

**Max Perlès**  
advanced industrial linings



*technical manual*  
*oil & gaz*

*PETROPERL systems*



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and “*max perles*” inside coatings for tanks and reservoirs

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Note 1:

We also propose double envelope coatings for underground hydrocarbon-containing tanks. Please consult us.

Note 2:

Specific systems have been designed for the vapor barrier component of insulating containment systems for concrete on-land LNG storage tanks. Please consult us.



## The Oil & Gas INDUSTRY and *maxperlès* interior coatings for tanks and reservoirs

### Why protect the interior of tanks and reservoirs?

#### Optimized Asset Management :

To prevent or to stop the degradation of infrastructure, hence significantly increasing its life expectancy and operating period, therefore generating a *positive return on the investment in the coating*.

#### Functionally:

To apply a *sealed barrier* between corrosive agents present in hydrocarbons (such as sulphides resulting from the presence of sulphate-reducing bacteria or aqueous residues) and the steel.

#### Technically:

- To facilitate maintenance by simple, low-cost cleaning operations thanks to the smooth, glossy and homogeneous finish of our coatings.
- To benefit from the advantages of a material chemically resistant to contact with the stored hydrocarbons, in accordance with applicable health and toxicological regulations.

### Advantages of max perlès coatings :

#### Health and Safety :

They are *solvent-free* and made of *non-toxic and non-polluting substances* . This *protects the environment* and allows them to be applied under *health and safety conditions* vital for both the personnel involved and the quality of the implementation. In particular , they *contain no carcinogenic or mutagenic substances or substances that are toxic to reproduction (CMRs)*.

#### Quality Assurance :

Our Research & Development and Technical Assistance Departments work in collaboration to develop our products' reliability, as well as to fine-tune new products, for a quality that we strive to always improve – *a must for ISO 9001-2015 certification* – to better meet the users' expectations and those of an *environment* more and more strictly governed by *regulations*.

#### Technical Assistance :

Our Technical Assistance Department offers upon request training or advice to application companies by assisting them before and/or during their work. It also operates post-application visits upon request by the Applicator or the end customer to detect possible defects.

#### Recognition from the professional trade:

Our coatings and linings are tested by laboratories approved by the oil companies.

### Warranties:

#### The expression of reliability

Max Perlès coating systems are guaranteed for the duration indicated on the specification supplied for each project . This guarantee is based on a specific *Insurance Policy* issued by a world-class Insurance Company . Our Application partners , once trained by us , should supply a similar guarantee on their workmanship . The end customer can then request from the manufacturer/applicator partnership a *Joint Guarantee* indicating that any failure of the coating during the warranty period resulting from bad product quality or its incorrect application will be corrected free of charge for the client.

UPWARDS OF 10 MILLION SQM OF CAPACITIES HAVE BEEN PROTECTED WITH  
OUR PRODUCTS OVER THE LAST 60 YEARS.

## Technical specification

# Internal protection of oil and gas storage tanks general specification

### *Introduction*

This specification describes our solutions for protecting the interior of metallic hydrocarbon storage tanks within the limits of the indicated temperatures and depending on their eventual corrosion degree.

It is completed by the product Data Sheets in Appendix 1 and by the Technical Advices describing how to apply them and how to check their application in Appendix 2.

Lastly, the reference list can be used to evaluate the variety and age of the MAX PERLES coatings that have been applied.

### *Surface preparation*

The environmental conditions, steel preparation, sand-blasting, eventual application of stand-by primer and treatment of any special points are described in Technical Advice nr 2 "Specification for steel preparation".

### *Choice of max perles coatings*

Our coatings can be applied as **single-layer anti-corrosion protection** or **reinforced with fiberglass**.

**The choice between these two solutions, and therefore the choice of the final thickness of the coating, will depend on the degree of existing corrosion of the substrate.**

### *Performance testing and retouching*

These controls must be carried out to check the efficiency of the implementation of the coating. They are carried out by the Application company or by the client, or by both jointly, both during and after the application.

They are executed according to the processes described in **Technical Advices Nr.3 "Performance testing"** and **Nr.4 "Dielectric testing"**.

The appropriate corrective action is described in **Technical Advice Nr.5 "Retouching"**.

### *Delay before commissioning*

It depends on the coating's curing temperature, i.e:

- at 10°C: 10 days
- at 20°C: 7 days
- at 30°C: 4 days
- at 40°C: 3 days



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## sheet ex.nr.100B Petroperl® 600μ, on Sa 2.5 and Primer

### Anti-corrosion protective coating

- made of:* single-layer solventfree epoxy
- for:* tanks and reservoirs
- in contact with:* petroleum products, fuels and oils, greases and paraffin hydrocarbons at  $t^{\circ} \leq 80^{\circ}\text{C}$
- substrate:* new steel or existing steel in a very good surface state <sup>(1)</sup> (that must be insulated or reinforced if  $t^{\circ} \geq 60^{\circ}\text{C}$ )

#### Preparation as per *Technical Advice nr.2*

*“Specification for preparation of steel”, and as a minimum:*

- ◆ Grinding of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
- ◆ Blasting <sup>(2)</sup> by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
- ◆ Removal of dust with industrial vacuum cleaner
- ◆ Application while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy **Primer EDA**, 30 μm dry film, **150 g/sqm**  
Or of **Primer EDP**, solvent borne epoxy, 40 μm dry film, **150 g/sqm**

#### Coating Petroperl® – thickness 0.6 mm:

- ◆ Application of **Petroperl® T**:  
In 1 layer using airless spray 45/1 minimum,  
Theoretical consumption: **800 g/sqm** for **600 microns**
- ◆ Checking as per *Technical Advice nr.3* “Performance testing” and *nr.4* “Dielectric testing”
- ◆ Repair of defects as per *Technical Advice nr.5* “Retouching”

*Application conditions:* In accordance with the rules of the art and the indications of our data sheets and technical advices.

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 5 years.*

In accordance with Circular G32 of the OHGPI.

*This proposal is based on our n°FA0095300, products civil liability insurance policy “after delivery”, within its terms and limitations  
To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*



- <sup>(1)</sup> This specification is for works to a maximum of state D according to standard ISO 8501-1988 - page 15:  
If corrosion exceeds the state D, the implementation of a **reinforced with glassfiber Petroperl® R** structure is necessary before the application of the topcoat **Petroperl® T**.
- <sup>(2)</sup> In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application.  
If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.



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## sheet ex.nr.101B

### Petroperl® 800μ, on Sa 2.5 and Primer

## Anti-corrosion protective coating

<i>made of:</i>	single-layer solventfree epoxy
<i>for:</i>	tanks and reservoirs
<i>in contact with:</i>	petroleum products, fuels and oils, greases and paraffin hydrocarbons at $80^{\circ}\text{C} < t^{\circ} \leq 95^{\circ}\text{C}$
<i>substrate:</i>	new steel or existing steel in a very good surface state <sup>(1)</sup> (that must be insulated or reinforced if $t^{\circ} \geq 60^{\circ}\text{C}$ )

Preparation as per *Technical Advice nr.2*

*“Specification for preparation of steel”, and as a minimum:*

◆ Grinding	of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
◆ Blasting <sup>(2)</sup>	by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
◆ Removal	of dust with industrial vacuum cleaner
◆ Application	while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy <b>Primer EDA</b> , 30 μm dry film, <b>150 g/sqm</b> Or of <b>Primer EDP</b> , solvent borne epoxy, 40 μm dry film, <b>150 g/sqm</b>

*Coating Petroperl® – thickness 0.8 mm:*

◆ Application	of <b>Petroperl® T</b> : In 1 layer using airless spray 45/1 minimum, Theoretical consumption: <b>1100 g/sqm</b> for <b>800 microns</b>
◆ Checking	as per <i>Technical Advice nr.3</i> “Performance testing” and <i>nr.4</i> “Dielectric testing”
◆ Repair	of defects as per <i>Technical Advice nr.5</i> “Retouching”

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 7 years.*

In accordance with Circular G32 of the OHGPI.

*This proposal is based on our n°FA0095300, products civil liability insurance policy “after delivery”, within its terms and limitations  
To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*

- (1) **This specification is for works to a maximum of state D according to standard ISO 8501-1988 - page 15:**  
If corrosion exceeds the state D, the implementation of a **reinforced with glassfiber Petroperl® R** structure is necessary before the application of the topcoat **Petroperl® T**.
- (2) **In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application.**  
If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.



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## sheet ex.nr.102B

### Petroperl® 1000μ, on Sa2.5 and Primer

## Anti-corrosion protective coating

- made of:* single-layer solventfree epoxy
- for:* tanks and reservoirs
- in contact with:* petroleum products, fuels and oils, greases and paraffin hydrocarbons at  $t \leq 95^{\circ}\text{C}$
- substrate:* new steel or existing steel in a very good surface state <sup>(1)</sup> (that must be insulated or reinforced if  $t^{\circ} \geq 60^{\circ}\text{C}$ )

Preparation as per *Technical Advice nr.2*

*"Specification for preparation of steel", and as a minimum:*

- ◆ Grinding of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
- ◆ Blasting <sup>(2)</sup> by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
- ◆ Removal of dust with industrial vacuum cleaner
- ◆ Application while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy **Primer EDA**, 30 μm dry film, **150 g/sqm**  
Or of **Primer EDP**, solvent borne epoxy, 40 μm dry film, **150 g/sqm**

*Coating Petroperl® – thickness 1 mm:*

- ◆ Application of **Petroperl® T**:  
In 1 layer using airless spray 45/1 minimum,  
Theoretical consumption: **1350 g/sqm** for **1000 microns**
- ◆ Checking as per *Technical Advice nr.3* "Performance testing" and *nr.4* "Dielectric testing"
- ◆ Repair of defects as per *Technical Advice nr.5* "Retouching"

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 10 years.*

In accordance with Circular G32 of the OHGPI.

*This proposal is based on our n°FA0095300, products civil liability insurance policy "after delivery", within its terms and limitations  
To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*



- (1) This specification is for works to a maximum of state D according to standard ISO 8501-1988 - page 15:  
If corrosion exceeds the state D, the implementation of a **reinforced with glassfiber Petroperl® R** structure is necessary before the application of the topcoat **Petroperl® T**.
- (2) In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application.  
If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.





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# sheet ex.nr.203B

## Naphtoperl® T 1000μ, on Sa2.5 and Primer

### Anti-corrosion protective coating

*made of:* single-layer solventfree epoxy

*for:* tanks and reservoirs

*in contact with:* petroleum products including ethanol-containing up to E25, fuels and oils, greases and paraffin hydrocarbons at  $t \leq 60^{\circ}\text{C}$

*substrate:* new steel or existing steel in a very good surface state <sup>(1)</sup> (that must be insulated or reinforced if  $t^{\circ} \geq 60^{\circ}\text{C}$ )

#### Preparation as per *Technical Advice nr.2*

*"Specification for preparation of steel", and as a minimum:*

- ◆ Grinding of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
- ◆ Blasting <sup>(2)</sup> by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
- ◆ Removal of dust with industrial vacuum cleaner
- ◆ Application while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy **Primer EDA**, 30 μm dry film, **150 g/sqm**  
Or of **Primer EDP**, solvent borne epoxy, 40 μm dry film, **150 g/sqm**

#### Coating Naphtoperl T® – thickness 1 mm:

- ◆ Application of **Naphtoperl® T**:  
In 1 layer using airless spray 45/1 minimum,  
Theoretical consumption: **1500 g/sqm** for **1000 microns**
- ◆ Checking as per *Technical Advice nr.3* "Performance testing" and *nr.4* "Dielectric testing"
- ◆ Repair of defects as per *Technical Advice nr.5* "Retouching"

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A loss factor has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 10 years.*

In accordance with Circular G32 of the OHGPI.

*This proposal is based on our n°FA0095300, products civil liability insurance policy "after delivery", within its terms and limitations To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*

◆◆◆◆◆

- (1) This specification is for works to a maximum of state D according to standard ISO 8501-1988 - page 15:  
If corrosion exceeds the state D, the implementation of a reinforced with glassfiber **Petroperl® R** structure is necessary before the application of the topcoat **Naphtoperl® T**.
- (2) In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application.  
If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.





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# sheet ex.nr.110B

## Petroperl® / 1 glass mat / topcoat 400μ

### Anti-corrosion reinforced protective coating

*made of:* solvent-free epoxy reinforced with 450 g/sqm of fiberglass

*for:* tanks and reservoirs  
*in contact with:* petroleum products, fuels and oils, greases and paraffin hydrocarbons at  $t \leq 60^{\circ}\text{C}$

*substrate:* existing steel with residual thickness at all points of more than 2.5 mm

*Preparation as per [Technical Advice nr.2](#)*

*“Specification for preparation of steel”, and as a minimum:*

- ◆ **Grinding** of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
- ◆ **Blasting <sup>(1)</sup>** by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
- ◆ **Removal** of dust with industrial vacuum cleaner
- ◆ **Application** while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy **Primer EDA**, 30 μm dry film, **150 g/sqm**  
Or of **Primer EDP**, solvent borne epoxy, 40 μm dry film, **150 g/sqm**

*System Petroperl® / 1 glass mat 450 – thickness 2 mm:*

- ◆ **Uninterrupted laminate** of fiberglass/epoxy **Petroperl® R**, as per [Technical Advice nr.14](#):  
**Petroperl® R** coat for **impregnation**, using a roller, **600 microns, 800 g/sqm**  
**M450 type glass mat**, to be unrolled, and debubbled using a special roller, **450 g/sqm**  
**Petroperl® R** coat for **saturation**, using a roller, **500 microns, 700 g/sqm**  
**Silica SBO** to be sprinkled while progressing by mechanical projection, **400 g/sqm**
- ◆ **Checking** with [Technical Advice nr.3](#) “Performance testing” and [nr.4](#) “Dielectric testing”
- ◆ **Repair** of defects as per [Technical Advice nr.5](#) “Retouching”
- ◆ **Top coat** One coat of **Petroperl® T**, using airless spray or roller, **400 microns, 550 g/sqm**

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 10 years.*

In accordance with Circular G32 of the OHGPI.

*This proposal is based on our n°FA0095300, products civil liability insurance policy “after delivery”, within its terms and limitations. To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*



- <sup>(1)</sup> In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application.  
If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.



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## sheet ex.nr.111B Petroperl® / 1 glass mat / topcoat 800μ

### Anti-corrosion reinforced protective coating

*made of:* solvent-free epoxy reinforced with 450 g/sqm of fiberglass

*for:* tanks and reservoirs  
*in contact with:* petroleum products, fuels and oils, greases and paraffin hydrocarbons of  $60^{\circ}\text{C} < t^{\circ} \leq 95^{\circ}\text{C}$

*substrate:* existing steel with residual thickness at all points of more than 2.5 mm

*Preparation as per [Technical Advice nr.2](#)*

*“Specification for preparation of steel”, and as a minimum:*

- ◆ **Grinding** of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
- ◆ **Blasting <sup>(1)</sup>** by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
- ◆ **Removal** of dust with industrial vacuum cleaner
- ◆ **Application** while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy **Primer EDA**, 30 μm dry film, **150 g/sqm**  
Or of **Primer EDP**, solvent borne epoxy, 40 μm dry film, **150 g/sqm**

*System Petroperl® / 1 glass mat 450 – thickness 2.4 mm:*

- ◆ **Uninterrupted laminate** of fiberglass/epoxy **Petroperl® R**, as per [Technical Advice nr.14](#):  
**Petroperl® R** coat for **impregnation**, using a roller, **600 microns, 800 g/sqm**  
**M450 type glass mat**, to be unrolled, and debubbled using a special roller, **450 g/sqm**  
**Petroperl® R** coat for **saturation**, using a roller, **500 microns, 700 g/sqm**  
**Silica SBO** to be sprinkled while progressing by mechanical projection, **400 g/sqm**
- ◆ **Checking** with [Technical Advice nr.3](#) “Performance testing” and [nr.4](#) “Dielectric testing
- ◆ **Repair** of defects as per [Technical Advice nr.5](#) “Retouching”
- ◆ **Top coat** One coat of **Petroperl® T**, using airless spray or roller, **800 microns, 1100 g/sqm**

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 10 years.*

In accordance with Circular G32 of the OHGPI.

*This proposal is based on our n°FA0095300, products civil liability insurance policy “after delivery”, within its terms and limitations To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*



- <sup>(1)</sup> In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application. If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.



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## sheet ex.nr.112B Petroperl® / 3 glass mats / topcoat 400μ

### Anti-corrosion reinforced protective coating

<i>made of:</i>	solvent-free epoxy reinforced with 1350 g/sqm of fiberglass
<i>for:</i>	tanks and reservoirs
<i>in contact with:</i>	petroleum products, fuels and oils, greases and paraffin hydrocarbons at $t \leq 60^{\circ}\text{C}$
<i>substrate:</i>	existing steel with penetrating or localized through corrosion

Preparation as per *Technical Advice no.2*

*"Specification for preparation of steel", and as a minimum:*

◆ Grinding	of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
◆ Blasting <sup>(1)</sup>	by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
◆ Removal	of dust with industrial vacuum cleaner
◆ Application	while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy <b>Primer EDA</b> , 30 μm dry film, <b>150 g/sqm</b> Or of <b>Primer EDP</b> , solvent borne epoxy, 40 μm dry film, <b>150 g/sqm</b>

*System Petroperl® / 3 glass mats 450 – thickness 4 mm:*

◆ Uninterrupted laminate	of fiberglass/epoxy <b>Petroperl® R</b> , as per <i>Technical Advice nr.14</i> : One <b>impregnating</b> coat of <b>Petroperl® R</b> , using a roller, <b>600 microns, 800 g/sqm</b> <b>M450 type glass mat</b> , to be unrolled, and debubbled using a special roller, <b>450 g/sqm</b> Same operation for the <b>2<sup>nd</sup></b> , then the <b>3<sup>rd</sup></b> glass mat One <b>saturation</b> coat of <b>Petroperl® R</b> , using a roller, <b>500 microns, 700 g/sqm</b> <b>Silica SBO</b> to be sprinkled while progressing by mechanical projection, <b>400 g/sqm</b>
◆ Checking	with <i>Technical Advice nr.3</i> "Performance testing" and <i>nr.4</i> "Dielectric testing
◆ Repair	of defects as per <i>Technical Advice nr.5</i> "Retouching"
◆ Top coat	One coat of <b>Petroperl® T</b> , using airless spray or roller, <b>400 microns, 550 g/sqm</b>

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 10 years.*

In accordance with Circular G32 of the OHGPI.

*This proposal is based on our n°FA0095300, products civil liability insurance policy "after delivery", within its terms and limitations To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*

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- (1) In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application.  
If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.



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## sheet ex.nr.113B Petroperl® / 3 glass mats / topcoat 800μ

### Anti-corrosion reinforced protective coating

<i>made of:</i>	solvent-free epoxy reinforced with 1350 g/sqm of fiberglass
<i>for:</i>	tanks and reservoirs
<i>in contact with:</i>	petroleum products, fuels and oils, greases and paraffin hydrocarbons at $60^{\circ}\text{C} < t^{\circ} \leq 95^{\circ}\text{C}$
<i>substrate:</i>	existing steel with penetrating or localized through corrosion

#### Preparation as per *Technical Advice no.2*

*"Specification for preparation of steel", and as a minimum:*

- ◆ Grinding of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
- ◆ Blasting <sup>(1)</sup> by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
- ◆ Removal of dust with industrial vacuum cleaner
- ◆ Application while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy **Primer EDA**, 30 μm dry film, **150 g/sqm**  
Or of **Primer EDP**, solvent borne epoxy, 40 μm dry film, **150 g/sqm**

#### System Petroperl / 3 glass mats 450 – thickness 4.4 mm:

- ◆ Uninterrupted laminate of fiberglass/epoxy **Petroperl® R**, as per *Technical Advice nr.14*:  
One **impregnating** coat of **Petroperl® R**, using a roller, **600 microns, 800 g/sqm**  
**M450 type glass mat**, to be unrolled, and debubbled using a special roller, **450 g/sqm**  
Same operation for the **2<sup>nd</sup>**, then the **3<sup>rd</sup>** glass mat  
One **saturation** coat of **Petroperl® R**, using a roller, **500 microns, 700 g/sqm**  
**Silica SBO** to be sprinkled while progressing by mechanical projection, **400 g/sqm**  
with *Technical Advice nr.3* "Performance testing" and *nr.4* "Dielectric testing" of defects as per *Technical Advice nr.5* "Retouching"
- ◆ Checking One coat of **Petroperl® T**, using airless spray or roller, **800 microns, 1100 g/sqm**
- ◆ Repair
- ◆ Top coat

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 10 years.*

In accordance with Circular G32 of the OHGPI

*This proposal is based on our n°FA0095300, products civil liability insurance policy "after delivery", within its terms and limitations  
To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*



- (1) In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application.  
If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.

# sheet ex.nr.190B

## Petroperl®/1 glass mat topcoat Naphtoperl® T 400μ

### Anti-corrosion reinforced protective coating

<i>made of:</i>	solvent-free epoxy reinforced with 450 g/sqm of fiberglass + specific topcoat
<i>for:</i>	tanks and reservoirs
<i>in contact with:</i>	petroleum products including ethanol-containing up to E25, fuels and oils, greases and paraffin hydrocarbons at $t \leq 60^{\circ}\text{C}$
<i>substrate:</i>	existing steel with residual thickness at all points of more than 2.5 mm

#### Preparation as per *Technical Advice nr.2*

*"Specification for preparation of steel", and as a minimum:*

◆ Grinding	of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
◆ Blasting <sup>(1)</sup>	by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
◆ Removal	of dust with industrial vacuum cleaner
◆ Application	while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy <b>Primer EDA</b> , 30 μm dry film, <b>150 g/sqm</b> Or of <b>Primer EDP</b> , solvent borne epoxy, 40 μm dry film, <b>150 g/sqm</b>

#### System Petroperl® / 1 glass mat 450 / topcoat Naphtoperl® T – thickness 2 mm:

◆ Uninterrupted laminate	of fiberglass/epoxy <b>Petroperl® R</b> , as per <i>Technical Advice nr.14</i> : <b>Petroperl® R</b> coat for <b>impregnation</b> , using a roller, <b>600 microns, 800 g/sqm</b> <b>M450 type glass mat</b> , to be unrolled, and debubbled using a special roller, <b>450 g/sqm</b> <b>Petroperl® R</b> coat for <b>saturation</b> , using a roller, <b>500 microns, 700 g/sqm</b> <b>Silica SBO</b> to be sprinkled while progressing by mechanical projection, <b>400 g/sqm</b>
◆ Checking	with <i>Technical Advice nr.3</i> "Performance testing" and <i>nr.4</i> "Dielectric testing"
◆ Repair	of defects as per <i>Technical Advice nr.5</i> "Retouching"
◆ Top coat	One coat of <b>Naphtoperl® T</b> , using airless spray 45/1 minimum, <b>400 microns, 600 g/sqm</b>

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 10 years.*

In accordance with Circular G32 of the OHGPI.

*This proposal is based on our n°FA0095300, products civil liability insurance policy "after delivery", within its terms and limitations To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*

◆◆◆◆◆

<sup>(1)</sup> In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application. If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.

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# sheet ex.nr.191B

## Petroperl®/2 glass mats topcoat Naphtoperl® T 400µ

### Anti-corrosion reinforced protective coating

<i>made of:</i>	solvent-free epoxy reinforced with 900 g/sqm of fiberglass + specific topcoat
<i>for:</i>	tanks and reservoirs
<i>in contact with:</i>	petroleum products including ethanol-containing up to E25, fuels and oils, greases and paraffin hydrocarbons at $t \leq 60^{\circ}\text{C}$
<i>substrate:</i>	existing steel with residual thickness at all points of more than 2.5 mm

#### Preparation as per *Technical Advice nr.2*

*"Specification for preparation of steel", and as a minimum:*

◆ Grinding	of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
◆ Blasting <sup>(1)</sup>	by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
◆ Removal	of dust with industrial vacuum cleaner
◆ Application	while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy <b>Primer EDA</b> , 30 µm dry film, <b>150 g/sqm</b> Or of <b>Primer EDP</b> , solvent borne epoxy, 40 µm dry film, <b>150 g/sqm</b>

#### System Petroperl® / 2 glass mats 450 / topcoat Naphtoperl® T – *thickness 3 mm:*

◆ Uninterrupted laminate	of fiberglass/epoxy <b>Petroperl® R</b> , as per <i>Technical Advice nr.14:</i> <b>Petroperl® R</b> coat for <b>impregnation</b> , using a roller, <b>600 microns, 800 g/sqm</b> <b>M450 type glass mat</b> , to be unrolled, and debubbled using a special roller, <b>450 g/sqm</b> Same operation for the <b>2<sup>nd</sup></b> glass mat <b>Petroperl® R</b> coat for <b>saturation</b> , using a roller, <b>500 microns, 700 g/sqm</b> <b>Silica SB0</b> to be sprinkled while progressing by mechanical projection, <b>400 g/sqm</b> with <i>Technical Advice nr.3</i> "Performance testing" and <i>nr.4</i> "Dielectric testing"
◆ Checking	of defects as per <i>Technical Advice nr.5</i> "Retouching"
◆ Repair	One coat of <b>Naphtoperl® T</b> , using airless spray 45/1 minimum, <b>400 microns, 600 g/sqm</b>
◆ Top coat	

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

**Guarantee: 10 years.**

*This proposal is based on our n°FA0095300, products civil liability insurance policy "after delivery", within its terms and limitations To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*



<sup>(1)</sup> In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application. If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.

# sheet ex.nr.192B

## Petroperl®/3 glass mats topcoat Naphtoperl® T 400μ

### Anti-corrosion reinforced protection

- made of:* solvent-free epoxy reinforced with 1350 g/sqm of fiberglass + specific topcoat
- for:* tanks and reservoirs
- in contact with:* petroleum products including ethanol-containing up to E25, fuels and oils, greases and paraffin hydrocarbons at  $t \leq 60^{\circ}\text{C}$
- substrate:* existing steel with penetrating or localized through corrosion

#### Preparation as per *Technical Advice no.2*

*"Specification for preparation of steel", and as a minimum:*

- ◆ Grinding of barbs and welding projections until elimination, and of weld beads and sharp angles for softening
- ◆ Blasting <sup>(1)</sup> by any appropriate means to obtain minimum Sa 2.5 standard, with an average Medium G - Rt 50-75 microns profile
- ◆ Removal of dust with industrial vacuum cleaner
- ◆ Application while progressing and before any flash-rusting, of one stand-by coat of colorless waterborne epoxy **Primer EDA**, 30 μm dry film, **150 g/sqm**  
Or of **Primer EDP**, solvent borne epoxy, 40 μm dry film, **150 g/sqm**

#### System Petroperl® / 3 glass mats 450 / topcoat Naphtoperl® T – thickness 4 mm:

- ◆ Uninterrupted laminate of fiberglass/epoxy **Petroperl® R**, as per *Technical Advice nr.14*:  
One **impregnating** coat of **Petroperl® R**, using a roller, **600 microns, 800 g/sqm**  
**M450 type glass mat**, to be unrolled, and debubbled using a special roller, **450 g/sqm**  
Same operation for the **2<sup>nd</sup>**, then the **3<sup>rd</sup>** glass mat  
One **saturation** coat of **Petroperl® R**, using a roller, **500 microns, 700 g/sqm**  
**Silica SBO** to be sprinkled while progressing by mechanical projection, **400 g/sqm**
- ◆ Checking with *Technical Advice nr.3* "Performance testing" and *nr.4* "Dielectric testing"
- ◆ Repair of defects as per *Technical Advice nr.5* "Retouching"
- ◆ Top coat One coat of **Naphtoperl® T**, using airless spray 45/1 minimum, **400 microns, 600 g/sqm**

*Application conditions: In accordance with the rules of the art and the indications of our data sheets and technical advices.*

A **loss factor** has to be added for practical consumption, **about 15%**, according to means and methods used.

*Guarantee: 10 years.*

In accordance with Circular G32 of the OHGPI.

*This proposal is based on our n°FA0095300, products civil liability insurance policy "after delivery", within its terms and limitations  
To become effective, it must have been formalised in a duly signed guarantee commitment certificate.*



- <sup>(1)</sup> In case of sweating of steel plates loaded with oily products, observe a 48 h delay after blasting before application.  
If brown stains appear within the 48h, a new blasting of the affected areas must be done until they disappear.



## Technical specification



## Insurance Certificate – General Liability

We **SCOR Europe SE**, located 5 Avenue Kléber - 75 116 Paris - France, hereby certifies that the company:

**MAX PERLES et Cie**  
4 rue du Professeur René Dubois  
60119 HENONVILLE

is insured under the policy n° **FA0095300** underwritten with our Company in respect of pecuniary consequences of general liability risks that may result from the Insured's Premises and due to Insured activities as mentioned in the policy.

Activity: Sale of products for the execution of covering work for storage and transport capacities in the field of oil and gas.

The guarantees of the Contract are exercised up to the amounts indicated below:

Combined Insurance limit:

**PUBLIC LIABILITY / PRODUCT LIABILITY**

ALL COVERED DAMAGES COMBINED (Bodily injuries, Property damages and Financial losses): **10 M€** per year

Including:

- Pure Financial Losses ("D.I.N.C.") with the amount of **5 M€** per year
- "Faute inexcusable de l'employeur" with the amount of **5 M€** per year
- Dismantling/Reinstalling costs with the amount of **5 M€** per year
- Professional liability with the amount of **2.5 M€** per year
- Pollution Sudden and Accidental (classified locations excluded) with the amount of **3 M€** per year
- Damages resulting from exports to the USA/Canada, all damages aggregate (Bodily injuries, Property damages and Financial losses): with the amount of **5 M€** per year
- Including: Pure financial losses ("D.I.N.C.") on "Loss of use" basis with the amount of **1 M€** per year

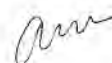
DEFENSE AND RECOURSE: EUR 30'000 per claim and per year

The present certificate is valid for the period from 01/01/2022 to 31/12/2022 inclusive. It is addressed to whom it may concern and cannot bind the insurer beyond the limits of the clauses and conditions of the policy that it refers to and notably with respect to the activities covered by this policy.

This certificate is evidence the insurance as identified is in force and conveys all rights and privileges afforded under the policy, limits shown may have been reduced by paid claims.

Issued in Paris, 11/01/2022

**SCOR**  
The Art & Science of Risk  
Europe SE  
11 Jan 2022



Digitally signed by  
Ana Vázquez Ballestín  
Date: 2022.01.11  
14:51:59 +01'00'



Technical specification

## Appendix 1:

### Product technical data sheets

PRIMER EDA  
PRIMER EDP

RENDER AR100

PETROPERL<sup>®</sup>

NAPHTOPERL<sup>®</sup>

CARBOPERL<sup>®</sup>



**Max  
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advanced industrial coatings

## data sheet

august 2019

Primer

# EDA

waterborne epoxy

scope:  
*surface preparation*

## CHARACTERISTICS

### Description / purpose

**Where :** On steel or concrete // Primer under our epoxy systems

**Steel :** Stand-by primer with no "flash rusting".

Recoat interval : 1 week to 1 month depending on climatic conditions.

**Concrete :** Impregnation for adhesion and wetting ability.  
Reduction or even stopping of water infiltrations.

### Colour / finish

Clear / satin.

### Packaging

In 2 separate cans, pre-adjusted for 8 kg.

Proportions, *by weight*: base **20** / hardener **80**.

### Storage conditions

- 18 months max, in the original cans, never opened,
- Under shelter,
- At temperatures of between 1°C/34°F and 35°C/95°F <sup>(1)</sup>.

### V.O.C. content

21 g/l according to ISO 11890-1 (statistic average).

### Composition

Resin: epoxide                      Pigments: none  
Hardener: polyamide              Vehicle: water

### Specific gravity (mix) at 20°C/68°F

1.03 ± 0.05 g/ml as per ISO 2811

### Solids content (mix)

By weight : 31 % ± 2 as per ISO 3251  
By volume : 30 % per calculation

### Viscosity (mix) at 20°C/68°F

1 000 mPas ± 100 // 10 poises ± 1

<sup>(1)</sup> which might increase or decrease by 10°C/50°F, once only, during a 5 days max transport time to destination.

## IMPLEMENTATION

For all use:  
refer to relevant material safety data sheets indicating risk sentences and safety recommendations

### Surface preparation

• **Steel :** on abrasive blasted surfaces to Sa 2,5 degree, average profile : Medium G or Rt 50-75 µ.

\*Recoat interval : 1 week to 1 month depending conditions.

• **Concrete :** Free from oil, laitance and dust.

Possible application on damp but non sweating surface.

### Instructions for use

• **Application temperature:**

**Substrate:** 3°C/37°F above dewpoint,  
with 5°C/41°F at least ♦ 45°C/113°F at most.

**Product:** 5°C/41°F mini ♦ 35°C/95°F maxi.

• **Reducing viscosity when temp. < 15°C/60°F:** add 10% water to the hardener *prior to mixing with the base*.

• **Mix:** Pour *the base into hardener* while carefully stirring mechanically until a perfectly homogeneous mixture is obtained.

• **Maturing:** none.

• **Potlife mixture** at 20°C/68°F: 2 hours <sup>(2)</sup>

• **Application:** Spray gun on steel, roller on concrete.

### Consumption / thickness

• On steel : 150 g/sqm for 30 microns, dry film.

• On concrete : 200 g/sqm for a non significant surface.  
2 or even 3 coats can be applied in case of lasting humidity or high porosity.

### Curing at 10°C/50°F – 30°C/86°F

- Dust free: ..... 3 and 1 hours
- Tack free: ..... 8 and 4 hours
- Recoatable: ..... mini: 8 and 4 hours ♦ maxi : none\*

### Precautions and safety

Waterborne product. Flash point (cc) : >100°C/212°F

### Cleaning of application equipment

- Immediately after use : water
- Afterwards and up to 3 hours standby :  
Flammable ED Thinner – Flash point (cc) : 25°C/77°F.

<sup>(2)</sup> The limit shows when a separation of phases becomes visible on the surface, producing a "turned" mix effect.



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## data sheet

august 2019

Primer

# EDP

Epoxy with solvents

scope:  
*steel surface preparation*

## CHARACTERISTICS

### Description / purpose

**Where :** On steel // Under our epoxy systems

**What :** Temporary protection of steel surfaces. 1 to 3 months outdoors, depending on climatic conditions. Up to 6 months indoors. Can be applied on pre-painted steel .

**Concrete :** Impregnation for adhesion and wetting ability. Reduction or even stopping of water infiltrations.

### Colour / finish

Reddish brown / semi-mat.

### Packaging

In 2 separate cans, pre-adjusted for 8 kg.

Proportions, *by weight*: base **82** / hardener **18**.

### Storage conditions

- 18 months max, in the original cans, never opened,
- Under shelter,
- At temperatures of between 0°C/32°F and 35°C/95°F.

### V.O.C. content

349 g/l according to ISO 11890-1 (statistical average).

### Composition

Resin : epoxide  
Hardener : polyamide  
Pigments : stable synthetic oxydes  
Solvents : a mixture of hydrocarbons/alcohols/cetone

### Specific gravity (mix) at 20°C/68°F

1.50 ± 0.05 g/ml as per ISO 2811

### Solids content (mix)

By weight : 75 % ± 2 as per ISO 3251

By volume : 53 % per calculation

### Viscosity (mix) at 20°C/68°F

60 to 90 seconds, as per Afnor n°4.

## IMPLEMENTATION

For all use:  
refer to relevant material safety data sheets indicating risk sentences and safety recommendations

### Surface preparation

- **Steel :** on abrasive blasted surfaces to Sa 2,5 degree, average profile : Medium G or Rt 50-75 µ.
- Shop primer compatible, after appropriate preparation.

### Instructions for use

- **Application temperature:**

**Substrate:** 3°C/37°F above dewpoint,  
with 5°C/41°F at least ♦ 45°C/113°F at most.

**Product:** 5°C/41°F mini ♦ 35°C/95°F maxi.

- **Mix:** First re-homogenize the base using a mechanical mixer, then pour the hardener into the base, while carefully stirring mechanically until a perfectly homogeneous mixture is obtained.

- **Maturing:** 30 to 60 minutes, re-mix before application.

- **Potlife mixture** at 20°C/68°F: 10 hours

- **Application:** Spray gun. For small surfaces, roller brush can be used, after 5% dilution with ED thinner.

### Coverage for 40 micron thickness, dry film

- Theoretical : 8,8 m<sup>2</sup>/kg ♦ 114 g/m<sup>2</sup>
- Practical : 6,6 m<sup>2</sup>/kg ♦ 150 g/m<sup>2</sup>

### Curing

t°	Dust Free	Tack Free	Recoatable (Minimum)
10°C	45 mn	3 h 00	18 h 00
30°C	20 mn	1 h 00	6 h 00

### Precautions and safety

Inflammable product. Flash point (cf) : 16°C

### Cleaning of application equipment

Flammable ED Thinner – Flash point (cf) : 25°C/77°F.



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## data sheet

august 2019

# Render AR100

solventfree epoxy

scope:  
*concrete and steel  
preparation*

## OVERVIEW

### Purpose

**Where:** Under our epoxy systems or other compatible.

**What:** Surfacing, rendering, plugging, patching cavities, filling fixed joints, chamfers.

**Which:** Steel or concrete structures.

### Description

**Product :** Solventfree epoxy, CMR's free, in the form of a pasty gel, after mixing of the 2 components.

**Use :** It can be used both for racking and for heavy filling, up to 15/20, or even 30 mm, vertically without recharging.

### Properties and benefits

#### Mechanical properties :

Exceptional adhesion and sticking properties, with a very high mechanical cohesion.

#### Use properties :

**Render AR100** is easy to use and polyvalent.

It requires neither powdering, nor grinding, except in case of binder raising at the surface: see page 2/2 « **Recoating** ».

#### Compliance with safety and regulatory requirements:

**Render AR100** is **solventfree**, flash point (cc): > 90°C/194°F for optimal safety and minimized application constraints.

It is **aromatic amines or phthalates free** for compliance with current regulations.

## CHARACTERISTICS

### Packaging

- In 2 separate cans, pre-adjusted for 4 or 12 kg.
- Proportions, *in weight*: base **85** / hardener **15**

### Storage conditions

- 18 months max, in the original cans, never opened,
- Under shelter,
- At temperatures of between 0°C/32°F and 35°C/95°F<sup>(1)</sup>,  
<sup>(1)</sup> which might increase or decrease by 10°C/50°F, once only during a 5 days max transport time to destination.

### Colours

Yellow ochre, approaching RAL 8001.

### Finish

Semi-flat.

### V.O.C. content

17.7 g/l, according to ISO 11890-1 (statistic average).

### Composition

Resin	:	epoxide
Hardener	:	non aromatic polyamine
Pigments	:	synthetic oxides
Filler	:	silicates/silica
Solvent	:	none

### Specific gravity (mix) at 20°C/68°F

1.90 ± 0,05 g/ml as per ISO 2811

### Solids content (mix)

By weight	:	96–100% after 6 hrs maturation - ISO 3251
By volume	:	100% per calculation

### Viscosity (mix) at 20°C/68°F

Pasty.

## IMPLEMENTATION

Conform and controlled conditions during application and hardening periods are necessary to obtain required quality

For all use:  
Refer to relevant material safety data sheets as to risk sentences and safety recommendations

### ◆ Before:

#### Surface preparation

**Concrete** impregnated with **Primer EDO** or **EDA** :  
see relevant data sheets and *Technical Advice nr 1* :  
« Specification for preparation of concrete ».

**Steel** after smoothing sharp edges, on abrasive blasted surfaces to Sa 2,5 minimum.

Average profile :

- Case of prior application of **Primer EDA** (see data sheet) :  
Medium G or Rt 50-75µ.
- Case of direct application :  
Rough G or Rt 100µ.

*Always apply on clean and dry substrates*

#### Products preparation

24 hours minimum before application, place the drums in a temperate place at 10°C/50°F min and 30°C/86°F max.

#### Application temperatures:

**Substrate:**

3°C/37°F mini above dew point,  
*with* 5°C/41°F at least ◆ 45°C/113°F at most.

**Product:**

While mixing : 10°C/50°F ◆ 30°C/86°F max  
Use: at mixing temperature

#### Mixing

- *Never make up partial mixtures*, in order to avoid the risks of incorrect proportions.
- Pour the hardener on the base while carefully stirring mechanically until a perfectly homogeneous mixture is obtained.

#### Conditions for use

- Maturing : none.
- Apply immediately as far as mixing has been done.
- *Never dilute*, before nor during application.

#### Application conditions

- Manual :  
Palette knife, spatula or trowel.
- Mechanically :  
Pump for past-like product, or pneumatic double cartridge caulking gun with a static mixer

### ◆ During:

#### Potlife of mixture

10°C/50°F	20°C/68°F	30°C/86°F
4 h 00	2 h 00	1 h 00

#### Consumption / thickness per mm

1,9 kg/sqm.

This theoretical value should be *10-5% increased* to get it practical, according to nature of substrate and implementation method.

**Note:**

*Consumption will increase when surface temperature is < 20°C, making the product viscous with its contact.*

#### Overcoating

No minimum neither maximum after application, and no particular prior conditions, except in the following case :

*Application with a thickness > 5 mm, as well as a strong smoothing, may result in a binder rise on the surface :*

*In that case it is necessary :*

- *either to sprinkle Silica S80 or F15 on the fresh application, while progressing,*
- *either to sand down the coated surface, after at least 12/24 hours drying according to temperature in order to get a Rough G.*

#### Cleaning of application equipment

Flammable ED Thinner. Flash point (cc): 25°C/77°F.

### ◆ After:

#### Curing

t°	Dust free	Tack free
10°C	8 to 9 h 00	24 h 00
20°C	5 to 6 h 00	15 to 18 h 00
30°C	2 to 2 h 30	5 to 6 h 00





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data sheet

august 2019

# PETROPERL

“cold applied” solventfree epoxy

scope:  
*oil industry*

## OVERVIEW

### Purpose

**Where :** Interior of tanks, cisterns, pipes, secondary containments.

**What :** Storage of petroleum hydrocarbons.

**Which :** Steel or concrete structures.

### Description

**Product:** solvent-free epoxy, C.M.R.'s free.

**As laminate lining**, it is designed for tightness in cement works, or for reinforcement of steel works in which corrosion resulted in significant damage to the substrate.

**As single thick coat**, it is suitable for anticorrosion of steel.

**Use:**

**Petroperl R:** Impregnation/saturation of reinforcements

**Petroperl T:** Top or single coat, from 400 to 1000  $\mu$

They can be applied with all the devices commonly used on job sites, see below [Application](#).

### Properties and benefits

#### Chemical performances:

Suitable for contact with petroleum-based fuels.

S.E.A. Agreements n°55354/55355 for military fuels.

Also suitable for contact with oils, greases and industrial water.

#### Mechanical resistance and proofing of laminate:

Especially high as a result of its behavior to shearing, tensile strength, cracking and counter pressure.

#### Surface properties:

Aspect : uniform and seamless glossy surface.

Result : very easy to clean, no weak areas.

#### Compliance with safety and regulatory requirements:

**Petroperl is solventfree**, flash point (cc): > 90°C/194°F for optimal safety and minimized application constraints.

It is **aromatic amines or phthalates free** for compliance with current regulations.

## CHARACTERISTICS

### Packaging

• In 2 separate cans, pre-adjusted for:

**R :** 12 kg ♦ **T :** 12 or 20 kg

Proportions *by weight*:

**R/T:** base **3** / hardener **1**

### Storage conditions

• 18 months max, in the original cans, never opened,

• Under shelter,

• At temperatures between 0°C/32°F and 35°C/95°F<sup>(1)</sup>,

<sup>(1)</sup> which might increase or decrease by 10°C/50°F, once only during a 5 days max transport time to destination.

### Colours

**R/T:** Turquoise blue.

### Finish

Glossy with limited chalking and yellowing in operation *especially if implementation requirements are respected*.

### Reinforcements

Please consult us.

### V.O.C. content

**R/T:** 10.0/11.9 g/l, according to ISO 11890-1 (statistical average).

### Composition

Resin : epoxy

Hardener : non-aromatic polyamine

Charges : synthetic oxides

Solvent : none

### Specific gravity (mix) at 20°C/68°F

**R/T** : 1.32 ± 0.05 g/ml as per ISO 2811

### Solids content (mix)

By weight : 96–100% after 6 hrs maturation - ISO 3251

By volume : 100% per calculation

### Viscosity (mix) at 20°C/68°F

**S** : 5 000 mPa.s ± 1000 ♦ 50 poises ± 10

**T** : 6 000 mPa.s ± 1000 ♦ 60 poises ± 10

*A slight evolution may happen during the storage period, without any effect on the application conditions.*



## IMPLEMENTATION

Conform and controlled conditions during application and hardening periods are necessary to obtain required quality

For all use:  
Refer to relevant material safety data sheets as to risk sentences and safety recommendations

### ◆ Before:

#### Surface preparation

**Steel** after smoothing sharp edges, on abrasive blasted surfaces to Sa 2.5 degree minimum.

Average profile:

- In case of prior application of **ED1 Varnish**, **EDA Primer** or **EDP Primer** (see relevant data sheets):

Medium G or Rt 50-75μ.

- In case of direct application: Rough G or Rt 100μ.

**Concrete** impregnated with **EDO** or **EDA Primer**:

Refer to relevant data sheets and *Technical Advice nr1*: Specification for preparation of concrete.

. Our epoxy laminates, according to specification.

*Always apply on clean and dry substrates*

#### Products preparation

24 hours minimum before application, place the drums in a temperate area at 10°C/50°F min and 30°C/86°F max.

#### Application temperatures

**Substrate:**

3°C/37°F mini above dew point,

*with* 5°C/41°F at least ◆ 45°C/113°F at most.

**Product:**

While mixing: 10°C/50°F mini ◆ 30°C/86°C maxi

Spraying (R/T): at 25/35°C // 77/95°F at hose exit

Manual use (R/T): at mixing temperature

#### Mixing

- *Never make up partial mixtures*, in order to avoid the risks of incorrect proportions.

- Stir the base with a power mixer to an even consistency. Then, add hardener and continue stirring until a perfectly homogeneous mixture is obtained.

#### Conditions for use

- No maturing before use.
- Start the application immediately after mixing.
- **Petroperl should never be diluted.**

#### Application

**Laminate – grade R:**

- Medium bristle roller (or airless spraying unit, with a 45/1 min pump ratio) for the binder.

- Debubbler roller for the glass fiber,

- Mechanical sprinkling of Silica SB 0 before drying.

**Top or topcoat – grade T:**

- Airless spraying unit, with a 45/1 min pump ratio.

- Or medium bristle roller, for small or difficult to access areas, on condition to *pay particular attention to the thickness and regularity of applied coat: this shall be followed by smoothing the surface with a flat brush.*

### ◆ During:

#### Pot life of mixture

Grades	10°C/50°F	20°C/68°F	30°C/86°F
R	3 h 00	1 h 00	0 h 25
T	2 h 00	0 h 35	0 h 10

*In case of long lasting spraying application, the hose should be cleaned once per hour with ED Thinner.*

#### Number of coats

2 per layer, except in case of multi-layer continuous application, plus 1 for topcoating or for a singlecoat.

#### Thicknesses

**Laminate – grade R:**

They will vary with nature of specified reinforcement : they are generally comprised between 2.0 and 4.0 mm, *including* a 300 to 800μ *topcoat*.

**Singlecoat (grade T):**

Min 400 microns - max 1000 microns, according to spec.

#### Consumptions

**Laminate – grade R:**

- 1.4 kg/m<sup>2</sup> of binder for a P45 fabric - 450 g/m<sup>2</sup> – 1.5 mm
- 1.8 kg/m<sup>2</sup> of binder for a proper matt - 450 g/m<sup>2</sup> – 2.0 mm
- 3.8 kg/m<sup>2</sup> of binder for a proper 3 matts - 450 g/m<sup>2</sup> – 3.5 mm

**Top or singlecoat – grade T:**

132 g/sqm per 100 microns thickness. This theoretical value should be *20±5% increased* to get it practical, according to nature of substrate and implementation method.

**Note:**

*Consumption will increase by 100 to 300 g/m<sup>2</sup> when surface temperature is < 20°C, making the product viscous with its contact.*

#### Cleaning of application equipment

Flammable ED Thinner. Flash point (cc): 25°C/77°F.

### ◆ After:

#### Curing

t°	Dust free	Tack free
10°C	R : 8 h 00 – T : 3 h 30	R : 24 h 00 – T : 12 h 00
20°C	R : 5 h 00 – T : 3 h 00	R : 15 h 00 – T : 10 h 00
30°C	R : 2 h 00 – T : 1 h 30	R : 6 h 00 – T : 3 h 30

**Delay before use:** 10 to 4 days, depending on temperature.

#### Repairs

Report to our *Technical Advice nr 5*.



**Max  
Perlès**  
advanced industrial coatings

data sheet

April 2021

# NAPHTOPERL

« cold applied » solventfree epoxy

scope:  
oil industry

## OVERVIEW

### Purpose

**Where:** Interior of tanks, especially underground vessels according to the « double-wall » process as per French Ministerial Decree of April 18th, 2008.

**What:** Storage of inflammable solvents and hydrocarbons, including current « bio » ones, until E25.

**Which:** Steel or concrete structures.

### Description

**Product:** solventfree epoxy, C.M.R.'s free.

As **lamine lining**, it is designed for tightness in cement works, or for reinforcement of steel works, possibly coupled with a double-walled technique for leak detection.

As **single thick coat**, it is suitable for anticorrosion of steel.

**Use:**

- |               |   |
|---------------|---|
| Naphtoperl S: | Impregnation/saturation of reinforcements |
| Naphtoperl F: | Impregnation/saturation of "3 D"          |
| Naphtoperl C: | Conductive tie-coat over reinforcements   |
| Naphtoperl T: | Top or single coat, from 500 to 1000 µ.   |

### Properties and benefits

#### Chemical performances:

- L.N.E. Lab File L060081- Doc DE/3 in accordance with French Ministerial Decree of April 18th, 2008.
- S.E.A. Agreement n°55352 for military fuels.
- I.F.P. Tests and Approval.

#### Mechanical performances:

In accordance with the 2008 French Ministerial Decree.

#### Surface properties:

- Aspect : uniform and seamless glossy surface.  
Result : very easy to clean, no weak areas.

#### Compliance with safety and regulatory requirements:

Naphtoperl is **solventfree**, flash point (cc): > 90°C/194°F for optimal safety and minimized application constraints. It is **aromatic amines or phthalates free** for compliance with current regulations.

## CHARACTERISTICS

### Packaging

- In 2 separate cans, pre-adjusted for: **S/F/C:** 12 kg  
**T:** 12 or 20 kg
- Proportions *by weight*: **S/F:** base 63 / hardener 37  
**C/T:** base 50 / hardener 50

### Storage conditions

- 18 months max, in the original cans, never opened,
- Under shelter,
- At temperatures between 0°C/32°F and 35°C/95°F<sup>(1)</sup>,  
<sup>(1)</sup> which might increase or decrease by 10°C/50°F, once only during a 5 days max transport time to destination.

### Colours

**S/F:** clear blue ♦ **C:** dark grey ♦ **T:** sand-coloured.

### Finish

Semi-glossy with limited chalking and yellowing in operation  
*especially if implementation requirements are respected.*

### Reinforcements

Please consult us.

### V.O.C. content

- F/S/T:** 16 g/l, according to ISO 11890-1 (statistical average).  
**C:** 66 g/l, according to ISO 11890-1 (statistical average).

### Composition

- |          |   |  |
|----------|---|--|
| Resin    | : | epoxy                                    |
| Hardener | : | non-aromatic polyamine                   |
| Charges  | : | synthetic oxides and conductive elements |
| Solvent  | : | none                                     |

### Specific gravity (mix) at 20°C/68°F – ISO 2811

**S/F/C/T** : 1.05 / 1.06 / 1.16 / 1.43 ± 0,05 g/ml

### Solids content (mix)

- |           |   |   |
|-----------|---|---|
| By weight | : | 96–100% after 6 hrs maturation - ISO 3251 |
| By volume | : | 100% per calculation                      |

### Viscosity (mix) at 20°C/68°F

- |          |   |   |
|----------|---|---|
| <b>S</b> | : | 3 500 mPa.s ± 1 000 ♦ 35 poises ± 10.   |
| <b>F</b> | : | 600 mPa.s ± 200 ♦ 6 poises ± 2.         |
| <b>C</b> | : | 10 500 mPa.s ± 1 500 ♦ 105 poises ± 15. |
| <b>T</b> | : | 8 500 mPa.s ± 1 500 ♦ 85 poises ± 15.   |

A slight evolution may happen during the storage period,  
with no effect on the application conditions. **1/2**

ISO 9001 certified since 1996

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## IMPLEMENTATION

Conform and controlled conditions  
During application and hardening periods  
Are necessary to obtain required quality

For all use:  
Refer to relevant material safety data sheets as to  
risk sentences and safety recommendations

### ◆ Before:

#### Surface preparation

**Steel** or **Concrete**, in accordance with data provided in each Specification or Operating Mode for these surfaces, depending on selected system.

*Always apply on clean and dry substrates*

#### Products preparation

24 hours minimum before application, place the drums in a temperate area at 10°C/50°F min and 30°C/86°F max.

#### Application temperatures

##### Substrate:

3°C/37°F mini above dew point,

**with** 10°C/50°F at least ◆ 45°C/113°F at most.

##### Product:

While mixing: 15°C/59°F mini ◆ 25°C/77°F maxi

Manual use: at mixing temperature

Spraying (S/T) at 30/40°C / 86/104°F at hose exit

#### Mixing

- **Never make up partial mixtures**, in order to avoid the risks of incorrect proportions.
- Stir the base with a power mixer to an even consistency. Then, add hardener and continue stirring until a perfectly homogeneous mixture is obtained.

#### Conditions for use

- No maturing before use.
- Start the application immediately after mixing.
- **Naphtoperl should never be diluted.**

#### Application

##### Laminate – grade S/F:

- Medium bristle roller, or 45:1 airless pump for the binder,
- Debubbler roller for the glass fiber,
- Mechanical sprinkling of Silica SB 0 before drying.

##### Surfacing of laminate – grade C:

- Medium bristle roller
- Mechanical sprinkling of Silica SB 0 before drying.

##### singlecoat and/or topcoat – grade T:

- Airless spraying unit, with a 45:1 min pump ratio, fitted with heating hose.
- Or medium bristle roller, for small or difficult to access areas, on condition to **pay particular attention to the thickness and regularity of applied coat: this shall be followed by smoothing the surface with a flat brush.**

### ◆ During:

#### Pot life of mixture

Grades	10°C/50°F	20°C/68°F	30°C/86°F
S/F	2 h 00	0 h 35	0 h 10
C/T	1 h 00	0 h 30	0 h 15

*In case of long lasting spraying application, the hose should be cleaned once per hour with ED Thinner.*

#### Number of coats

Depending on specification, except for the single layer topcoat.

#### Thicknesses

- They will vary with nature of specified reinforcement: they are generally comprised between 2.0 and 3.0 mm, **including** a 500µ **topcoat**.
- They are as high as 10.0 mm in case a double-wall technique is implemented.

#### Consumptions

##### Laminate – grade S/F:

- 1.2 kg/m<sup>2</sup> of binder for a P45 fabric-450 g/m<sup>2</sup> – 1.5 mm
- Refer to the operating mode: epoxy coating « double wall » for steel, or for concrete, as the case may be

##### Top or singlecoat – grade T:

143 g/sqm per 100 microns thickness.

This theoretical value should be **20±5% increased** to get it practical, according to nature of substrate and implementation method.

##### Note:

*Consumption will increase by another 10±5% when surface temperature is < 20°C, making the product viscous with its contact.*

#### Cleaning of application equipment

Flammable ED Thinner. Flash point (cc): 25°C/77°F.

### ◆ After:

#### Curing

t°	Dust free	Tack free
10°C	S/F : 3 h 30 – C/T : 6 h 00	S/F : 12 h 00 – C/T : 20 h 00
20°C	S/F : 3 h 00 – C/T : 3 h 00	S/F : 10 h 00 – C/T : 11 h 00
30°C	S/F : 1 h 30 – C/T : 1 h 30	S/F : 3 h 30 – C/T : 4 h 00

**Delay before use :** 10 to 4 days, depending on temperature.

#### Repairs

Report to our *Technical Advice nr 5*.



**Max  
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data sheet

august 2019

# CARBOPERL

Solventfree novolac epoxy

scope:  
*oil industry*

## OVERVIEW

### Purpose

**Where :** Internal protection of capacities, primary and secondary containments, pipelines.

**What :** Contact with "green" hydrocarbons, such as ethanol containing biofuel, or diester based biodiesels.

**Which :** Steel or concrete structures.

### Description

**Product :** solventfree novolac epoxy, C.M.R.'s free.

**Use :** In a single layer – to avoid problems with delays between coats causing disbondings – using a high ratio airless spraying pump:

- either as a direct single coat

- or as a topcoat over a glassfibre-epoxy compound such as one of the « **perl** » range.

**Typical thickness:**

600 to 1000 microns, horizontally as well as vertically

### Properties and benefits

**Chemical performance:**

Suitable for straight ethanol, for ethanol/fuel mixtures, and generally for all petroleum hydrocarbons.

Evaluation has been made by IFP EN – French Petroleum Institute – New Energies.

**Application properties:**

To take advantage of the safety and the comfort of an automatic dosing and mixing process by the spraying machine, gradually as needed.

**Surface properties:**

Aspect : uniform and seamless glossy surface.

Result : very easy to clean, no weak areas.

**Compliance with safety and regulatory requirements:**

**Carboperl is solventfree**, flash point (cc): > 90°C/194°F for optimal safety and minimized application constraints.

It is **aromatic amines, phthalates and styrene free** for compliance with current regulations.

## CHARACTERISTICS

### Packaging

- In 2 separate cans, pre-adjusted for 20 kg
- Proportion, *by weight*: base **1** / hardener **1**

### Storage conditions

- 18 months max, in the original cans, never opened,
- Under shelter,
- At temperatures between 0°C/32°F and 35°C/95°F<sup>(1)</sup>,  
<sup>(1)</sup> which might increase or decrease by 10°C/50°F, once only during a 5 days max transport time to destination.

### Colours

Beige

### Finish

Glossy with limited chalking and yellowing in operation **especially if implementation requirements are respected.**

### V.O.C. content

17.6 g/l, according to ISO 11890-1 (statistical average)

### Composition

Resin	:	novolac epoxy
Hardener	:	non-aromatic polyamine
Pigments	:	synthetic oxides
Solvent	:	none

### Specific gravity (mix) at 20°C/68°F

1.35 ± 0.05 g/ml as per ISO 2811

### Solids content (mix)

By weight	:	96–100% after 6 hrs maturation - ISO 3251
By volume	:	100% per calculation

### Viscosity (mix) at 20°C/68°F

11 000 mPa.s ± 1 500 ♦ 110 poises ± 15

*A slight evolution may happen during the storage period, without any effect on the application conditions.*

## IMPLEMENTATION

Conform and controlled conditions during application and hardening periods are necessary to obtain required quality

For all use:  
Refer to relevant material safety data sheets as to risk sentences and safety recommendations

### ◆ Before:

#### Surface preparation

**Steel** after smoothing sharp edges, on abrasive blasted surfaces to Sa 3 degree. Average profile:

- In case of prior application of **Primer EDA** (see data sheet): Medium G or Rt 50-75μ.
- In case of direct application: Rough G or Rt 100μ.

Our epoxy **laminates**, according to specification.

On specific recommendation: **concrete** impregnated with **EDO** or **EDA Primer**: please consult us.

*Always apply on clean and dry substrates*

#### Products preparation

24 hours minimum before application, place the drums in a temperate area at 10°C/50°F min and 30°C/86°F max.

#### Application temperatures

**Substrate:**

3°C/37°F mini above dew point,

**with** 5°C/41°F at least ◆ 45°C/113°F at most.

**Product:**

While mixing: 10°C /50°F mini ◆ 30°C/86°C maxi

Spraying : at 35/45°C // 95/113°F at hose exit

Manual use: at mixing temperature

#### Mixing

- *Never make up partial mixtures*, in order to avoid the risks of incorrect proportions.
- Stir the base with a power mixer to an even consistency. Then, add hardener and continue stirring until a perfectly homogeneous mixture is obtained.

#### Conditions for use

- No maturing before use.
- Start the application immediately after mixing.
- **Carboperl should never be diluted.**

#### Application

- Airless spraying unit, with a 45/1 min pump ratio, fitted with heating hose.
- Medium bristle roller, for small or difficult to access areas, on condition to *pay particular attention to the thickness and regularity of applied coat: this shall be followed by smoothing the surface with a flat brush.*

### ◆ During:

#### Pot life of mixture

10°C/50°F	20°C/68°F	30°C/86°F
2 h 00	0 h 30	0 h 15

*In case of long lasting spraying application, the hose should be cleaned once per hour with ED Thinner.*

#### Number of coats

One.

#### Recommended Thickness

Min 600 microns – max 1000 microns, according to spec.

**Note:**

Thicknesses are proposed in agreement with the method of the International standard ISO 19840 :

*Do not exceed 30%* above the maximum value, except for pre-touchups and local overcoatings

#### Theoretical Consumption

135 g/sqm per 100 microns thickness.

This theoretical value should be **20±5% increased** to get it practical, according to nature of substrate and implementation method.

**Note:**

*Consumption will increase by 100 to 300 g/m² when surface temperature is < 20°C, making the product viscous with its contact.*

#### Cleaning of application equipment

Flammable ED Thinner. Flash point (cc): 25°C/77°F.

### ◆ After:

#### Curing

t°	Dust free	Tack free
10°C	5 h 00	12 h 00
20°C	2 h 00	8 h 00
30°C	1 h 00	3 h 30

**Delay before use:** 10 to 4 days, depending on temperature.

#### Repairs

Report to our [Technical Advice nr 5](#).

Technical specification

## Appendix 2:

### Technical advices

Technical Advice Nr. 2  
“Specification for steel preparation”

Technical Advice Nr. 3  
“Performance testing”

Technical Advice Nr. 4  
“Dielectric testing”

Technical Advice Nr. 5  
“Retouching”

Technical Advice Nr. 14  
“Application of fiberglass/epoxy laminates”



## Specification for preparation of steel

### Scope

This document describes:

- the necessary requirements, in terms of substrate surface conditions, to undertake coating work, new or remedial.
- the products to use and measures to take if such requirements are not fulfilled.

*It does not cover the structural state or strength of the steel substrate, which is presumed to comply with all applicable norms, rules and regulations.*

### Requirements

#### Preparation of sheet steel :

***Must be to degree P2 as per standard NF EN ISO 8501-3.***

- Barbs, scratches or weld projections must be eliminated by chipping and grinding.
- Sharp edges and weld beads must be rounded by grinding.

#### Environmental conditions:

- ***All coating work must be undertaken at ambient temperature within the range indicated in the product data sheet of the chosen coating.***

Appropriate air heating or, symmetrically, air cooling and ventilation equipment must be used if necessary.

Work in cold weather on an open air surface is not recommended.

- ***Always operate at a difference of at least +3°C / + 38°F between the measured temperature of the steel substrate and the dew point – see standard NF EN ISO 8502-4.***

Use appropriate air heating, or deshydration equipment if necessary.

ISO 12944 recommendations should be applied.

#### Blasting:

- **Before:** if using solid abrasive material, check that it is of appropriate quality and not damp, check that the blasting equipment is operational and that air pressure at the nozzle is sufficient to cover pressure losses.
- **Implementation:** by sand blasting or hydro blasting or combined blasting until the profile and the roughness specified in our system sheet is obtained.
- **After:** vacuum-dust very carefully and eliminate all abrasive deposits, including those on the scaffolding.

***The residual dust content on the steel surface is measured according to ISO 8502-3 and must not exceed category 2.***

***The soluble salt content on the steel surface is measured according to ISO 8502-6 and 9 and must be lower than 50 mg/sqm.***

#### Primer:

Immediately after blasting and before any re-oxidation, apply a 30 microns dry film thickness stand-by coat of Varnish ED1 or Primer EDA, colorless epoxies, unless our specification stipulates direct application of the coating on the blasted steel.

### Specific points

#### Sheet holes:

Before applying the coating, fill all holes and craters with Render AR100, solventfree epoxy.

#### Floating roof tank strut supports:

After blasting and prior to any coating, screw struts one by one and stick in place 5 mm thick prefabricated reinforced epoxy plates using Render AR100.

Precut to a size slightly smaller than the one of the metallic reinforcement plates which may exist.



## Performance testing

### Scope

This document describes the tests that must be done to carry out the reliability of the coating implementation.

They take place: . **during** the application,  
. **after** the application.

### Testing during application

- **Environmental conditions:**

While progressing with humidity and temperature recording devices, placed and moved depending on work progress to ensure at all times that the dew point is not reached and the temperature ranges are met.

- **Wet film thickness:**

At each coat, using a **calibrated** notched gauge, while progressing and at least once every sqm.

- **Consumption:**

It is complementary to the thickness test and detects any possible discrepancy in real time.

- **Aspect :**

Permanent verification that bubbles or "pinholes" do not appear and that the film presents a uniform and homogeneous surface.

### Testing after application:

- **Dry film thickness on metallic surfaces:**

After physical "drying", using a magnetic sensor device, calibrated under the conditions defined by the standard ISO 19840.

- **Polymerization:**

After 48 hours minimum (at 20°C // 68°F), by a test, with white cotton rubbed once on the film onto which a few drops of acetone were deposited: cotton should not show any trace of the coating colour.

- **Porosities:**

Verification of the coating's dielectric sealing following the method described in our [Technical Advice nr.4](#) "Dielectric testing" by sweeping all the coated surfaces with an electrical brush adapted to the substrate.

*In case of linings reinforced with fiberglass fabric, this test is carried out on the laminate before topcoat is applied.*

*If the laminate is implemented on an old supposedly insulating coating, it is necessary to apply a coat of conducting interface beforehand: ref. Interface CF.*

*It is also possible to test the topcoat independently if a coat of the same Interface CF has been applied between the two layers.*

*Please consult us.*

### Repairs:

If necessary, all tests must be followed by the appropriate corrective actions:

– immediately, if tests are carried out during the application

*or*

– as described in our [Technical Advice nr.5](#) then re-tested in case of tests carried out after application.

## Dielectric testing

### Scope

This document describes the operation to be carried out to detect perforations, porosities, micro-cracks, conductive inclusions or other defects in a waterproof coating, whether applied on concrete or on steel.

### Principle

With the substrate connected to ground, test the integrity of the coating by sweeping its surface with a continuously powered "brush" or "broom" probe:

A **yellowish-white electric arc** is created in case of perforation or conductive inclusion in the coating, accompanied by a sharp audible signal.

**Note:** When this control is done on a laminated coating, a bluish glow can be observed due to surface ionization, accompanied by a continuous buzz of the device. This phenomenon is not in itself indicative of porosity. It can be eliminated by reducing either the tension or the sensitiveness of the equipment.

### Conditions

#### Time limit :

Dielectric testing should be performed at least 48 hours (when ambient temperature is around 20°C // 68°F), or 72 hours ( at around 15°C // 59°F ) , after coating application.

*If the coating is multi-layered, glass-tissue reinforced, this test is carried out on the coating before the topcoat ( finishing coat ) is applied.*

*If the coating is being applied on a previously-existing, supposedly insulating coating, it is necessary to apply a coat of our conductive interface CF onto the old coating before proceeding with the new coating.*

*It is also possible to test the topcoat only if a coat of this Interface CF is applied between the reinforced laminate and the topcoat.*

### Equipment

ELCOMETER or similar.

### Steps

**1. Connect the equipment to ground using the ground wire**

**2. Power up and test the charge**

**3. Calibrate the equipment:**

Connect the brush or broom fibers with a surface of bare concrete or of bare metal and progressively increase the voltage until an audible or luminous error signal is obtained. The indicated value at this point is considered as the tare, and must be added to the control voltage defined by the coating thickness – see NF EN ISO 29601 standard and paragraph 4 below.

**4. Set the equipment to the appropriate voltage:**

Film thickness:	Test voltage:
0,5 mm	2,9 kVolts
1,0 mm	5,5 kVolts
1,5 mm	8,5 kVolts
2,0 mm	11,7 kVolts
3,0 mm	17,0 kVolts
4,0 mm	22,5 kVolts

**5. Perform the test :**

After checking that the coating is dry and clean, the operation is carried out at a constant speed of about 5 linear meters/min :

- with a broom for large flat surfaces
- with a brush for corners and in areas with irregular profile.

The yellowish-white arc together with the sharp audible signal indicate the presence of perforations or conductive inclusions in the coating.

Defects detected this way are marked out for later repairs as per our [Technical Advice nr.5](#). Once corrected, they too will be checked according to the same process.

## Retouching

### Scope

This document describes the steps to carry out localized repairs in the following cases:

- Correction, after polymerization of the coating, of areas showing porosity, appearance or hardness defects, insufficient thickness, etc.
- Repair of accidental mechanical or chemical damages.
- Reinstating the watertightness of the coating when it has been drilled through by chemical plugging to install equipment fittings.

### Implementation conditions

Environmental conditions, including temperature and humidity, must be those specified in the relevant product data sheets.

### Surface preparation

- **Clearly delimitate** the areas to be repaired by surrounding them with adhesive tape at a distance of 5cm from the damaged or faulty spot.
- **Totally eliminate** the coating inside the delimited area, back to the substrate, by grinding.
- **Re-create** the same roughness as originally both on the bared substrate and on the adjacent undamaged areas, using appropriate mechanical means, in order to provide optimum adhesion of the new coating.

### Cleaning

Must be done on all prepared areas, ensuring elimination of pollution, dust or heterogeneous particles.

### Retouching

*Use the same coating products as initially implemented, under the same conditions.*

- **In the case of an originally airless-sprayed topcoat or single coat :**

- **homogeneous or open surfaces:**

Apply the new coating using the same machine/pump as originally, after having protected the surrounding surfaces in order to avoid the deposit of spray mist or “overspray” which can cause surface roughness which, in turn, would complicate ulterior cleaning operations and reduce the sanitary characteristics of the coating.

- **small or difficult to access surfaces :**

Apply the new coating using a flat nylon brush, followed, if necessary, by smoothing with a spalter brush.

- **In the case of an originally roller-brush applied coating :**

Proceed exactly in the same way as with the original coating.

### At the end of the retouching operation

Remove the delimiting adhesive tape as soon as the retouching operation is finished.

## Implementation of fiberglass/binder laminates

### Scope

This document describes the operations to perform to obtain a homogeneous, reinforced, waterproof epoxy or vinylester coating.

### Process

1. **Prepare**, before starting the operation, the required quantities of fiberglass, taking into account the necessary 4 inches / 10 cm wide overlaps and all specific cuts to be done to deal with singular points (curves, rivet lines, seams, columns, penetrations, ...)

2. **Make sure** that the application work is going to be carried out in the environmental and usage conditions prescribed in the product data sheet.

3. **Proceed** with the laminate application, making sure no interruption of more than 0h30 to 3 hours <sup>(1)</sup> occurs between any two steps:

- **Apply** a first, *impregnation*, coat of the selected resin, using a medium-bristle roller or an airless spray gun, as per the quantity specified in the system sheet.

- **Unroll and lay-out** the fiberglass tissue or mat onto the resin.

- **Debubblize** carefully by strongly cross-rolling the tissue or mat with a debubbling roller <sup>(2)</sup> until a homogeneous impregnation is obtained. The resin's colour must come up through the tissue/mat, more or less strongly depending on the type and weight of the fiberglass ( tissue or mat ), knowing that for example a 300 g/sqm fiberglass tissue will "sweat" more, and more easily, than a 900 g/sqm fiberglass mat.

- **Apply** a second, *saturation*, coat of the same resin, using a medium-bristle roller or an airless spray gun, as per the quantity specified in the system sheet, preferably using new cans to benefit from a maximum period of use.

- **Debubblize again** to ensure the resin's penetration through the fibers. At this stage, the surface aspect must be perfectly homogeneous and uniform.

4. **If specified in the system sheet being used, repeat** the operation, depending on the number of fiberglass layers specified, using each time the *saturation* coat of the previous ply as the next ply's *impregnation* coat. Shift the layers of fiberglass by half a width in order to spread out the zones of overlapping.

5. **If specified in the system sheet being used, mechanically sprinkle** the still-wet saturation coat, while progressing, with 400 g/sqm of Silica sand ( 100/300 microns in particle size for our reference F15 , 100/600 microns for our reference SB0 ), respecting a minimum distance of 1m between the spray nozzle and the laminate. This in order to obtain a uniform surface roughness for proper topcoat adhesion. Use a low-pressure sand pistol.

**NB:** *Taking into account the dispersion resulting from the projection, prepare to use an effective quantity of 600 g/sqm of silica sand on horizontal surfaces, 800 g/sqm on vertical surfaces and 1000 g/sqm on roof undersides.*

6. **Proceed** in the same way on adjacent areas, being sure that overlaps is 10cm on previous tissue or mat.

7. After drying, **sandpaper or very softly grind off** all areas that stand out, such as fiberglass overlaps, for example, and then thoroughly vacuum away any dust.

8. **Carry out a general review of the coating** in order to detect any defects, as per our *Technical Advice nr.4 " Dielectric Testing "* and proceed with any corrections and repairs as per our *Technical Advice nr.5 " Retouching "*.

9. **Apply** the specified topcoat on the entire laminated surface, that must be non-condensing.

<sup>(1)</sup> Depending on the resin used and the temperature of the substrate at the time of use: if in doubt, please consult us.

<sup>(2)</sup> Polyamide, Teflon or aluminum monoblock type rollers.



Technical specification

## Appendix 3:

### Reference list



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## References

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oil  
industry



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# *Oil Refineries*

## Oil Refineries – France

### **EXXON MOBIL – FOS SUR MER (13)**

Tank bottom	TK 314	1980
Tank bottom	TK 312 (part of it, only)	1981
Tank bottom	TK 405 (part of it, only)	1981
Tank bottom	TK 406 (part of it, only)	1981
Tank bottom	TK 1102	1984
Tank bottom	TK 1708	1984
Tank bottom	TK 1601	1987
Tank bottom	TK 1602	1990
Tank bottom	TK 2001	1990
Tank bottom	TK 1501	1990
Tank bottom	TK 1701	1990
Roof tank	TK 1701	1990
Tank bottom	TK 403	1993
Tank bottom	TK 1501	1995
Tank bottom	TK 2701	1997
Roof tank	TK 2701	1998
Tank bottom	TK 2502	1999
Tank bottom	TK 1601	2000
Tank bottom and walls	TK 902	2002
Floating roof tank	TK 902	2002
Tank bottom	TK 1901	2002
Tank bottom	TK 2702	2002
Tank bottom	TK 804	2003
Tank bottom	TK 501	2004
Tank bottom	TK 1102	2004
Tank bottom	TK 2501	2005
Tank bottom	TK 409	2005
Tank bottom	TK 315	2006
Tank bottom	TK 2201	2007
Tank bottom	TK 2202	2007

### **EXXON MOBIL (zone ESSO) – PORT JEROME (76)**

Tank walls	TK 1236	1979
Tank walls	TK 1233	1979
Tank bottom	TK 2402	1979
Tank walls	TK 1820	1980
Tank walls	TK 1216	1980
Tank walls	TK 2316	1980
Complete tank	TK 508	1980
Tank walls	TK 504	1981
Tank bottom	TK 3003	1981
Tank walls	TK 511	1982
Tank bottom	TK 2314	1984
Below the floating roof	TK 2704	1984
Tank bottom	TK 3002	1985
Tank bottom	TK 6102	1986
Tank walls	TK 1235	1990

*Oil Refineries France (cont'd)*

*EXXON MOBIL (zone ESSO) – PORT JEROME (cont'd)*

Tank walls	TK 2314	1992
Tank bottom	TK 407	1992
Tank bottom	TK 2319	1992
Tank walls	TK 2318	1992
Tank bottom	TK 1237	1992
Tank walls	TK 1237	1992
Tank bottom	TK 2104	1992
Tank bottom	TK 1238	1993
Tank walls	TK 1238	1993
Tank bottom	TK 1408	1993
Tank bottom	TK 2319	1993
Tank bottom	TK 2322	1994
Tank bottom	TK 504	1994
Tank bottom	TK 627	1994
Tank bottom	TK 1136	1995
Tank bottom	TK 1422	1995
Tank bottom	TK 6003	1995
Tank walls	TK 6002	1996
Tank bottom	TK 2701	1996
Tank walls	TK 1225	1996
Tank bottom	TK 409	1996
Tank bottom	TK 2703	1998
Tank bottom	TK 408	2000
Tank walls	TK 1234	2000
Tank bottom	TK 178	
Tank walls	TK 178	2001
Tank bottom	TK 179	
Tank walls	TK 179	2001
Tank bottom	TK 194	
Tank walls	TK 194	2002
Tank bottom	TK 122	
Tank walls	TK 122	2003
Tank bottom	TK 6101	
Tank walls	TK 6101	2003
Tank bottom	TK 102	2007
Tank bottom	TK 1235	2007
Tank bottom	TK 1610	2007
Tank bottom	TK 193	2007
Balloons D118 and D119		2007
Tank bottom	TK 1408	2011
Tank -1 virole	TK 3728	2013

*Oil Refineries France (cont'd)*

***EXXON MOBIL (zone MOBIL) – NOTRE DAME DE GRAVENCHON (76)***

Tank bottom 62 (part of it, only)	1981
Tank bottom F 7	1982
Tank bottom F 4 (part of it, only)	1986
Tank bottom 319 (part of it, only)	1986
Tank bottom 314 (part of it, only)	1987
Tank bottom 516	1988
Tank walls516	1988
Tank bottom 517	1988
Tank walls517	1988
Complete tank 731	1988
Tank bottom 9	1989
Tank bottom 20	1989
Tank bottom 928	1989
Tank walls928	1989
Tank bottom 305	1990
Tank bottom 66	1991
Balloon 531	1992
Tank bottom 64	1993
Tank bottom 725	1993
Tank walls725	1993
Tank walls52	1994
Tank bottom 727	1994
Tank 76	1995
Tank bottom 63	1995
Tank bottom 307	1996
Tank bottom 315	1996
Balloon F 11	1996
Tank walls723	1996
Tank bottom 701	1997
Tank bottom 60	1997
Tank bottom 7 (part of it, only)	1998
Tank bottom 10	1998
Tank walls728	1998
Tank bottom 728 (part of it, only)	1998
Reactor 2D1A	1998
Balloon D 103	1999
Tank bottom 54	1999
Complete tank A 66	2000
Complete tank 906	2000
Tank bottom 416	2000
Tank bottom 413	2000
Tank walls 413	2000
Tank bottom 311	2001
Angle walls /Tank bottom 83	2001
Balloon F1	2001
Balloon F4	2002
Tank bottom and walls15	2002

*Oil Refineries France (cont'd)*

**INEOS (ex-BP) – LAVERA (13)**

Tank bottom B 6 (dépôt de la Crau)	1981
Tank bottom B 2 (dépôt de la Crau)	1982
Tank bottom AT 06	1982
Tank bottom CF 10	1983
Tank bottom AV 15	1983
Tank bottom B 1 (dépôt de la Crau)	1983
Tank bottom CU 14	1983
Tank bottom CU 12	1983
Tank bottom AT 20	1983
Tank bottom CO 21	1983
Tank bottom AO 04	1984
Tank bottom AO 05	1984
Tank bottom CD 04	1984
Below the floating roof Tank CD 04	1984
Tank bottom B 3 (dépôt de la Crau)	1984
Tank bottom CD 06	1984
Tank bottom DA 01	1985
Tank bottom DA 02	1985
Below the floating roof Tank DA 01	1985
Below the floating roof Tank DA 02	1985
Tank bottom CD 09	1985
Tank bottom DZ 603	1986
Tank bottom + walls CU 14	1992
Tank walls AO 05	1993
Tank walls AO 04	1994
Dessus du toit flottant du Tank AO 04	1994
Tank bottom CE 02	1996
Tank walls AO 04	1996
Tank bottom CA 09	2000
Fond and Tank walls EA 03	2001
Tank bottom AT 36	2001
Dessus du toit and des caissons du Tank CO 20	2002
Tank bottom CF 03	2003
Tank bottom CO 14	2003
Tank bottom DZ 08	2004
Toit du Tank CO 18	2004
Tank bottom CD 01	2004
Tank bottom CD 07	2004
Pied du Tank DA 02	2004
Tank bottom CO 19	2005
Tank bottom DA 02	2005
Tank bottom DZ 62	2006
Tank bottom CF 10	2006
Bottom + roof tank CO 21	2006
Tank bottom CU 16	2006
Tank bottom BP 20	2007
Tank bottom BP 13	2007
Tank bottom BW 03	2007
Tank bottom CD 02	2007
Tank bottom CG 08	2007
Tank bottom DA 02	2008
Tank bottom DA 01	2012



**Oil Refineries France (cont'd)**

**LYONDELLBASELL (ex-SHELL) – BERRE (13)**

Tank bottom T 1019	1983
Tank bottom T 3111	1990
Tank bottom T 1024	1991
Below the floating roof T 1024	1991
Tank bottom T 1030	1991
Below the floating roof T 1030	1991
Tank bottom T 717	1992
Tank T 5916	1994
Tank bottom T 1023	1995
Full tank T 11803	1999
Tank bottom T37R73	1999
Full tank T 037G64	1999
Tank bottom T3120	2000
Tank bottom T3101	2001
Tank bottom T3102	2001
Tank bottom T3103	2001
Tank bottom T1027	2003
Tank bottom T3111	2003
Tank bottom S2	2004

**PETROPLUS (ex-SHELL) – PETIT COURONNE (76)**

Tank bottom T 761	1978
Tank T 104	1980
Tank walls T 923	1982
Tank walls T 912	1982
Tank walls T 963	1983
Tank walls T 432	1983
Tank bottom T 961	1984
Tank walls T 964	1984
Tank bottom 6802	1989
Below the floating roof 6802	1989
Tank bottom 6829	1989
Below the floating roof 6829	1989
Tank bottom 6830	1989
Below the floating roof 6830	1989
Tank bottom 6815	1990
Below the floating roof 6815	1990
Tank bottom 6812	1990
Below the floating roof 6812	1990
Tank bottom 6817	1990
Below the floating roof 6817	1990
Tank bottom T 764	1990
Below the floating roof T 764	1990
Tank bottom 6820	1990
Below the floating roof 6820	1990
Tank bottom 6840	1991
Below the floating roof 6840	1991
Tank bottom 6805	1991
Below the floating roof 6805	1991
Tank bottom T 930	1991
Tank bottom T 934	1991

### *Oil Refineries France (cont'd)*

#### ***PETROPLUS (ex-SHELL) – PETIT COURONNE (cont'd)***

Tank bottom T 935	1992
Tank bottom T 932	1993
Full tank T 1706	1994
Tank bottom T 421	1994
Tank bottom T 966	1995
Tank bottom T 965	1997
Tank bottom T 951	1997
Tank bottom 1002	2000
Tank bottom 1001	2002
Tank bottom PB 420	2011

#### ***SRD (ex-BP) DUNKERQUE (59)***

Tank bottom E16	1995
Tank bottom L6	1997
Tank bottom E21	1998
Tank bottom E22	1998
Tank bottom E 15	1999
Tank bottom E 17	2000
Paraffin balloons	2001
Tank bottom E 12	2002
Tank bottom E 11	2002
Tank bottom E 13	2003
Tank bottom I 31	2003
Full Tank 14 FA2	2014
Tank bottom M2	2014

#### ***TOTAL DONGES (44)***

Tank bottom 74	1981
Tank bottom 620	1981
Tank bottom P 886	1981
Tank bottom P 888	1981
Tank bottom P 868	1983
Tank bottom P 858	1983
Tank bottom P 552	2004

#### ***TOTAL FEYZIN (69)***

Tank bottom 383	1980
Tank bottom 364	1980
Tank 101 – bottom and walls	1980
Tank bottom 301 a	1981
Tank bottom 282	1981
Tank 102 – Dessous du toit flottant	1982
Tank 411 – Dessus du toit flottant	1982
Tank bottom 360	1983
Tank 227 – bottom & Below the floating roof	1983
Tank Stripper 64C301	1993
Full tank 228	2010
Sphere 633	2010
Tank 361 – bottom and walls	2010
Tank 363 – bottom and walls	2011
Tank 301 B - bottom	2012
Tank 102 474 – bottom and walls	2012

### *Oil Refineries France (cont'd)*

#### ***TOTAL FLANDRES (59)***

Tank bottom D 2	1983
Tank bottom A 302	1985
Full tank B 22	1990
Tank bottom A 13	1991
Tank bottom A 311	1995
Tank D14 – bottom and walls	2013

#### ***TOTAL GRANDPUITS (77)***

Tank bottom 43 D 12	1990
Full tank D 72	1995
Tank bottom 320 D 107	2006
Tank bottom 320 D 66	2009
Tank 320 D 121 – bottom and walls	2012
Tank 320 D 2 – bottom and walls	2012
Tank 59 – bottom and walls	2013
Tank bottom 320 D 104	2014

#### ***TOTAL NORMANDIE (76)***

Tank bottom A 10	1979
Tank bottom C 61	1979
Tank bottom D 52	1979
Tank bottom F 9	1979
Tank bottom F 10	1979
Tank bottom C 4	1979
Tank bottom D 20	1979
Tank bottom D 51	1979
Tank bottom A 305	1979
Tank bottom H 1	1979
Tank bottom A 457	1979
Tank bottom A 106	1979
Tank bottom E 38 Tank bottom A 202	1980
Tank bottom A 461	1980
Tank bottom A 452	1980
Tank bottom E 37	1980
Tank bottom B 16	1980
Tank bottom D 50	1980
Tank bottom A 206	1980
Tank bottom A 53	1980
Tank bottom A 902	1980
Tank bottom A 209	1980
Tank bottom A 38	1980
Tank bottom A 51	1980
Tank bottom B 9	1980
Tank bottom A 453	1980
Tank bottom B 7	1981
Tank bottom A 455	1981
Tank bottom A 114	1981
Tank bottom D 19	1981
Tank bottom B 1	1981
Tank bottom A 52	1981

*Oil Refineries France (cont'd)*

***TOTAL NORMANDIE (76) (cont'd)***

Tank bottom A 901	1981
Tank bottom A 16	1981
Below the floating roof Tank A 462	1981
Tank bottom A 36	1981
Tank bottom B 15	1981
Below the floating roof Tank A 309	1982
Tank bottom E 29	1982
Tank bottom A 1	1982
Below the floating roof Tank A 460	1982
Tank bottom A 460	1982
Tank bottom A 505	1982
Below the floating roof Tank A 505	1982
Tank bottom A 112	1982
Tank bottom C 56	1982
Tank bottom B 2	1982
Tank bottom A 451	1982
Below the floating roof Tank A 458	1982
Tank bottom B 10	1983
Tank bottom A 28	1983
Tank bottom B 4	1983
Below the floating roof Tank A 310	1983
Tank bottom A 210	1983
Tank walls C 61	1983
Tank bottom A 31	1983
Tank bottom B 3	1983
Tank bottom A 502	1983
Below the floating roof Tank A 502	1983
Below the floating roof Tank A 463	1983
Below the floating roof Tank A 504	1984
Tank bottom A 903	1984
Below the floating roof Tank A 30	1984
Below the floating roof Tank A 464	1984
Tank bottom A 30	1984
Tank bottom A 8	1984
Tank bottom A 32	1984
Tank bottom A 504	1984
Tank bottom A 11	1985
Below the floating roof Tank A 1	1985
Below the floating roof Tank A 455	1985
Tank bottom B 5	1985
Below the floating roof Tank A 456	1985
Tank bottom A 2	1985
Tank bottom A 456	1985
Tank bottom B 8	1985
Tank bottom A 56	1986
Tank bottom A 611	1986
Tank bottom A 609	1986
Tank bottom A 34	1987
Tank bottom A 311	1987
Tank bottom, external & central part - Tank A 55	1987

*Oil Refineries France (cont'd)*

***TOTAL NORMANDIE (cont'd)***

Tank bottom A 403	1988
Tank bottom A 608	1988
Tank bottom A 607	1988
Tank bottom A 42	1988
Tank bottom A 352	1989
Tank bottom A 208	1989
Tank bottom A 306	1989
Tank bottom E 32	1989
Tank bottom A 33	1990
Tank bottom A 6	1990
Tank bottom A 402	1990
Tank bottom F 62	1990
Tank bottom A 501	1990
Tank bottom A 454	1991
Tank bottom A 15	1991
Tank bottom A 506	1991
Tank bottom A 9	1992
Tank bottom A 606	1993
Tank bottom D 72	1994
Tank bottom A 10	1994
Tank bottom A 902	1995
Tank bottom A 212	1995
Tank bottom A 615	1995
Tank bottom C 4	1995
Tank bottom C 5	1995
Full Tank D 10	1995
Below the floating roof Tank A 209	1996
Tank bottom A 456	1996
Tank bottom B 9	1996
Tank walls B 9	1996
Tank bottom A 311	1996
Tank bottom A 505	1996
Tank bottom A 2	1996
Tank walls A 2	1996
Tank bottom D 14	1996
Tank bottom C 55	1996
Tank bottom D 70	1996
Tank bottom A 613	1996
Tank bottom B 16	1996
Tank walls A 34	1997
Tank bottom A 12	1997
Tank walls A 12	1997
Tank bottom A 455 (part of it, only)	1998
Tank bottom A 33	1999
Tank bottom A 502	1999
Tank A 29 : walls / bottom angle	1999
Tank walls B 14	2000
Tank bottom 501 (repairs)	2000
Tank bottom B 14	2001
Tanks E 322 & E 323	2010

*Oil Refineries France (cont'd)*

***TOTAL PROVENCE (13)***

<i>Tank bottom E 5 (part of it, only)</i>	<i>1980</i>
<i>Tank bottom B 2</i>	<i>1981</i>
<i>Tank bottom E 29</i>	<i>1982</i>
<i>Tank bottom A 307</i>	<i>1982</i>
<i>Tank bottom E 37</i>	<i>1982</i>
<i>Tank bottom A 101</i>	<i>1982</i>
<i>Tank bottom A 56 (part of it, only)</i>	<i>1983</i>
<i>Tank bottom C 23</i>	<i>1994</i>
<i>Tank bottom A 8</i>	<i>1998</i>
<i>Tank bottom A 31</i>	<i>2008</i>
<i>Tank bottom A21</i>	<i>2013</i>



## *Oil Refineries – Export*

### ***ALBATROS – ANVERS/BELGIUM***

*Tank bottom TK 2603*

1981

### ***NNPC – PORT HARCOURT/NIGERIA***

*84 deposits : fully or partially coated depending on the stored products*

1987-88

### ***SHELL PETOBRAZI – ROMANIA***

*2 deposits*

1998

### ***STE IVOIRIENNE DE RAFFINAGE ABIDJAN – IVORY COAST***

*Tank bottom 1003*

1990

*Below the floating roof 1003*

1990

*Tank bottom A601*

1991

*Tank bottom A602*

1991

### ***STIR BIZERTE/TUNISIA***

*Tank S32*

2007

### ***TEXACO GAND – BELGIUM***

*Tank bottom 20/D/112*

1980

### ***TEXACO – PORT PETROLIER DE ZEEBRUGGE – BELGIUM***

*Tank bottom 15/D/3*

1981

# *Depots*

## Depots - France

### **ARSENAL DE BREST (29)**

Deposit bottom R 10	1987
Deposit walls R 10	1987
Tank bottom R 25	1999
Sous-face du toit du Tank R 25	1999

### **ARSENAL DE CHERBOURG (50)**

Deposit walls R 5	2000
Deposit walls R 6	2000
Deposit walls R 7	2000
Deposit walls R 8	2000
Deposit walls R 9	2000

### **ARSENAL DE TOULON (83)**

Deposit R 9 (Park de Missiessy)	1994
Deposit R 2 (Park de Missiessy)	1995
Deposit R 12 (Park du Lazaret)	1995
Deposit R 6 (Park de Missiessy)	1996
Deposit R 3 (Park de Missiessy)	1996
Deposit bottom R 13 (Park du Lazaret)	1997
Deposit R 11 (Park de Missiessy)	1999
Deposit R 12 (Park de Missiessy)	1999
Deposit R 13 (Park de Missiessy)	1999

### **BOLLORÉ – METZ (57)**

Tanks bottom 1, 2, 3 et 4	2015/2016
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### **C.I.M. - LE HAVRE (76)**

Tank bottom 31	1980
Tank bottom 71	1982
Tank bottom 17	1982
Tank bottom 18	1982
Tank bottom 16	1983
Tank bottom 19	1983
Tank bottom 20	1983
Tank bottom 47	1983
Tank bottom 45	1983
Tank bottom 76	1983
Tank bottom 46	1984
Tank bottom 105	1984
Tank bottom 48	1984
Tank bottom 104	1984
Tank bottom 106	1984
Tank bottom 38	1988
Tank bottom 39	1988
Tank bottom 67	1991
Tank bottom 54	1992
Tank bottom 53	1992
Tank bottom 300	1992
Tank bottom 301	1992
Tank bottom 302	1992
Tank bottom 303	1992
Tank bottom 304	1992

**Depots France (cont'd)**

***C.I.M. - LE HAVRE***

Tank bottom 305	1992
Tank bottom 306	1992
Tank walls 159	1994
Tank bottom 60	1994
Tank bottom 59	1994
Tank bottom 305	1995
Tank bottom 60	1995
Tank bottom 303	1997
Tank bottom 49	1998
Tank bottom 50	1998
Tank bottom 91	1998
Tank bottom 75	1999
Tank bottom 52	1999
Tank bottom 85	1999
Tank bottom 2	1999
Tank bottom 90	2000
Tank bottom 16	2000
Tank bottom 18	2000
Tank bottom 80	2002
Tank bottom 37	2002
Tank bottom 303	2003
Tank bottom 180	2006
Tank bottom 181	2006
Tank bottom 35	2006
Tank bottom 66	2007
Tank bottom 72	2007
Tank bottom 166	2007
Tank bottom 65	2009
Tank bottom 14	2009
Tank bottom 31	2011
Tank bottom 145	2011
Tank bottom 73	2011
Tank bottom 88	2012
Tank bottom 175 and 176	2012
Tank bottom 165	2013
Tank bottom 26	2014
Tank bottom 1000	2014
Tank bottom 186	2015
Tank bottom 173	2015
Tank bottom 154	2015

***C.I.M – CCMP – MITRY MORY (77)***

Fuel tanks nr <sup>s</sup> 13 & 17	2009
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***C.I.M - CCMP – PAUILLAC (33)***

Tank bottom T 510	1983
Tank bottom T 006 (deposit of Verdon)	1985
Tank bottom 513	2008
Tank bottom 702	2009
Tank bottom 712	2009
Tank bottom 715	2014

**Depots France (cont'd)**

**DEPOT PETROLIER (ex-ESSO) – AMBES (33)**

Tank 1002 – Walls and bottom 1981

**DEPOT PETROLIER (ex-EXXON) – PORT LA NOUVELLE (11)**

Tank bottom 1 1988

Tank bottom 2 1988

Tank bottom 3 1988

Tank bottom 4 1988

Tank bottom 5 1988

Tank bottom 6 1988

**DEPOT PETROLIER (ex-MOBIL FRONTIGNAN) - SETE (34)**

Tank bottom D 16 1985

Tank bottom 104 1985

Tank bottom 116 1986

Tank bottom 112 1992

**DEPOT PETROLIER (ex-MOBIL) – GENNEVILLIERS (92)**

Tank bottom 13 1989

**DEPOT PETROLIER SPLRL (ex-TOTAL) – HAUCONCOURT (57)**

Tank bottom A 107 1979

**DEPOT PETROLIER (ex-MOBIL) – ST HERBLAIN/NANTES (44)**

Tank n° 3 1971

Tank n° 5 1971

**DEPOT PETROLIER (ex-RAFFINERIE DU MIDI) – LA ROCHELLE PALLICE (17)**

Tank bottom n° 3 1983

**DEPOT PETROLIER (ex-MOBIL) – STRASBOURG (67)**

Tank bottom n° 1 1991

**DPF (DEPOT PETROLIER DE FOS) – FOS SUR MER (13)**

Tank R10 – cold hydrocarbons, unleaded gasoline 2015

**GPVM – VILLENEUVE LE ROI (94)**

Tank bottom 206 1993

Tank bottom 14 1994

**TOTAL ACS (ex-PORT PETROLIER) – GIVORS (69)**

Tank bottom n° 1 1980

**RUBIS TERMINAL HFR (ex-C.P.A.) – LE GRAND QUEVILLY (76)**

Tank bottom 104 1989

Tank bottom 105 1989

Tank bottom 106 1989

Tank bottom 107 1990

Tank bottom n° 6 1992

Tank bottom n° 2 1993

Tank bottom n°61 2001

*Depots France (cont'd)*

***RUBIS TERMINAL T41 – LE PETIT QUEVILLY (76)***

Purge cuve 2014

***RUBIS (ex-PETROPLUS SHELL) – REICHSTETT (67)***

Tank T 498	1977
Tank bottom T 467	1978
Tank T 485	1978
Tank T 2220	1980
Tank bottom T 460	1981
Tank bottom T 423	1982
Tank T 2202	1984
Tank bottom T 103	1986
Tank bottom T 3506	1987
Tank T 496	1988
Tank bottom T 5841	1988
Tank walls T 5841	1988
Tank bottom T 5842	1989
Tank walls T 5842	1989
Tank T 3501	1989
Tank T 802	1990
Tank T 460	1995
Tank T 461	1995

***S.E.A./SERVICE DES ESSENCES DES ARMEES – Tanks bottom in :***

CAMBRAI	1982-83
GERGY	1982-83
COLMAR	1982-83
ST DIZIER	1984
DIJON LONGVIC	1984
CAZAUX	1984
TOURS	1984
ST DIZIER	1986
LUXEUIL	1986
SOLENZARA	1986
DIJON	1986
HYERES	1986
NANCY	1986
STRASBOURG	1986
COLMAR	1986
ST DIZIER	1986
CAMBRAI	1986
LANDIVISIAU	1987
TOULOUSE	1987
MONNAIE/TOURS	1987
ORLEANS	1987
AVORD	1987
REIMS	1987
PORT ST LOUIS DU RHONE	1987
BRICY BOULET	1988
CROZON	1988
VILLACOUBLAY	1988
CAMBRAI	1989
STRASBOURG	1989



**Depots France (cont'd)**

**S.E.A./SERVICE DES ESSENCES DES ARMEES (cont'd) – Tanks bottom in :**

COLMAR	1989
LYON	1989
MAYOTTE (ILE DE MAYOTTE)	1989
CHALONS S/MARNE	1992
ST DIZIER	1993
GERGY	1993
MONTBARTIER	1993
CASTELSARRASIN	1993
BON ENCONTRE	1993
CHALONS S/MARNE	1994
GERGY	1994
MONTBARTIER	1994
MONT DE MARSAN	1994
ORANGE	1994
COLMAR	1994
LUXUEIL	1995
GERGY	1995
MONTBARTIER	1995
GILLOT (ILE DE LA REUNION)	1995
ROCHAMBEAUD (GUYANE)	1995
NANCY OCHEY TOUL	1995
MAYOTTE (ILE DE MAYOTTE)	1995
ORANGE	1996
GILLOT (ILE DE LA REUNION)	1996
EVREUX	1996
REIMS	1996
ISTRES	1997
EVREUX	1997
HYERES	1997
LA ROCHELLE PALLICE	2000
ORLEANS BRICY	2003
LAON	2004
TOURS	2004
CANJUERS	2008

**SFDM - SAINT GERVAIS (72)**

Tank bottom	2004
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**SFDM – NUISEMENT SUR COOLE (51)**

Tank bottoms A2, A5 et A8	2007
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**SEPP (ex-SHMPP) – LE HAVRE (76)**

Tank bottom D1	1992
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**SMADEC – MACON (71)**

Tanks Bottoms 2 900 m3 and 630 m3	2009
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**Depots France (cont'd)**

**S.P.M.R. - VILLETTE DE VIENNE (38)**

Tank bottom 43	1977
Tank bottom 13	1978
Tank bottom 26	1978
Tank bottom 24	1979
Tank bottom 28	1979
Tank bottom 21	1980
Tank bottom 25	1980
Tank bottom 23	1980
Tank bottom 27	1980
Tank bottom 31	1981
Tank bottom 32	1982
Tank bottom 42	1982
Tank bottom 14	1983
Tank bottom 41	1983
Tank bottom 11	1986
Tank bottom 16	1986
Tank bottom 15	1987
Tank bottom 22	1987
Tank bottom 51	1993
Tank bottom 52	1993
Tank bottom 53	1993
Tank bottom T 650	1994
Tank bottom T 651	1994
Tank bottom T 652	1994
Tank bottom T 653	1994

**S.R.P.P. - LE PORT (LA REUNION)**

Tank bottom n° 11	1987
Tank bottom n° 19	1989
Tank bottom n° 16	1992
Tank bottom n° 23	1999
Tank bottom 16	2014
Tank bottom 21	2014

**TOTAL CARLING (57)**

Tank bottom R12	2011
Tank bottom FBD607	2013

**TOTAL GARGENVILLE (78)**

Tank bottom 32 D 148	1981
Tank bottom 32 D 147	1981
Tank bottom 32 D 43	1982
Tank bottom 32 D 33	1982
Tank bottom 32 D 1	1982
Tank bottom 32 D 128	1982
Tank bottom 32 D 118	1982
Tank bottom 32 D 2	1983

**Depots France (cont'd)**

**TOTAL (ex-ELF) – GENNEVILLIERS (92)**

Tank bottom n° 13 1981

**TOTAL - IVRY S/SEINE (94)**

Tank bottom R 1985

**TOTAL - LA ROCHELLE PALLICE (17)**

Tank bottom n° 9 1987

**TOTAL - NANTERRE (92)**

Tank bottom n° 7 1986

**TOTAL EPL - PORT EDOUARD HERRIOT – LYON (69)**

Tank bottom n° 20 1987

Tank bottom n° 13 1990

Tank bottom n° 33 1980

**TOTAL (ex-FINA) - PORT LA NOUVELLE (11)**

Tank bottom 7 1983

**TOTAL (ex-STE DES CARBURANTS DU SUD-OUEST) – PORT LA NOUVELLE (11)**

Tank bottom R 24 1981

Tank bottom R 23 1982

Tank bottom R 18 1983

**TOTAL - VENIZEL (02)**

Tank B 1980

**TOTAL – VERT LE GRAND (91)**

Tank bottom TA 5001 2007

Tank bottom TA 5002 2007

**TRAPIL – Tanks bottom in:**

LANGRES - Tank 14 1974

LANGRES - Tank 15 1974

CHAUMONT - Tank 4 1974

LA FERTE ALAIS - Tank D3 1975

LA FERTE ALAIS - Tank D4 1975

FOS SUR MER - Tank 1 1975

LANGRES - Tank 19 1975

METZ ST BAUSSANT Thiaucourt - Tank B4 1975

METZ ST BAUSSANT Thiaucourt - Tank B6 1975

L'ESPIQUETTE (Le Grau du Roi) Tank 3 1976

LANGRES - Tank 6 1976

CHALONS SUR MARNE - Tank 6 1976

L'ESPIQUETTE - Tank 5 1976

L'ESPIQUETTE - Tank 7 1976

L'ESPIQUETTE - Tank 4 1976

LA FERTE ALAIS - Tank D7 1977

LANGRES – Tank 9 1977

L'ESPIQUETTE – Tank 6 1977

DUNKERQUE – Tank 4 1977

SAINT BAUSSANT - Bac 9 park A 1977

CAMBRAI - tank 2 park 2 1977

**Depots France (cont'd)**

**TRAPIL (cont'd) – Tanks bottom in:**

PHALSBOURG - Tank 4	1978
DONGES - Tank 2 park B	1978
CAMBRAI - Tank 3 park 2	1978
DONGES - Tank 2 park C	1979
DUNKERQUE - Tank 3	1979
CAMBRAI - Park 2 Tank 5	1980
MIRECOURT - Tank 2	1980
LA FERTE ALAIS - Tank B3	1980
LA FERTE ALAIS - Tank B5	1980
CHAUMONT - Tank 1	1980
LE HAVRE - Park 1 Tank C	1980
LE HAVRE - Park 1 Tank D1	1980
LE HAVRE - Park 2 Tank D1	1980
LAVERA - Tank 1	1980
LAVERA - Tank 2	1980
LANGRES - Park 1 Tank 18	1980
LANGRES - Park 2 Tank	1980
LA FERTE ALAIS - Park 8 Tank 7	1981
DUNKERQUE - Tank 1	1981
LANGRES - Park 1 Tank B13	1981
CHALONS S/MARNE - Park A Tank A11	1981
LA FERTE ALAIS - Park B Tank B10	1981
LA FERTE ALAIS - Park C Tank C10	1981
LA FERTE ALAIS - Park C Tank C11	1981
FOS SUR MER - Tank 4	1981
PIRIAC SUR MER - Park D Tank D2	1981
METZ ST BAUSSANT Thiaucourt Park B Tank 8	1981
LA FERTE ALAIS - Park C Tank C4	1981
LA FERTE ALAIS - Park C Tank C3	1982
CAMBRAI - Park 1 Tank 1	1982
CAMBRAI - Park 2 Tank 1	1982
LANGRES - Park 2 Tank 1	1982
PHALSBOURG - Tank 3	1982
LA FERTE ALAIS - Park C Tank 5	1982
LA FERTE ALAIS - Park C Tank 6	1982
LA FERTE ALAIS - Tank A1	1982
LA FERTE ALAIS - Tank A3	1982
LA FERTE ALAIS - Tank C1	1982
LA FERTE ALAIS - Tank C2	1982
LA FERTE ALAIS - Tank D5	1982
SAINT BAUSSANT - Tank 3 park A	1982
LA FERTE ALAIS - Tank D1 park D	1983
L'ESPIQUETTE - Tank 1	1983
FOS SUR MER - Tank 1	1983
FOS SUR MER - Tank 2	1983
CHALONS S/MARNE - Tank D6	1983
CHALONS S/MARNE - Tank D7	1983
LA FERTE ALAIS - Tank D2	1983
VILCEY SUR TREY - Tank 5	1983
BELFORT - Tank 2	1983
PIRIAC - Tank 1 park D	1983
CHALONS S/MARNE - Tank 2 park 2	1983
LA FERTE ALAIS - Tank 2 park A	1983

**Depots France (cont'd)**

**TRAPIL (cont'd) – Tanks bottom in:**

CHALONS S/MARNE - Tank 4 park D	1984
CHALONS S/MARNE - Tank 5 park D	1984
LE HAVRE - Tank 4 park 2	1984
LANGRES - Tank 11 park 1	1984
CHALONS S/MARNE - Tank 1 park A	1984
LA FERTE ALAIS - Tank 8 park D	1984
LA FERTE ALAIS - Tank 9 park D	1984
CHALONS S/MARNE - Tank 1 park D	1984
CHALONS S/MARNE - Tank 4 park C	1984
CHALINDREY - Tank 11 deposit 1	1984
LA FERTE ALAIS - Tank 1 park B	1984
LA FERTE ALAIS - Tank park B	1984
SAINT BAUSSANT – Tank 12 park A	1984
LA FERTE ALAIS - Tank 10 park D	1985
LA FERTE ALAIS - Tank 11 park D	1985
VILCEY SUR TREY - Tank 2	1985
CHALINDREY - Tank 12 park 1	1985
LE HAVRE - Tank 3 park 2	1985
PHALSBOURG - Tank 2	1985
ST BAUSSANT - Tank 7 park A	1985
MIRECOURT - Tank 4	1985
ST BAUSSANT - Tank 7 park B	1985
CHALINDREY - Tank 7 park 2	1985
VILCEY SUR TREY - Tank 3	1985
DAMPIERRE - Tank 7 park 1	1985
ST BAUSSANT - Tank 8 park A	1986
VILCEY SUR TREY - Tank 6	1986
ST BAUSSANT - Tank 11 park A	1986
BELFORT - Tank 1	1986
LA FERTE ALAIS - Tank 7 park C	1986
LAON - Tank 1	1986
MIRECOURT - Tank 1	1986
VILCEY SUR TREY - Tank 4	1986
DONGES - Tank 5 park B	1986
LE HAVRE - Tank DE2 - park 1	1986
CHALONS S/MARNE - Tank 6 - park A	1986
CAMBRAI - Tank 4 - park 2	1987
LA FERTE ALAIS - Tank 6 - park A	1987
LA FERTE ALAIS - Tank 4 - park D	1987
LA FERTE ALAIS - Tank 6 - park D	1987
LA FERTE ALAIS - Tank 7 - park D	1987
LA FERTE ALAIS - Tank 3 - park D	1987
LA FERTE ALAIS - Tank 12 - park D	1987
CHALONS S/MARNE - Tank 7 - park A	1987
CHALONS S/MARNE - Tank 4	1987
ST BAUSSANT - Tank 10 - park A	1987
LANGRES - Tank 14 park 1	1987
LANGRES - Tank 16 - park 1	1987
VILCEY SUR TREY - Tank 3	1987
MIRECOURT - Tank 3	1987
CHALONS S/MARNE - Tank 4 - park 2	1987

**Depots France (cont'd)**

**TRAPIL (cont'd) – Tanks bottom in:**

DONGES - Tank 2 park C	1988
ST BAUSSANT - Tank 4 - park A	1988
ST BAUSSANT - Tank 6 - park A	1988
DONGES - Tank 1 - park C	1988
LA FERTE ALAIS - Tank 5 - park A	1988
LAON - Tank 2	1988
ST BAUSSANT - Tank 4 - park B	1988
ST BAUSSANT - Tank 6 - park B	1988
CAMBRAI - Tank 2 - park B	1988
LE HAVRE - Tank 5 - park 2	1988
LE HAVRE - Tank 6 - park 2	1988
DONGES - Tank 4 - park B	1988
L'ESPIQUETTE - Tank 2	1988
LA FERTE ALAIS - Tank 7 - park A	1988
DONGES - Tank 2 - park B	1988
LAON - Tank 3	1988
ST BAUSSANT - Tank 9 - park B	1989
ST BAUSSANT - Tank 9 - park A	1989
LE HAVRE - Tank 1 - park 1	1989
LE HAVRE - Tank 2 - park 1	1989
LANGRES - Tank 17 - park 1	1989
DONGES - Tank 5 - park C	1989
LAON - Tank 4	1989
LA FERTE ALAIS - Tank 8 - park C	1989
LA FERTE ALAIS - Tank 9 - park C	1989
CHALONS S/MARNE - Tank 3 - park A	1989
DONGES - Tank 6 - park B	1989
ST BAUSSANT - Tank 2 - park B	1989
BELFORT - Tank 3	1989
FOS SUR MER - Tank 2	1989
CHALONS S/MARNE - Tank 4 - park B	1989
CHALONS S/MARNE - Tank 7 - park B	1989
DUNKERQUE - Tank 3	1989
HERBLAY - Tank 4	1989
LE HAVRE - Tank 3	1989
LE HAVRE - Tank 4	1989
LAON - Tank 5	1989
PHALSBOURG - Tank 4	1989
DONGES - Tank 4 - park C	1989
CAMBRAI - Tank 3 - park 2	1990
ST BAUSSANT - Tank 4 - park B	1990
BELFORT - Tank 4	1990
ST BAUSSANT - Tank 3 - park B	1990
LE HAVRE - Tank 5 - park 1	1990
LE HAVRE - Tank 6 - park 1	1990
DUNKERQUE - Tank 2	1990
CAMBRAI - Tank 2 - park 1	1990
PHALSBOURG - Tank 1	1990
LA FERTE ALAIS - Tank 8 - park A	1990
FOS SUR MER - Tank 1	1990

**Depots France (cont'd)**

**TRAPIL (cont'd) – Tanks bottom in:**

CAMBRAI - Tank 3 - park 1	1991
CHALONS S/MARNE - Tank 4 - park A	1991
LA FERTE ALAIS - Tank 8 - park B	1991
FOS SUR MER - Tank 4	1991
LE HAVRE - Tank 1 - park 2	1991
DONGES - Tank 3 - park C	1991
LA FERTE ALAIS - Tank 9 - park B	1991
DUNKERQUE - Tank 5	1992
CHALONS S/MARNE - Tank 5	1992
L'ESPIGUETTE - Tank 3	1992
ST BAUSSANT - Tank 1 - park B	1992
DAMPIERRE AU TEMPLE - Tank 4	1992
CHALONS S/MARNE - Tank 1 - park 1	1993
CHALONS S/MARNE - Tank 2 - park 1	1993
CHALONS S/MARNE - Tank 5 - park 1	1993
CAMBRAI - Tank 8 - park 1	1993
CAMBRAI - Tank 9 - park 1	1993
L'ESPIGUETTE - Tank 4	1993
CHALONS S/MARNE - Tank 2 - park D	1998
CHALONS S/MARNE - Tank 5 - park D	1998
L'ESPIGUETTE - Tank 7	2000
AUTREVILLE SUR LA RENNE - Tank 5	2002
PHALSBOURG - Tank 2	2004
LA FERTE ALAIS - Tank A4	2004
CHAUMONT - Tank 4	2005
LANGRES - Tank 1 - park 1	2007
VILLETTE DE VIENNE – Tank n°28	2009
CAMBRAI – Park D and stations 1 and 3	2011
CAMBRAI – Station n°1 – fuel rinsing tanks n° 1 and 2	2011
CAMBRAI – Station n°3 – fuel rinsing tanks n° 1, 2 and 3	2011
CAMBRAI – Park D – rinsing tanks	2011
CHALONS S/MARNE – Station n°1 – cuves de purge fuel n° 1 and 2	2011
CHALONS S/MARNE – Station n°2 – cuves de purge fuel n° 1 and 2	2011
LANGRES – Park E – cuve de purge multi-produit	2011
L'ESPIGUETTE – Purges cuves 1 and 2	2011
LE GRAU DU ROI – 2 cuves de purge – fuel	2011
LE GRAU DU ROI – Tanks n°1 and 2 – gasoil	2011
GENNEVILLIERS – purge cuve	2012
PETIT COURONNE (76) – Purges cuves all kind of fuel (2 tanks 300001)	2014
VILCEY SUR TREY (54) – Tank 100m3	2015
LANGRES (52) – Tank 1	2015/2016
Mirecourt (88) – Tank 2	2017



## Depots – Export

### ***BELGO MAZOUT - PORT PETROLIER D'ANVERS / BELGIUM***

Tank bottom n° 23 1981

### ***BP OIL UK LTD – SOUTHAMPTON / ENGLAND***

Tank 6 2007

### ***IRISH SHELL – CORK / IRELAND***

Tank 10 1994

Tank 7 1995

Tank 11 1995

Tank 15 1995

### ***IRISH SHELL – DUBLIN / IRELAND***

Tank 1988

Tank 4 1989

Tank 2 1990

Tank 10 1994

Tank 11 1994

Tank 12 1994

Tank 5 1995

Tank 6 1995

### ***MOBIL OIL – CORYTON / ENGLAND***

Tank 52: top of the floating roof 1989

Tank 51: top of the floating roof 1991

### ***PERN – GDANSK / POLAND***

Tank n°5: tank bottom and below the roof 1996

### ***SONATRACH TRC- RTO/ARZEW / ALGERIA***

Tank bottom 807 2007

Tank bottom 802 2008

Tank bottom 851 2014

### ***SONATRACH TRC- RTC/BEJAIA / ALGERIA***

Tank bottom n°2A1 - Biskra 2008

Tank bottom n°3A1 - M'Sila 2008

### ***SONATRACH TRC- RTE/SKIKDA / ALGERIE***

Tank bottom 105 2010

Tank bottom 106 2010

### ***THE OIL AND PIPELINES AGENCY – BRISTOL / ENGLAND***

Tank n°3 1997

Tank n°4 1997

Tank bottom n°912 1997

### ***TOTAL - GUAYNABO BULK TERMINAL – PUERTO RICO***

Tank bottom n°12 2011

# *Airport jet fuel depots*

## Airport jet fuel depots - France

### **AIR BP**

LE BOURGET	1965
MARSEILLE/MARIGNANE	1987
SEMOUTIERS	1995
CLERMONT FERRAND	1996
CHAMBERY	1997
COLMAR	1997
GAP	1998
SISTERON	1998
LA ROCHELLE	1998
CARCASSONNE	1998
BEZIERS	1998
AGEN	1998
GRENOBLE	1998
DIJON	1998
NEVERS	1998
LE PLESSIS BELLEVILLE	1998

### **AIR FRANCE**

TOULOUSE MONTAUDRAN	1970
PARIS ROISSY CDG	2014

### **AIR TOTAL (with ELF AVIATION)**

AJACCIO-CAMPO DEL ORO	1971
BASTIA-PORETTA	1971
BORDEAUX-MERIGNAC	1963
BORDEAUX-MERIGNAC	1977
CALVI SAINTE-CATHERINE	2012
LE TOUQUET	2013
LILLE-LESQUIN	1963
LYON-SATOLAS	1978
LYON-SATOLAS	1980
MARSEILLE-MARIGNANE	1960
MELUN-VILLAROCHE	1966
NICE COTE-D'AZUR	1960
PARIS-LE BOURGET	1970
PERPIGNAN-LLABANERE	1963
ST DENIS DE LA REUNION	1975
SAINT ETIENNE-FRANCE BOUTHEON	1972
TOULOUSE-BLAGNAC	1965
TOULOUSE-ST MARTIN DUTOUCH	1980

### **AVIA**

GRANVILLE-MONT SAINT MICHEL	2012
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### **EXXON**

NICE-COTE D'AZUR	1996
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### **SHELL AVIATION**

PARIS-LE BOURGET	1971
MARSEILLE/MARIGNANE	1987

**Airport jet fuel depots - France (cont'd)**

***S.M.C.A. STE DE MANUTENTION DES CARBURANTS D'AVIATION***

PARIS ORLY - 9 Tank s	1959
PARIS ROISSY - 4 Tank s	1973
PARIS ORLY - 2 Tank s	1973
PARIS ORLY - 2 Tank s	1978
PARIS ORLY - 2 Tank s	1980
PARIS ORLY - 3 Tank s	1985
PARIS ORLY - 3 Tank s	1986
PARIS ROISSY - 2 Buried Tanks	1986
PARIS ROISSY - 2 Buried Tanks	1987
PARIS ORLY - 3 Tanks	1987
PARIS ROISSY - Tank 21	1989
PARIS ROISSY - Tank 22	1999
PARIS ROISSY - Tank 31	2000
PARIS ORLY - Tanks 62 and 63	2002
PARIS ROISSY - Tank 11	2003
PARIS ORLY - Tank s 52 and 53	2003
PARIS ROISSY - Tank 12	2004
PARIS ROISSY - Tank 2	2005
PARIS-ORLY - Tank 71	2005
PARIS ROISSY - Tank n°56	2010
PARIS ORLY – Tanks: n° 2, 3, 21 et 23	2014
PARIS ORLY – 9 tanks	2015/2016
PARIS ORLY – Tank 22	2016

***TOTAL AVIATION***

AERODROME DE CHAUBUISSON – FONTENAY TRESIGNY	2015
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***AEROPORT DE CALVI (20)***

AD blue tanks (6) + Jet fuel A1 tank (1) + hydrocarbon liq tank (1)	2014
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## Airport jet fuel depots - Export

### **AIR BP**

NEWCASTLE (England)	1994
PRESTWICK (England)	1996
CARDIFF (Scotland)	2004

### **AIR TOTAL**

MOSCOU-DOMODIEDOVO (Russia)	1965
KIEV-BORISPOL (Ukraine)	1966
ATHENES-CENTRAL (Greece)	1967
DAMAS-INTERNATIONAL (Syria)	1968

### **ATLANTIC POWER**

KILLINGHOLME (England)	1999
MISTERTON (England)	1999
SAFFRON WALDEN P.S.D. (England)	2002

### **AVIATION FUEL SERVICES**

LONDRES-HEATHROW (England)	1990
LONDRES-HEATHROW (England)	2004

### **B.P.A.**

BUNCEFIELD (England)	1999-2000-2001
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### **CSE AVIATION**

OXFORD (England)	1990
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### **ELF AVIATION**

TCHIBANGA (Gabon)	1976
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### **NAFTAL**

ALGER-HOUARI BOUMEDIENNE (Algeria)	2006
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### **ROMANIAN FUEL SERVICES**

BUCAREST (Rumania)	1998
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### **SADCOP**

DAMAS (Syria)	2001-02
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### **SHELL AVIATION**

ABERDEEN (Scotland)	1988
BUCAREST (Rumania)	1998
MANCHESTER (England)	1988

### **STAR OIL**

CONAKRY (Guinea Conakry)	2015 and 2018
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### **WESTERLEIGH (England)**

2015

# *Service Station tanks*

## Service station tanks – France

<b>AUCHAN – OSNY (95)</b> Service station tank – gasoil	2015
<b>BP – RUE DES HAUTES COUTURES – CONFLANS SAINT HONORINE (78)</b> Service station tank – gasoil	2015
<b>BP – A10 AIRE D'ORLEANS GIDY VERS PARIS – GIDY (45)</b> Service station tank – gasoil	2015
<b>BP – 26 BOULEVARD CAMILLE FLAMMARION – MARSEILLE (13)</b> Service station tank – gasoil	2015
<b>BP – 12 BOULEVARD GAMBETTA – POISSY (78)</b> Service station tank – gasoil	2015
<b>BP – ROND POINT BONAPARTE – TOULON (83)</b> Service station tank – Géo +	2015
<b>ELAN / STATION "1 AVENUE CORPS FRANC POMMIÈS" - FLEURANCE (32)</b> Service station tank - gasoil	2017
<b>INTERMARCHE – SAINTES (17)</b> Service station tank – fuel	2012
<b>TOTAL / STATION "100, RUE DE COURCELLES" – PARIS 17<sup>e</sup></b> Service station tank – gasoil	2011
<b>TOTAL / STATION SAINT-JOUAN L'ISLE (22)</b> Service station tank – essence & gasoil	2011
<b>TOTAL / STATION "LES DEMOISELLES" – TOULOUSE (31)</b> 3 Service stations tanks – gasoil, SP 98-95	2011
<b>TOTAL / STATION "RELAIS PONT SAINT JEAN" – VILLEFRANCHE SUR MER (06)</b> Service station tank – SP 98-95	2011
<b>TOTAL / STATION ACCESS – NEUILLY (92)</b> Service station tank – SP95	2013
<b>TOTAL / STATION ACCESS "BOULEVARD DE L'EUROPE" – BREST (92)</b> Service station tank – SP95	2013
<b>TOTAL-CSTJF – PAU (64)</b> Service station tank Hydrocarbons Lab L4	2014
<b>TOTAL – NEUILLY SUR SEINE (92)</b> Service station tank – gazole & Géo +	2014
<b>TOTAL – A33 AIRE D'ANTHELUP – VITRIMONT (54)</b> Service station tank – gasoil	2016
<b>STATION ELAN - Fleurance (32)</b> Service station tank – gasoil	2017
<b>ERI Vaugirard - Paris (75)</b> Cuve	2019



## *Service station tanks – Export*

<i>TOTAL SOUTH AFRICA</i>	<i>42 tanks</i>	<i>since 2018</i>
<i>TOTAL BELGIUM</i>	<i>2 tanks</i>	<i>2015</i>
<i>TOTAL BURKINA FASO</i>	<i>88 tanks</i>	<i>since 2016</i>
<i>TOTAL CAMEROON</i>	<i>93 tanks</i>	<i>since 2011</i>
<i>TOTAL EQUATORIAL GUINEA</i>	<i>10 tanks</i>	<i>2020</i>
<i>TOTAL GUINEE CONAKRY</i>	<i>37 tanks</i>	<i>2019</i>
<i>TOTAL IVORY COAST</i>	<i>166 tanks</i>	<i>since 2009</i>
<i>TOTAL MALI</i>	<i>138 tanks</i>	<i>since 2008</i>
<i>TOTAL MOROCCO</i>	<i>331 tanks</i>	<i>since 2011</i>
<i>TOTAL NIGER</i>	<i>109 tanks</i>	<i>2006</i>
<i>TOTAL NIGERIA</i>	<i>60 tanks</i>	<i>2013-2014</i>
<i>TOTAL SENEGAL</i>	<i>2 tanks</i>	<i>2019</i>
<i>TOTAL UGANDA</i>	<i>7 tanks</i>	<i>since 2018</i>
<i>TOTAL TOGO</i>	<i>79 tanks</i>	<i>since 2013</i>
<i>VIVO MOROCCO</i>	<i>24 tanks</i>	<i>since 2020</i>
<i>PETROSEN SENEGAL</i>	<i>3 tanks</i>	<i>2020</i>

# *Various – France*

## Various – France

### **AERODROME – SAINT CREPIN (05)**

Storage tank – aviation fuel

2015

### **AUZOU CITERNES – SAINT SAENS (76)**

Storage tank – crude oil

2015

### **AXÉO – EPINAY SOUS SENART (91)**

Tank truck

2014

### **BSN GLASS PACK – PUY GUILLAUME (03)**

Heavy fuel tank

2004

### **EDF - CENTRALE DE CORDEMAIS (44)**

Heavy fuel tank n°8

2007

Heavy fuel tank n°9

2013

### **EDF - CENTRALE DE POINTE JARRY – GUADELOUPE (971)**

Heavy and domestic fuel tank

2011

Button heavy fuel tank nr 203

2013

### **EDF - CENTRALE DE DEGRAD DES CANNES – GUYANE (973)**

Tank 00GDK 001BA – heavy fuel

2002

Heavy and domestic fuel tank

2005

### **EDF - CENTRALE DE LUCCIANA - BASTIA (20)**

Heavy fuel tank

2002

Heavy fuel tank

2006

Heavy fuel tank n°1

2008

Light fuel tank BKO 2201

2013

Light fuel tank BKO 2202

2014

Light fuel tank BKO 2203

2014

### **EDF - CENTRALE DE BELLEFONTAINE – MARTINIQUE (972)**

Heavy and domestic fuel tank

2011

### **EDF - CENTRALE DE MONTEREAU (77)**

Oil Tanks OBK 1100 and OBK 1200

2010

### **EDF - CENTRALE DE LE PORT – LA REUNION (974)**

Heavy and domestic fuel tank

1983

Heavy and domestic fuel tank

2010

### **EDF - CENTRALE DE VAIRES (77)**

Oil Tank OBK 1100

2008

Oil Tank OBK 1200

2009

Oil Tank OBK 1300

2009

Oil Tank OBK 1400

2009

### **EDF - CENTRALE DE VAZZIO – AJACCIO (20)**

Tank 00GDK 003 BA – heavy fuel n°2 TBTS

2011

**Various - France (cont'd)**

**EDF - CENTRALE DE VITRY (94)**

Tank OSPF 0108 BA – fuel

2009

**ENERGIE – NEUILLY SUR SEINE (92)**

Tank FOD

2016

**EURODISNEY – MARNE LA VALLÉE (77)**

No road diesel

2014

Tank Autovia – SP95

2016

Storage tank – gasoil

2016

**HELISTATION CHR ORLEANS (45)**

Jet fuel A1

2014

**HELISTATION CHU – TOURS (37)**

Jet fuel A1

2014

**RENAULT – AUBEVOYE (27)**

Unleaded gasoline tank

2015

**SERVICE TECHNIQUE MUNICIPAL – ANTONY (92)**

Service station tank – gasoil

2012-2013

**SIAAP– CLICHY (92)**

3 service station tanks – gasoil, SP 98-95

2011

**UNIVAR – VILLENEUVE LA GARENNE (92)**

Bottom tank n°17 – gasoil

2011

**USINE TRAITEMENT DES DECHETS / RECYCLAGE – PRUNAY SUR ESSONNE (91)**

Retention

2015

**VERMILLON – VULAINES (77)**

Hydrocarbon and deep water depots

1998

Technical specification

## Appendix 4:

O.H.G.P.I 's circular G32/Rev. 12/2020



# Circulaire G32

## Rév 12 / 2020

Revêtements intérieurs  
de réservoirs et capacités en acier  
pour  
pétrole brut, fiouls, carburants  
et hydrocarbures aliphatiques

## Avertissement :

Les homologations délivrées par l'OHGPI en application de cette Circulaire sont basées sur les conditions de mise en jeu de la garantie précisées dans le Code G30, qui complète et prévaut dans le cas présent, sur le Code DGO-12.

## 0 – Préambule

### 0.1 – Objet

La présente Circulaire a pour objet de préciser quels types et durées de garanties maximales peuvent être homologuées pour les protections intérieures de capacités en tous genres devant contenir du pétrole brut, des hydrocarbures aliphatiques, des fiouls et carburants, comme par exemple : essence, gazole, kérosène, GPL, biocarburants y compris à base d'éthanol.

### 0.2 – Catégories de revêtements et types de garanties : définitions

On distingue :

- 4 catégories principales de revêtements

1. Les revêtements à liant minéral (donc inorganique)
2. Les revêtements à liant organique en phase solvant
3. Les revêtements à liant organique sans solvant
4. Les revêtements à liant organique sans solvant armés de fibres de verre.

- 2 types de garanties

#### **Garantie d'aptitude :**

On entend par aptitude le fait que le revêtement soit apte à remplir des fonctions de protection des surfaces intérieures, protection anticorrosion Ri 0 incluse, et de non pollution de leur contenu, dans des conditions et pendant une durée définies.

***Peuvent y prétendre certains revêtements des catégories 2 et 3 et tous les revêtements de la catégorie 4.***

#### **Garantie d'anticorrosion :**

On entend par anticorrosion, une performance telle que définie au Code DGO-12, assortie d'un cliché d'enrouillement, pendant une durée définie.

***Les revêtements de la catégorie 1, et certains des catégories 2 et 3 sont susceptibles d'être concernés.***

### 0.3 – Définition de l'état des subjectiles non revêtus selon ISO 8501-1

Quatre degrés de rouille sont décrits, désignés respectivement par A, B, C et D.

Ils sont définis ci-dessous, et représentés sous formes de photographies au chap 6 de ISO 8501-1 :

- A** ⇒ Subjectile d'acier largement recouvert de calamine adhérente mais avec peu ou pas de rouille.
- B** ⇒ Subjectile d'acier qui a commencé à rouiller et d'où la calamine a commencé à s'écailler.
- C** ⇒ Subjectile d'acier où la calamine a disparu sous l'action de la rouille ou peut en être détachée par grattage, mais qui présente quelques chancres de rouille observables à l'œil nu.
- D** ⇒ Subjectile d'acier où la calamine a disparu sous l'action de la rouille et qui présente de nombreux chancres de rouille observables à l'œil nu.



## 0.4 – Subjectiles revêtus

Leur cas particulier est traité dans le Code G30 auquel il convient de se reporter.

## 0.5 – Préparation de surface

- Le degré de soin ne sera jamais inférieur à Sa 2½ ou DHP 4 et ≤ OF1, ou Wa 2½ L : se reporter aux documents particuliers.
- Les soudures des ouvrages neuves sont préparées au degré de soin P3 selon NF EN ISO 8501-3. Ce degré de soin ne nécessite pas l'arasage des soudures mais uniquement l'adoucissement.
- La rugosité est adaptée à l'épaisseur prévue du revêtement et est spécifiée dans la demande d'homologation : Ra, Rt ou profils de rugosité définis selon les normes NF EN ISO 8503-1 et 2. Minimum admissible : Ra 12,5µ ou Rt 75µ, ou Moyen (G).

Les degrés de soin et rugosité sont obtenus avec matériel et abrasif(s) appropriés.

- Le taux résiduel de poussière sur le subjectile est mesuré selon la norme ISO 8502-3 et ne doit pas dépasser la catégorie 2.
- La teneur en sels solubles mesurée sur la surface de l'acier selon ISO 8502-6 et 9, doit être inférieure à 50 mg/m<sup>2</sup>.

## 0.6 – Compatibilité

Le demandeur adhérent de l'Office devra s'assurer de la compatibilité du revêtement proposé avec le contenu prévu et les températures de stockage annoncées.

# 1 – Revêtements à liant minéral

## 1.1 – Etat du subjectile

Les capacités ou bacs peuvent être neufs ou en réfection, mais peu corrodés, d'une corrosion interne uniquement, et **au maximum** à l'état **B** défini au § 0.3.

## 1.2 – Garantie anticorrosion homologable pour des contenus à t ≤ 60°C

Aucune garantie n'est homologable pour les subjectiles grenailés pré-peints en automatique et les primaires d'attente.

### • Réservoir cylindrique à axe vertical et à fond plat

- Face interne de la robe :	- garantie maximum 5 ans Ri 3
- Sous face de toit flottant :	- garantie maximum 5 ans Ri 3
- Sous face de toit fixe :	- protection provisoire uniquement.
- Fond et remontée :	- protection provisoire uniquement.

### • Capacité ou citerne fixe ou mobile (cylindre à axe horizontal)

- Neuve ou existante :	- garantie maximum 3 ans Ri 3, sous réserve de compatibilité avec les produits de nettoyage ou de lavage.
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## 2 – Revêtements à liant organique en phase solvant

### 2.1 – Etat du subjectile

Les capacités ou bacs peuvent être neufs ou en réfection, mais peu corrodés, d'une corrosion interne uniquement, et **au maximum** à l'**état C** défini au § 0.3.

### 2.2 – Garantie d'aptitude ou d'anticorrosion <sup>(1)</sup> homologable

Tableau 1

Surfaces concernées	Epaisseur nominale du revêtement <sup>(2)</sup>	Garantie maximum selon température du contenu	
		≤ 60°C	> 60°C
. Fonds . Robes . Sous-faces de toit	≥ 300 µm	aptitude : 2 ans, ou anticorrosion : 3 ans Ri2	
	≥ 400 µm	aptitude : 3 ans, ou anticorrosion : 5 ans Ri2	

<sup>(1)</sup> Se référant à un cliché d'enrouillement de ISO 4628-3

<sup>(2)</sup> Selon ISO 19840. Les maxima sont indiqués dans les fiches techniques des fabricants.

### 3 – Revêtements à liant organique sans solvant, non armés

















#### 3.1 – Etat du sujet

Les capacités ou bacs peuvent être neufs ou en réfection, mais peu à moyennement corrodés, d'une corrosion interne uniquement, et **au maximum** :

- ⇒ à l'état **A, B ou C** défini au § 0.3 pour les revêtements d'épaisseur  $\leq 400 \mu$
- ⇒ à l'état **D** défini au § 0.3 pour les revêtements d'épaisseur  $> 400 \mu$ .

#### 3.2 – Garantie d'aptitude ou d'anticorrosion<sup>(1)</sup> homologable

Tableau 2

Surfaces concernées	Epaisseur nominale du revêtement <sup>(2)</sup>	Garantie maximum selon température du contenu					
		$\leq 60^{\circ}\text{C}$	$\leq 80^{\circ}\text{C}$		$\leq 95^{\circ}\text{C}$		$\leq 120^{\circ}\text{C}$
			Sans calorifuge extérieur	Avec calorifuge extérieur <sup>(3)</sup>	Sans calorifuge extérieur	Avec calorifuge extérieur <sup>(3)</sup>	Avec calorifuge extérieur <sup>(3)</sup>
. Fonds . Robes . Sous-faces de toit	$\geq 300 \mu\text{m}$	aptitude 2 ans, ou anticorrosion 3 ans Ri2					
	$\geq 400 \mu\text{m}$	aptitude 3 ans, ou anticorrosion 5 ans Ri2					
	$\geq 600 \mu\text{m}$	aptitude 5 ans, ou anticorrosion 6 ans Ri2	anticorrosion 3 ans Ri2	aptitude 5 ans			
	$\geq 800 \mu\text{m}$	aptitude 7 ans	anticorrosion 3 ans Ri2	aptitude 7 ans		aptitude 5 ans	
	$\geq 1\,000 \mu\text{m}$	aptitude 10 ans	anticorrosion 3 ans Ri2	aptitude 10 ans		aptitude 10 ans	aptitude 5 ans

<sup>(1)</sup> Se référant à un cliché d'enroulement de ISO 4628-3

<sup>(2)</sup> Selon ISO 19840. Les maxima sont indiqués dans les fiches techniques des fabricants.

<sup>(3)</sup> ***Ou pré-isolation par un revêtement interne armé formant écran selon les indications du tableau 3, page suivante***

**Nota :** Le masticage éventuel des points singuliers ne se substitue pas à un renfort par fibre de verre : se reporter au chapitre 4 ci-après.

## 4 – Revêtements à liant organique sans solvant, armés de fibres de verre

### 4.1 – Etat du sujettile

Il peut **avoir dépassé**, sur tout ou partie de la capacité, l'**état D** défini au § 0.3, par corrosion d'origine interne ou externe.

On qualifiera le revêtement avec la quantité de fibres de renforcement – ou armature – correspondante, selon les critères du tableau 3 ci-dessous.

### 4.2 – Garantie d'aptitude homologable

Tableau 3

Etat du sujettile	Corrosion caractérisée par des chancres ou cratères conduisant à une épaisseur de tôle résiduelle en tout point $\geq 2,5$ mm <sup>(1)</sup>			Corrosion traversante, ou caractérisée par des chancres ou cratères conduisant à une épaisseur de tôle résiduelle $< 2,5$ mm <sup>(1)</sup>		
	450 g/m <sup>2</sup>			1200 g/m <sup>2</sup>		
Température du contenu (C°)	$\leq 60$	$60 < t \leq 95$	$95 < t \leq 120$	$\leq 60$	$60 < t \leq 95$	$95 < t \leq 120$
Epaisseur totale <sup>(2)</sup> minimum (mm / $\mu$ m)	1,5 1 500	2,0 2 000	2,2 2 200	3,0 3 000	3,5 3 500	3,7 3 700
dont finition mini (mm / $\mu$ m)	0,3 300	0,8 800	1,0 1 000	0,3 300	0,8 800	1,0 1 000
Garantie maximum	10 ans	10 ans	5 ans	10 ans	10 ans	5 ans

<sup>(1)</sup> Selon définition du CODRES Division 2 révision 2013 du SNCT

<sup>(2)</sup> Selon ISO 19840. Les maxima sont indiqués dans les fiches techniques des fabricants.