

PVC Cable Trays in a phosphoric acid plant





City: El Jadida
Country: Morocco (Africa)
Engineering: Jacobs SA
Installer: Samsung C&T
Years: 2014-2016

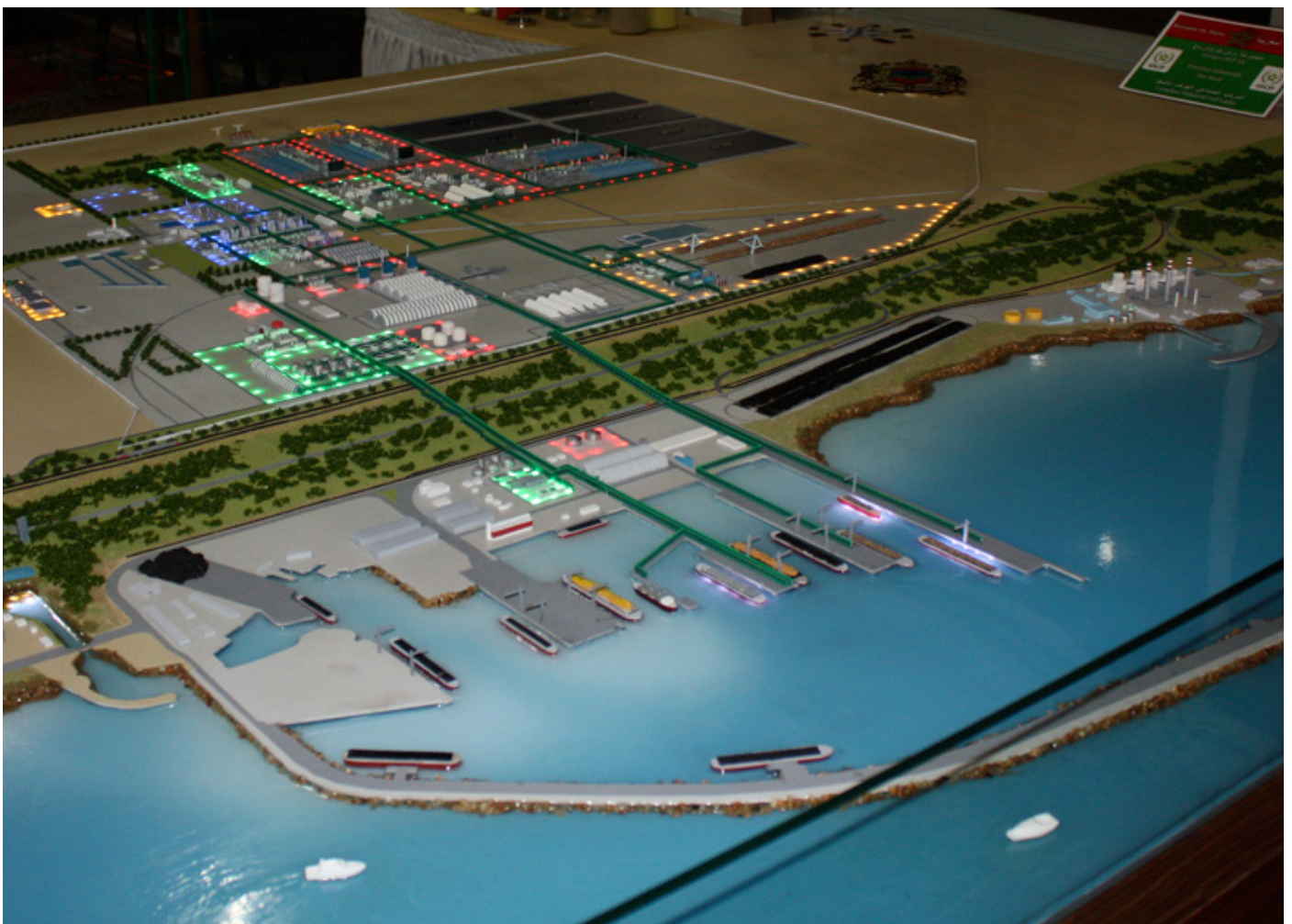
1. The site: Chemical complexes

To respond to the international market and develop a local phosphate industry, the project owner acquired the Safi chemical complex in 1965 and the Jorf Lasfar complex in 1984. These world-class facilities specialize in the production of phosphoric acid and fertilizer derivatives. About half of the production is concentrated then exported as semi-finished products (merchant grade phosphoric acid), while the other half is locally processed into solid fertilizers. Most of these fertilizers are shipped outside of Morocco. The share reserved for local customers is large enough to ensure the local market's total satisfaction.

In conjunction with the completion of this mineral pipeline, the owner built a new phosphoric acid production plant fired with the pulp originating from the terminal station. With a capacity of 1,400 tons of P_2O_5 /day (i.e. 450,000 tons of phosphoric acid per annum), this new unit allows to raise the production capacity of acid while providing greater flexibility of production and clear improvements in yields.

In addition to water and sunlight, plants have a vital need for three components that are essential to their development: nitrogen (N), phosphorous (P), and potassium (K). Arable lands naturally contain these three elements in varying proportions. Before the early 20th century, agriculture production did not call for large inputs of these elements; however, between 1900 and 2000, agricultural production increased by 600 percent.

As a result of this growth, it became necessary to add various amounts of these three elements to most land in order to improve its productivity. Today, between 40 and 60 percent of global food production requires the use of NPK fertilizer. Phosphorous alone represents a quarter of the 170 million tons of consumed nutrients per year.



If global agricultural production does not increase in this decade compared to the prior decade, we may face a global food output shortfall by 2050, when the world's population is anticipated to reach 9.2 billion people and arable land per capita is expected to drop from its current .20 hectares per capita level to .12. Therefore, food

production must increase by 70 percent, or 1.5 percent per year. This would be impossible without the use of chemical fertilizers. Cereal production, for example, will have to grow at an increased pace to serve expected consumption levels, which are currently between 400 and 1,500 daily grams per person worldwide. Industrial fertilizers, particularly phosphate fertilizers, provide an essential means to meet the planet's future dietary needs in a straightforward and effective way. They are the only way for populations to increase yields per hectare substantially and therefore limit the amount of land devoted to agriculture at the expense of an already strained forest cover.



From 50 million tons at present, demand for fertilizer will increase to around 70* million tons in 2020, an average growth of 2.6 percent per year. Therefore, 2 million additional tons of fertilizer will need to be produced each year.



2. The product installed: Basorplast BPE

BPE 60x100 to 60x300



Models (HxB) / Modelos (AxB):

60x100; 60x150; 60x200; 60x300; 100x200; 100x300; 100x400; 100x600.

Types: Slotted or solid bottom / Tipos: Perforadas o ciegas

Finishes / Acabados: PVC UVM1 RAL 7035

Characteristics of the tray / Características de la bandeja:

- Non metallic system / Sistema no metálico
- Resistant to UV radiation / Resistente a los rayos UV
- Excellent behaviour in outdoor / Excelente comportamiento al exterior
- Impact strength: 20J except 60x100 with 10J
Resistencia al impacto: 20J salvo 60x100 con 10J
- Minimum temperature / Temperatura mínima: -40°F (-40°C)
- Maximum temperature / Temperatura máxima: 140°F (60°C)
- Non-Flame propagating / No propagador de la llama
- No electrical continuity / Sin continuidad eléctrica
- Insulating / Aislante
- Dielectric Strength / Rigidez dieléctrica: 18+/-2 KV/mm
- High resistance to corrosion substances / Alta resistencia a las sustancias corrosivas (DIN 8061 & ISO/TR 10358)
- M1 reaction to fire / Reacción M1 al fuego: UNE 23727
- Glow wire test / Test de hilo incandescente: 1760°F (960°C) EN 60695-2-11
- Flammability / Inflamabilidad: UL 94-VO, ANSI/UL 94-1995
- LOI > 50% EN ISO 4589
- Comply / Cumple: RoHS 2011/65/UE
- Raw material without silicone / Materia prima sin silicona

BPE 100x200 to 100x600



Working Loads: Recommendation (Cargas de trabajo: Recomendación)

IEC 61537 SWL (CTA) kg/m (lb/ft)

MODELS	Temp. Max 40°C (104°F)				Temp. Max 60°C (140°F)			
	1 m span (Vano)		1.5 m span (Vano)		1 m span (Vano)		1.5 m span (Vano)	
	Kg/m	Lb/ft	Kg/m	Lb/ft	Kg/m	Lb/ft	Kg/m	Lb/ft
BPE-60X100	38	26	24	16	28	19	12	8
BPE-60X150	39	26	25	17	30	20	12	8
BPE-60X200	67	45	38	26	45	30	20	13
BPE-60X300	74	50	45	30	50	34	21	14
BPE-100X200	121	81	87	59	73	49	49	33
BPE-100X300	123	83	89	60	81	54	50	34
BPE-100X400	178	120	108	73	114	77	68	46
BPE-100X600	212	142	121	81	133	89	96	65

NOTE: Tests according to IEC 61537 (limited deflection) Type II test, with 1.7 Safety factor
 NOTA: Ensayos realizados según IEC 61537 (flecha máxima) Ensayo Tipo II con factor seguridad de 1.7

NEMA Cable Tray Classification (U.S.) - UL 568 SWL kg/m (lb/ft)

MODELS	NEMA	Temp. Max 40°C (104°F)				NEMA	Temp. Max 60°C (140°F)			
		1.8m (6 ft) span		2.4m (8 ft) span			1.8m (6 ft) span		2.4m (8 ft) span	
		Kg/m	Lb/ft	Kg/m	Lb/ft		Kg/m	Lb/ft	Kg/m	Lb/ft
BPE-60X100	-	5,5	3,7	3,1	2,1	-	3,6	2,4	2,0	1,3
BPE-60X150	-	7,6	5,1	4,2	2,8	-	4,9	3,2	2,7	1,8
BPE-60X200	-	34,3	23,1	19,3	13,0	-	22,4	15,0	12,6	8,4
BPE-60X300	5AA	37,8	25,4	21,2	14,2	-	24,6	16,5	13,8	9,3
BPE-100X200	5A	59,0	39,6	33,1	22,3	5AA	38,4	25,8	21,6	14,5
BPE-100X300	8AA	93,2	62,6	52,4	35,2	5A	60,7	40,8	34,1	22,9
BPE-100X400	8A	144,6	97,2	81,3	54,6	8AA	94,2	63,3	53,0	35,6
BPE-100X600	8B	216,5	145,4	121,7	81,8	8A	141,0	94,7	79,3	53,3

NOTE: Tests acc. UL 568 Method A (Load Before Destruction), 1.5 Safety factor
 NOTA: Ensayo s./ UL 568 Método A (Carga antes de destrucción), factor seguridad de 1,5

INSTRUCTIONS FOR USE

Assembly: H60 (2 union joints + 4 bolts) H100 (2 union joints + 8 bolts).

Installation: Not allowed under other canalisation such as water, vapour or gas.

Ventilation: Minimum distance between each tray of 250 mm.

Enviroments: Wet, salty and chemical.

Expansions: Depending of the expected growth in the temperatura (AT) leave a gap (h) between cable trays according to the following table.

INSTRUCCIONES DE USO

Ensamblado: H60 (2 uniones + 4 tornillos) H100 (2 uniones + 8 tornillos).

Instalación: No permitido bajo otras canalizaciones como agua, vapor o gas.

Ventilación: Distancia mínima entre bandejas de 250 mm.

Ambientes: Húmedos, salinos y químicos.

Expansiones: Dependiendo de las variaciones de temperature (AT) dejar un espacio (h) entre las bandejas acorde a la siguiente tabla:

Expected Temp. Growth	GAP	
	ΔT (°F)	ΔT (°C)
36	20	5
54	30	7
72	40	9
90	50	11

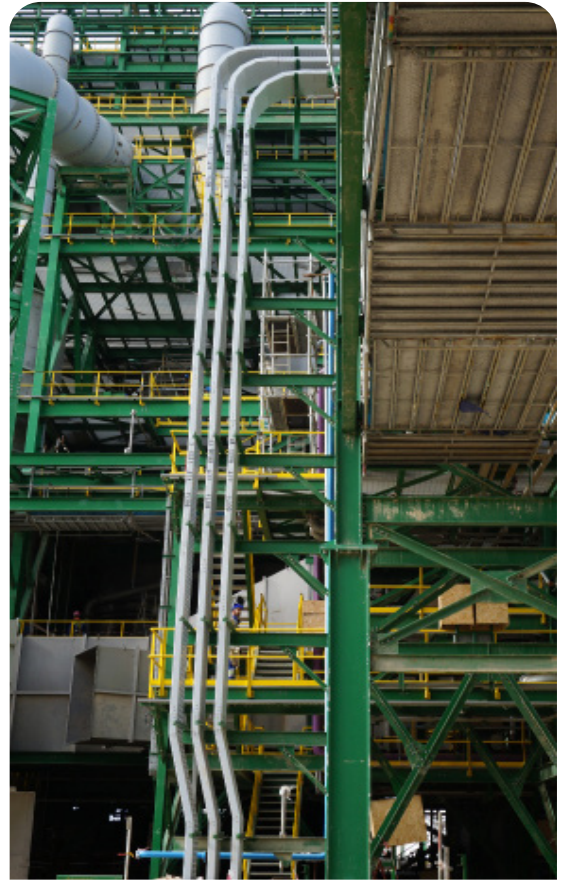
3. Other information about the BPE series

INSTALLATION RECOMMENDATION

- Trays for electrical systems can not be installed under other types of pipelines with risk of water, vapour or gas loss
- The correct support interval must be 3,3ft
- To guarantee a good ventilation, the installed trays must be a minimum distance of 250mm between them
- No grounding needed

TECHNICAL SPECIFICATIONS

- Product: Cable Management System for outdoor
- Raw Material: PVC polymer. UV resistant
- Listing according to UL-568
- Minimum temperature: -20°/ -4F°
- Maximum temperature: 60°/140 F°
- Accessories: Flat bend, inside bend, outside bend & supports (Tee & Cross under demand)
- Insulating
- Covers: For accessories & end covers
- Fittings: Union joints, screws, nuts & derivations
- Material Dimensions:
 - Height: 2.2/5" & 4"
 - Width: 4", 6", 8"



4. Chemical Resistance according to ISO/TR 10358

Agressive Medium	Concentration	Temperature	Material		
			PP	PVC	PE
fruit wine		20	●	●	●
		40			
		60			
		80			
		100			
fats and oils*, vegetale		20	●	●	●
		40	●	○	○
		60	○		
		80			
		100			
oleum vapours*	low	20	○	●	○
		40			
		60			
		80			
		100			
olive oil*		20	●	●	●
		40	●	●	●
		60	●	●	○
		80	●		
		100			
oleic acid	technically pure	20	●	●	●
		40	●	●	●
		60	○	●	○
		80			
		100			
oxalic acid*	cold saturated, hydrous	20	●	●	●
		40	●	●	●
		60	●	●	●
		80			
		100			
oxygen*	up to 2%, in air	20	○	●	○
		40	○		○
		60			
		80			
		100			
	cold saturated, hydrous	20	○	●	○
		40	○	●	○
		60			
		80			
		100			
paraffin oil		20	●	●	●
		40	●	●	●
		60	○	○	●
		80			
		100			
perchloroethylene (tetrachloroethylene)	technically pure	20	○	○	○
		40			
		60			
		80			
		100			
perchloric acid*	10%, hydrous	20	●	●	●
		40	●	●	●
		60	●	○	●
		80			
		100			
petroleum ether*	technically pure	20	●	●	●
		40	●	●	○
		60	○	●	○
		80			
		100			
petroleum	technically pure	20	●	●	●
		40	○	●	●
		60	○	○	○
		80			
		100			
phenol*	up to 10%, hydrous	20	●	●	●
		40	●	○	●
		60	●		○
		80			
		100			
	up to 90%, hydrous	20	●	○	●
		40	●		●
		60	●		○
		80			
		100			
phosgene*	technically pure, gaseous	20	○	●	○
		40		○	
		60		○	
		80			
		100			
phosphor chloride:*	technically pure	20	●	○	●
		40			
		60	○		○
		80			
		100			
-phosphor-penta-chloride		20	ng	ng	ng
		40			
		60			
		80			
		100			
-phosphoryl chloride		20	ng	ng	ng
		40			
		60			
		80			
		100			
phosphoric acid	up to 30%, hydrous	20	●	●	●
		40	●	●	●
		60	●	●	●
		80	●		
		100			
	up to 50%, hydrous	20	●	●	●
		40	●	●	●
		60	●	●	●
		80			
		100			
	85%, hydrous	20	●	●	●
		40	●	●	●
		60	●	●	○
		80	●		
		100	●		
phthalic acid*	saturated, hydrous	20	●	●	●
		40	●	○	●
		60	●	○	●
		80			
		100			
picric acid*	1%, hydrous	20	●	●	●
		40			
		60			
		80			
		100			

Agressive Medium	Concentration	Temperature	Material		
			PP	PVC	PE
phosphoric acid	up to 30%, hydrous	20	●	●	●
		40	●	●	●
		60	●	●	●
		80	●		
		100			

Key

●	resistant
○	limited resistant
○	not resistant
ng	not testet
*	stress cracking
GL	saturated solution
°	moisture expansion/softening

5. Some pictures of the installation



6. Some pictures of the installation



7. Some pictures of the installation



BE Basor

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