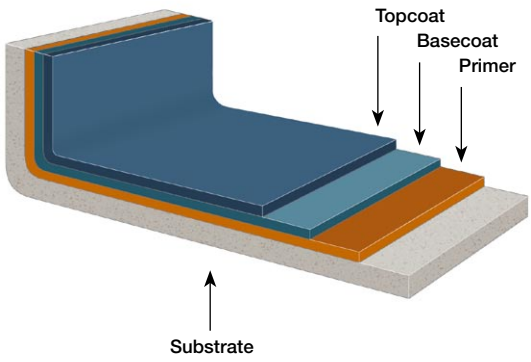
PLANT FLOW CHART



REMA TIP TOP – Rubber lining



REMA TIP TOP – COROFLAKE systems



Flue Gas Desulphurisation Plants applicable to the Limestone Gypsom Process

FIELDS OF APPLICATION

Component	COROFLAKE 18	COROFLAKE 23	COROFLAKE 24	COROFLAKE 28	COROFLAKE 29	COROFLAKE 60	TOPLINE 68	TOPLINE W	CHEMOLINE 4A	CHEMOLINE 4B	CHEMOLINE 4/CN
1. Ducts, GGH and Stack											
GGH	■	■		■	■						
Raw gas ducts		□		■	■					□	□
Clean gas ducts		■	■	■						■	
Bypass ducts		■		■	■						
Stacks		■		■	■						
2. Scrubbers/Absorbers											
Absorber inlet ducts		□		■	■						
Absorber, lower areas								■		■	□
Absorber, spray zones								□		■	□
Absorber outlet sections		■	■	■						■	□
Absorber mist eliminator sections		■	■	■						■	□
Pre-Scrubbers	■			■						■	□
Circulation pipes									■	□	
Spray header pipes									■	□	
3. Slurry Processing Plant											
Thickener tanks							■	■		■	■
Filtrate tanks						■	■	□		□	□
Gypsum slurry tanks								■		■	■
Limestone tanks								■		■	■
Holding tanks		■		■						■	■
Impellers									■	□	
4. Pits/Channels											
Pits							■	■		□	■
Channels							■	■		□	■

■ **Recommendation**

□ **Alternative**

Resin-based lining systems and coatings for Flue Gas Desulphurisation Plants

LINING AND COATING SYSTEMS

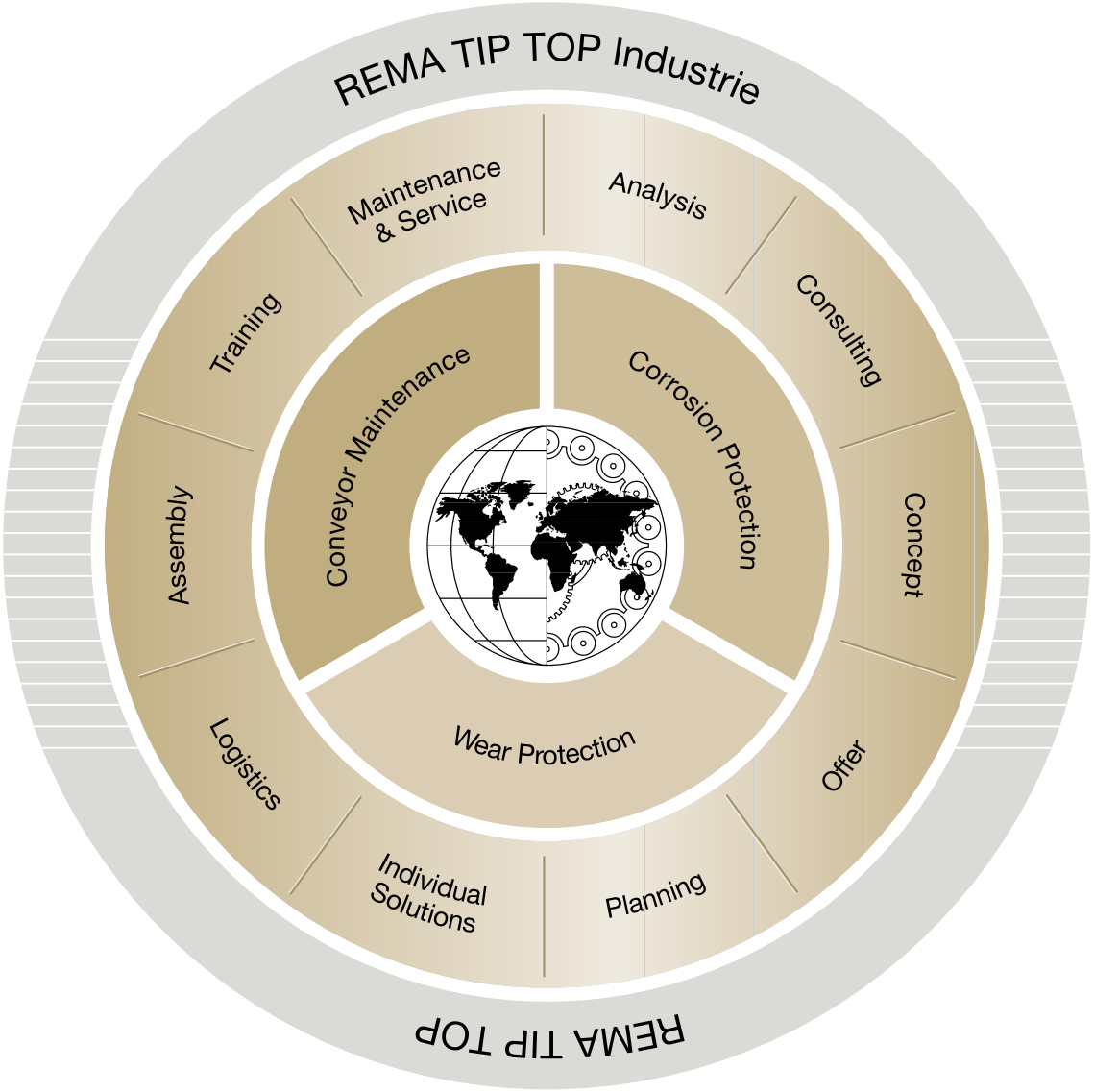
Component	COROFLAKE 18	COROFLAKE 23	COROFLAKE 24	COROFLAKE 28	COROFLAKE 29	COROFLAKE 60	TOPLINE 68	TOPLINE W
System specification								
Chemical Base of Resin EP= Expoxy, VE= Vinylester	VE	VE	VE	VE	VE	EP	EP	VE
Fillers S= Silica, A= Aluminium oxide, C= C Glass, M= Mica	C	M	M	C	C	M	S	S, A
Reinforcements GM= Glass Mats, IF= Inertflakes, GF= Glass Flakes	GF	IF	IF	GF	GF	IF	GM	GM
Build up								
Primer coat	1	1	1	1	1	1	1	1
Body coat - No.	1	1-2	1-2	2	2	1	1	1
Glass reinforcements	-	-	-	-	-	-	1	1
Top coats - No.	1	1	1	1	1	1	1	1
Dry film thickness mm	2,0	1,0-2,0	1,0-2,0	1,0-2,0	1,0-1,6	0,4	2,5	3,2
Substrate C= Concrete, S= Steel	S	C, S	C, S	S	S	C, S	C, S	C, S
Performance data - Mechanical properties								
Adhesion - to steel (DIN ISO 24624) Mpa	> 4	> 7	> 7	> 7	> 7	> 7	> 7	> 7
- to concrete Mpa	> 1,5	> 1,5	> 1,5	> 1,5	> 1,5	> 1,5	> 1,5	> 1,5
Abrasion resistance (ASTM – D 4060) mg	68	90	90	90	90	100	100	35
Barcol hardness (DIN EN59)	35	35	35	35	35	30	30	35
Compressive strength (DIN EN ISO 604) Mpa	42	40	40	42	42	35	50	70
Tensile strength (DIN EN ISO 527) Mpa	30	20	20	40	25	18	65	35
Physical properties								
Max. service temperature dry (° C)	160	220	120	180	230	110	150	-
Max. service temperature wet (° C)	90	70	70	70	70	60	80	75
Permeation resistance (ASTM-E 96) perm-inch	0,001	0,0016	0,0014	0,001	0,001	0,07	0,005	0,0031
Crack bridging capabilities (DIBt) mm	-	-	-	-	-	-	0,3	-
Application method								
H= Hand applied, T= Trowel, S= Spray, B= Brush or Roller	T	S, B	S, B	S	S, B	S, B	T, H	T, H

Rubber lining systems for Flue Gas Desulphurisation Plants

LINING AND COATING SYSTEMS

	DIN-Norm	CHEMOLINE 4A	CHEMOLINE 4B	CHEMOLINE 4/CN
Rubber type		soft rubber	soft rubber	soft rubber
Polymer	DIN ISO 1629	BIIR	BIIR	BIIR
Vulcanisation		autoclave	self vulcanised	pre vulcanised
Thickness mm		2-6	2-6	2-6
Density g/cm^3	DIN 53 479	1,27 ± 0,02	1,27 ± 0,02	1,30 ± 0,02
Hardness Shore A	DIN 53 505	55 ± 5	50 ± 5	50 ± 5
Tensile strength N/mm^2	DIN 53 504	≥ 5	≥ 5	≥ 5
Elongation at break	DIN 53 504	≥ 370 %	≥ 370 %	≥ 370 %
Adhesion to steel N/mm^2	DIN 53 531	≥ 4	≥ 4	≥ 3

Our service is your success



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