Max Perlès

advanced industrial linings

# *technical manual*
# *oil & gaz*

## *PETROPERL systems*

Max Perlès

# *Contents*



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.

Max Perlès

# The Oil & Gas INDUSTRY
and
*max perlès*
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 perles coatings :

### Health and Safety :

They are ***solvent-free*** and with very low VOC content

### 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

*We also propose our system **"3D"** for what is called **double-wall protection i.e. allowing leak detection.***
*Please consult us.*

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# sheet ex.nr.100B
# Petroperl® 600µ, on Sa 2.5 and ED1

# 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° ≤ 80°C

*substrate:* new steel or existing steel in a very good surface state (1) (that must be insulated or reinforced if t° ≥ 60°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** (2) | by any appropriate means to obtain minimim 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 **Varnish ED1**, solvent borne epoxy,30 µm dry film, **100 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.*

♦♦♦♦♦♦

(1) **This specification is for works to a maximum of state D according to standard ISO 8501-1:**
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.101B
# Petroperl® 800µ, on Sa 2.5 and ED1

# 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 80°C < t° ≤ 95°C

*substrate:* new steel or existing steel in a very good surface state (1) (that must be insulated or reinforced if t° ≥ 60°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** (2) — 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 **Varnish ED1**, solvent borne epoxy, 30 µm dry film, **100 g/sqm**

## *Coating* Petroperl® *– thickness* 0.8 mm*:*

- **Application** — of **Petroperl® T**: In 1 layer using airless spray 45/1 minimum, Theoretical consumption: **1100 g/sqm** for **800 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: 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 8501-1:**
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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oil and gas
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# sheet ex.nr.102B
# Petroperl® 1000µ, on Sa2.5 and ED1

# 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 ≤ 95°C

*substrate:* new steel or existing steel in a very good surface state (1) (that must be insulated or reinforced if t° ≥ 60°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** (2) — 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 **Varnish ED1**, solvent borne epoxy, 30 µm dry film, **100 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 8501-1 :**
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 ≤ 60°C
Superethanol max E85 – t < 25°C

*substrate:* new steel or existing steel in a very good surface state (1) (that must be insulated or reinforced if t° ≥ 60°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** (2) — 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 **Varnish ED1**, solvent borne epoxy, 30 µm dry film, **100 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 8501-1:**
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 ≤ 60°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** (1) — 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 **Varnish ED1**, solvent borne epoxy, 30 µm dry film, **100 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 debubblized using a special roller, **450 g/sqm**
  **Petroperl® R** coat for **saturation**, using a roller, **500 microns**, **700 g/sqm**
  **Silica SB0** 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.*

♦♦♦♦♦♦

(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.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°C < t°≤ 95°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** (1) — 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 **Varnish ED1**, solvent borne epoxy,30 µm dry film, **100 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 debubblized using a special roller, **450 g/sqm**
  **Petroperl® R** coat for **saturation**, using a roller, **500 microns**, **700 g/sqm**
  **Silica SB0** 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.*

♦♦♦♦♦♦

(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.112B
## Petroperl® / 3 glass mats / topcoat 400µ

# Anti-corrosion reinforced protective coating

*made of:* solvent-free epoxy reinforced with 1350 g/sqm of fiberglass

*for:* tanks and reservoirs

*in contact with:* petroleum products, fuels and oils, greases and paraffin hydrocarbons at t ≤ 60°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** (1) — 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 **Varnish ED1**, solvent borne epoxy, 30 µm dry film, **100 g/sqm**

## *System* Petroperl® / 3 glass mats 450 – *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 debubblized using a special roller, **450 g/sqm**
  Same operation for the 2nd, then the 3rd glass mat
  One **saturation** coat of **Petroperl® R**, using a roller, **500 microns**, **700 g/sqm**
  **Silica SB0** 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.*

♦♦♦♦♦♦

(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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manual

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

# Anti-corrosion reinforced protective coating

*made of:* solvent-free epoxy reinforced with 1350 g/sqm of fiberglass

*for:* tanks and reservoirs

*in contact with:* petroleum products, fuels and oils, greases and paraffin hydrocarbons at 60°C < t°≤ 95°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** (1) — 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 **Varnish ED1**, solvent borne epoxy, 30 µm dry film, **100 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 debubblized using a special roller, **450 g/sqm**
  Same operation for the 2nd, then the 3rd glass mat
  One **saturation** coat of **Petroperl® R**, using a roller, **500 microns**, **700 g/sqm**
  **Silica SB0** 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.*

♦♦♦♦♦♦

(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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manual

# sheet ex.nr.190B
## Petroperl®/1 glass mat topcoat Naphtoperl® T 400µ

# Anti-corrosion reinforced protective coating

*made of:* solvent-free epoxy reinforced with 450 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 ≤ 60°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** (1) — 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 **Varnish ED1**, solvent borne epoxy, 30 µm dry film, **100 g/sqm**

## *System* Petroperl® / 1 glass mat 450 / topcoat Naphtoperl® T – *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 debubblized 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 **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.*

♦♦♦♦♦♦

(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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oil and gas
manual

# sheet ex.nr.191B
## Petroperl®/2 glass mats topcoat Naphtoperl® T 400µ

# Anti-corrosion reinforced protective coating

*made of:* solvent-free epoxy reinforced with 900 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 ≤ 60°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** (1) — 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 **Varnish ED1**, solvent borne epoxy, 30 µm dry film, **100 g/sqm**

## *System* Petroperl® / 2 glass mats 450 / topcoat Naphtoperl® T – *thickness* 3 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 debubblized using a special roller, **450 g/sqm**
  Same operation for the 2nd glass mat
  **Petroperl® R** coat for **saturation**, using a roller, **500 microns**, **700 g/sqm**
  **Silica SB0** 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.*

*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.

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# 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 ≤ 60°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** (1) — 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 **Varnish ED1**, solvent borne epoxy, 30 µm dry film, **100 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 debubblized using a special roller, **450 g/sqm**
  Same operation for the 2nd, then the 3rd 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.*

♦♦♦♦♦♦

(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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# Technical specification

SCOR
The Art & Science of Risk

## Insurance Certificate – General Liability

The undersigned, SCOR Europe SE, having its head office at 5 Avenue Kléber - 75 116 Paris - France, hereby certifies that the company:

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

is insured under the policy n° **FA0095300** underwritten with our company in respect of the pecuniary consequences of its civil liability risks that may incur as a result of bodily injury, material and immaterial damage caused to third parties and attributable to the activities insured by this 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 DAMAGES COMBINED (bodily injured, property damages & financial losses) ..... **10 M€** per policy period

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

Limits shown above may have been reduced by paid claims.

The present certificate is certificate is valid for the period from 01/01/2025 to 31/12/2025 inclusive, subject to the payment of the premium, and subject to the possibility of suspension or termination of the policy during the policy period for the cases provided for by the French Insurance Code or the policy.

It is addressed to whom it may concern and cannot bind our company beyond the limits of the clauses and conditions of the policy that it refers to and notably with respect to the activities insured by this policy.

This certificate constitutes only an assumption of coverage. The coverage solely applies within the terms and conditions of the General Third-Party liability policy n° **FA0095300**.

Issued in Paris, 12/12/2024

Alain GILLES / Technical accountant

SCOR Europe SE
5 avenue Kléber - 75116 Paris - France
Tél. : +33 (0) 1 58 44 70 00 - Fax : +33 (0) 1 58 85 00
RCS Paris 840 025 509 - Siret 840 024 509 00019

Max Perlès

*oil and gas manual*

Technical specification

# Appendix 1:
## Product technical data sheets

VARNISH ED1

RENDER AR100

PETROPERL®

NAPHTOPERL®T

CARBOPERL®

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December 2024

Varnish

# ED1

Solvent borne epoxy

*scope:*
***steel priming***

# CHARACTERISTICS

## Description / purpose
Priming coat for metallic substrates. To be coated over by our epoxy coatings within 3 months when outdoor and within 6 months when not directly exposed to weathering.

## Color / finish
Clear / satin

## Packaging
In 2 separate cans, pre-adjusted for 3 or 8 kg.
Proportion, by weight: base 65 / hardener 35

## Storage conditions
- 18 months max, in the original cans, never opened,
- Under shelter.
- At temperatures between 0°C/32°F et 35°C/95°F(1).

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

## V.O.C. content
478.1 g/l, according to ISO 11890-1 (statistical average).

## Composition
Resin : epoxide
Hardener : polyamide
Pigments : none
Solvent : mixture of hydrocarbons and alcohols

## Specific gravity (mix) at 20°C/68°F
0.95 ± 0.05 g/ml as per ISO 2811.

## Solids content (mix)
By weight : 48 % ± 2 as per ISO 3251.
By volume : 40 % per calculation.

## Viscosity (mix) at 20°C/68°F
25 to 35 seconds, Afnor cup nr 4.

# APPLICATION

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

## Surface preparation
On abrasive-blasted steel surfaces to Sa 2.5 minimum, average profile : Medium G or Rt 50-75 µ.

## Instructions for use
Ambiant temperature: 10°C to 30°C
Substrate temperature: 5°C to 45°C and 3°C minimum above dew point
Product: 5°C to 35°C

## Mixing
Stir the base to an even consistency with a power mixer. Then add hardener and continue stirring until a perfectly homogeneous mixture is obtained.
*Potlife* at 20°C: 10 hours.

## Application
Airless or conventional spraying or by brush on small surfaces. *Must never be diluted.*

## Coverage for 30 micron dry film
Theoretical : 14 sqm/kg ♦ 71 g/sqm
Practical : 10 sqm /kg ♦ 100 g/ sqm

## Curing

| *Temperature* | *Dust free* | *Recoatable mini* | *Recoatable maxi* |
|---|---|---|---|
| 10°C | 30 mn | 8 hours | 18 hours |
| 30°C | 10 mn | 4 hours | 6 hours |

## Precautions and safety
Flammable product. Flash point (cc) : 25°C/77°F

## Cleaning of application equipement
Flammable ED Thinner – Flash point (cc) : 25°C/77°F.


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December 2024

Render
# AR100
solventfree epoxy

*scope:*
***concrete and steel surface preparation***

# OVERVIEW

## Purpose

Where: Under our epoxy coating systems or under other chemically-compatible coatings.

What: Surfacing, rendering, filling cavities and joints, creating chamfers.

Which: Steel or concrete structures.

## Description

Product : Solventfree epoxy.

Use : Light or heavy local or complete rendering and filling, creation of chamfers in angles. Thicknesses up to 30mm. Vertical or horizontal.

## Properties and benefits

Mechanical properties :

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

Usage properties :

RENDER AR100 is easy to use and multi-purpose.
It requires neither sanding nor grinding.

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 and phtalates free*** for compliance with current regulations.

# CHARACTERISTICS

## Packaging

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

## Storage conditions

- 18 months max, in the original cans, never opened,
- Under shelter,
- At temperatures of between 5°C/32°F and 35°C/95°F(1),

(1) *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-mat.

## 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.




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# APPLICATION

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

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

## ♦ Before:

### Surface preparation

Concrete impregnated with PRIMER EDO, AQUAPRIM or SCREENPERL® :
Refer to relevant data sheets and *Technical Advice nr 1* : « Specification for preparation of concrete ».

Steel : after smoothing of sharp edges, abrasive blasted surfaces to Sa 2,5 minimum. Average profile :

- In case of application of ED1 VARNISH, AQUAPRIM or SCREENPERL® primers (see data sheets) :

Medium G or Rt 50-75µ.

- In 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 cans in a temperate area at 10°C/50°F min and 30°C/86°F max.

### Application temperatures

Ambient temperature: 5°C to 35°C
Relative humidity: below 85%
Substrate temperature: 5°C to 35°C and 3°C minimum above dewpoint,
Product:
While mixing: 10°C /50°F mini ♦ 30°C/86°C maxi
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.
- RENDER AR100 *should never be diluted.*

### Application conditions

- Manual : Palette knife, spatula or trowel.
- Mechanically : Pump for paste-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 increared by *10±5%* for practical consumption,, according to the nature of the substrate and the application.

Note:
Consumption will increase when surface temperature is < 20°C, making the product viscous.

### Overcoating

No minimum or maximum delay after application and no particular prior conditions, except in the following case: if thickness is > 5 mm, or in the care of smoothing, there may be a rise of epoxy resin to the surface.
In this case it is necessary :
- either to sprinkle SILICA SB0 or F15 on the surface, while progressing,
- or to sand paper the surface, after at least 12/24 hours' drying according to temperature, in order to obtain a Rough G surface roughness.

## ♦ 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 to 6 h 00 |

### Cleaning of application equipment

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

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December 2024

# PETROPERL®

"cold applied" solventfree epoxy coating

*scope:*
*O & G*

## OVERVIEW

### Purpose

Where : Interior of tanks, reservoirs and secondary containments.

What : Storage of inflammable liquids, solvents and hydrocarbons ( traditional fuels such as SP95, SP98, diesel and domestic fuels, civil and military fuels such as JET A1 and AVGAS as well as ethanol-containing fuels up to E5 and ethanol-containing diesel up to B5 ) .

Which : Steel or concrete structures.

### Description

Product: solvent-free epoxy.

Designed to supply a long-lasting solution for the internal waterproofing and protection of concrete and steel tanks and reservoirs, as part of a "single-wall", multi-layer, glass-fiber or mat reinforced coating.

Use:

PETROPERL® R: Impregnation/saturation of glass mat or glass tissue reinforcements.

PETROPERL® T: Topcoat or single coat, in thicknesses of 400µ to 1000 µ depending on specification.

### Properties and benefits

Chemical performances:

S.E.A. Agreements n°55354/55355 for military fuels.
Also suitable for contact with oils, greases and industrial water.

Mechanical resistance:

Especially high as a result of its resistance to cracking in a concrete substrate, of its tensile strength and of its resistance to 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 and phtalates free*** for compliance with current regulations.

## CHARACTERISTICS

### Packaging

- In 2 separate cans, pre-adjusted for:

R : 12 kg ♦ T : 12 kg

Proportions *by weight:* R and 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(1),

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

### Colours

R and T: Turquoise blue.

### Finish

Glossy with limited chalking and yellowing in operation.

### Reinforcements

Please consult us.

### V.O.C. content

R and 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 and 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

| | | | | |
|---|---|---|---|---|
| R | : | 5 000 mPa.s ± 1000 | ♦ | 50 poises ± 10 |
| T | : | 6 000 mPa.s ± 1000 | ♦ | 60 poises ± 10 |





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# APPLICATION

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

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

## ♦ Before:

### Surface preparation

Steel after smoothing of sharp edges, abrasive blasted surfaces to Sa 2.5 degree minimum. Average profile:

- In case of prior application of ED1 VARNISH (see relevant data sheets):

Medium G or Rt 50-75µ.

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

Concrete impregnated with PRIMER EDO:

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

***Always apply on clean and dry substrates***

### Products preparation

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

### Application temperatures

Ambiant temperature: 5°C to 35°C
Relative humidity: below 85%
Substrate temperature: 5°C to 45°C and 3°C minimum above dewpoint (on concrete )
Product ( R and T ):

| | |
|---|---|
| While mixing: | 10°C mini ♦ 30°C maxi |
| Spraying: | 25°C to 35°C 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.
- PETROPERL® *should never be diluted*.

### Application

PETROPERL® R:

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

PETROPERL® T:

- Airless spraying unit, with a 45:1 min pump ratio.
- Or medium bristle roller, for small or difficult to access areas.

## ♦ 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 every hour with ED Thinner.

### Number of passes

2 per coat, except in the case of multi-layer continuous application, and 1 for topcoat and singlecoat.

### Thicknesses

PETROPERL® R:

They depend on the system specified and the thickness of the glass-fiber or mat reinforcement specified but are generally comprised between 2.0 and 4.0 mm, including a 300 to 800µ topcoat.

PETROPERL® T:

Min 400 microns - max 1000 microns, according to system specified.

### Consumption

PETROPERL® R:

- 1.4 kg/sqm for a P45 fabric - 450 g/m$^2$ : 1.5 mm
- 1.8 kg/sqm for a single mat - 450 g/m$^2$ : 2.0 mm
- 3.8 kg/sqm for a triple mat - 450 g/m$^2$ : 3.5 mm

PETROPERL® T:

132 g/sqm per 100 microns thickness.

This theoretical value should be increased by ***15±5%*** for practical consumption, according to the nature of the substrate and the application.

Note:

Consumption will increase by 100 to 300 g/sqm when surface temperature is < 20°C, making the product viscous.

### Cleaning of application equipment

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, 7 or 4 days, depending on ambient temperature.

### Repairs

Report to our *Technical Advice nr 5*. *2*

Replaces and cancels any former issue.
The above mentioned information is given with objectiveness but cannot involve our company beyond our manufacturer's responsibility.

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advanced industrial coatings

data sheet
December 2024

# NAPHTOPERL® T

solventfree epoxy coating

*scope:*
***petroleum products & other inflammable liquids***

## OVERVIEW

### Purpose

Where: Interior of tanks in general and particularly underground metal tanks object of the French Ministerial Decree of April 18th, 2008 imposing double-wall solutions linked with leak-detection systems.

What: Storage of inflammable liquids, solvents and hydrocarbons, including biofuels up to E25.

Which: Steel or concrete structures.

### Description

Product: solventfree epoxy.

Use: Designed to supply a long-lasting solution for the internal waterproofing and protection of concrete and steel civil works either as the top coat of a multi-layer mat or glass-fiber-reinforced coating capable of resisting a certain degree of future cracking in a concrete substrate, or as the top coat of a "double-wall" coating system linked with a leak-detection system or as a single-layer coating on concrete or steel.

Typical thickness: 400 to 1000 microns.

### Properties and benefits

Chemical Properties:

- 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 properties:

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

## CHARACTERISTICS

### Packaging

In 2 separate cans, pre-adjusted for 12 or 20 kg.
Proportions, *by weight*: base 1 / hardener 1

### Storage conditions

- 18 months max, in the original cans, never opened,
- Under shelter,
- At temperatures of between 5°C/32°F and 35°C/95°F[(1)],

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

### Colours

Sand-colored, approaching yellow RAL 1017

### Finish

Glossy with limited chalking and yellowing in operation.

### V.O.C. content

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

### Composition

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

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

1.43 ± 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

8 500 mPa.s ± 1 500 ♦ 85 poises ± 15




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# APPLICATION

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

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

## ♦ Before:

### Surface preparation

Steel : after smoothing of sharp edges, abrasive-blasted surfaces to Sa 3 degree, or equivalent.
Average profile:
- In case of prior application of VARNISH ED1 or PRIMER W1, (see data sheets): Medium G or Rt 50-75µ.
- In case of direct application: Rough G or Rt 100µ.

Concrete impregnated with PRIMER EDO or SCREENPERL®
Refer to relevant data sheet and *Technical Advice nr1* "Specification for preparation of concrete"

***Always apply on clean and dry substrates***

### Products preparation

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

### Application temperatures

Ambiant temperature: 5°C to 35°C
Relative humidity: below 85%
Substrate temperature: 5°C to 35°C and 3°C above dewpoint
Product:

| | |
|---|---|
| While mixing: | 10°C/50°F min ♦ 30°C/86° F max |
| Manual use: | at mixing temperature |
| Spraying: | at 30/35°C // 86/95°F min at hose exit. |

### Mixing

- *Never make up partial mixtures* in order to avoid the risk 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®T *should never be diluted.*

### Application

- 1 or 2-component 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, as long as particular attention is paid to the thickness and regularity of the 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 |
|---|---|---|
| 1 h 00 | 0 h 30 | 0 h 15 |

In case of long-lasting spraying application, the hose should be cleaned every hour with ED Thinner.

### Number of passes

One.

### Thicknesses

400 to 1000 microns, according to specification.

Note:
Thicknesses are proposed in agreement with the method of the International standard ISO 19840:
Do not exceed 20% above the maximum value, except for pre-touchups and local overcoatings.

### Theoretical consumption

143 g/sqm per 100 microns thickness.
This theoretical value should be by increased by *15±5 %* for practical consumption, according to the nature of the substrate and the method of application.

Note:
Consumption will increase by 100 to 300 g/sqm when surface temperature is < 20°C, making the product viscous.

### Cleaning of application equipment

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

## ♦ After:

### Curing

| *t°* | *Dustfree* | *Tack free* |
|---|---|---|
| 10°C | 6 h 00 | 20 h 00 |
| 20°C | 3 h 00 | 11 h 00 |
| 30°C | 1 h 30 | 4 h 00 |

Delay before use: 10, 7 or 4 days, depending on ambient temperature.

### Repairs

Refer to our *Technical Advice nr 5*.

Max Perlès
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data sheet
December 2024

# 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.

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, phtalates 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[(1)],

[(1)] *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.*





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

- In case of prior application of Varnish ED1 (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”

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Technical Advice Nr.2

December 2024

# 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, symetrically, 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 deshydratation 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.





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# Technical Advice Nr.3

December 2024

# 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.

Replaces and cancels any former issue

The above mentioned information is given with objectiveness but cannot involve our company beyond our manufacturer's responsibility.



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# Technical Advice Nr.4

December 2024

# 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. It is termed dielectric testing or holiday detection .

## 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 *bluish electric arc and a distinct drop in voltage* occurs in case of porosity, perforation or conductive inclusion in the coating, accompanied by a *sharp audible signal.*

Note: When this control is done on a multi-layer coating, a yellowish glow may be observed, accompanied by a continuous buzz of the device. This phenomenon is not in itself indicative of the presence of a porosity.

## 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 / 60°F ) after coating application.

*If the coating is multi-layer, 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 SCREENPERL® coating onto the old coating before proceeding with the new coating.

## 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:

On concrete or steel substrates :

Apply the brush or broom to the surface of bare concrete or of bare metal and progressively increase the voltage until an audible and luminous error signal is obtained. *The value indicated 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 + tare |
| 1,0 mm | 5,5 kVolts + tare |
| 1,5 mm | 8,5 kVolts + tare |
| 2,0 mm | 11,7 kVolts + tare |
| 3,0 mm | 17,0 kVolts + tare |
| 4,0 mm | 22,5 kVolts + tare |

5. Perform the dielectric testing :

After checking that *the coating surface 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.

*If the voltage indicated by the equipment drops to a value close to the tare value ( or drops by at least two thirds of the set voltage ) and the bluish arc appears together with the sharp audible signal, this indicates the presence of perforations, porosities 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 tested using the same process.


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Technical Advice
Nr.5
December 2024

# 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.


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Technical Advice
Nr.14
December 2024

# 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 inchs / 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 [(1)] 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 [(2)] 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 " Di-electric 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.

(1) *Depending on the resin used and the temperature of the substrate at the time of use: if in doubt, please consult us.*
(2) *Polyamide, Teflon or aluminum monoblock type rollers.*


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Technical specification

# Appendix 3:
# Reference list

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# References

# oil industry

# *Summary*

# *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 C0 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 (76) (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)*

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

# *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 – ROMENIA*
*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 |
| Réservoir R 102 (Parc de Missiessy) | 2021 |
| Réservoir R 103 (Parc de Missiessy) | 2021 |
| Réservoir R 104 (Parc de Missiessy) | 2021 |
| Réservoir R 105 (Parc de Missiessy) | 2021 |
| Réservoir R 106 (Parc de Missiessy) | 2022 |
| Réservoir R 101 (Parc de Missiessy) | 2022 |
| Réservoir R 107 (Parc de Missiessy) | 2022 |

## BOLLORÉ – METZ (57)

| | |
|---|---|
| Tanks bottom 1, 2, 3 et 4 | 2015/2016 |

*Depots France (cont'd)*

## *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* |
| *Tank bottom 305* | *1992* |
| *Tank bottom 306* | *1992* |
| *Tank walls159* | *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* |

*Depots France (cont'd)*

## *C.I.M. - LE HAVRE (76) (cond't)*

| | |
|---|---|
| *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$^{s}$ 13 & 17* | *2009* |

## *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* |

## *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* |

*Depots France (cont'd)*

*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* |

*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* |

*Depots France (cont'd)*

*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* |
| *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* |

*Depots France (cont'd)*

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

| | |
|---|---|
| *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* |

## *SFDM – NUISEMENT SUR COOLE (51)*

| | |
|---|---|
| *Tank bottoms A2, A5 et A8* | *2007* |

## *SEPP (ex-SHMPP) – LE HAVRE (76)*

| | |
|---|---|
| *Tank bottom D1* | *1992* |

## *SMADEC – MACON (71)*

| | |
|---|---|
| *Tanks Bottoms 2 900 m3 andt 630 m3* | *2009* |

## *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* |

*Depots France (cont'd)*

*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* |

*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* |

*Depots France (cont'd)*

## *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'ESPIGUETTE (Le Grau du Roi) Tank 3* | *1976* |
| *LANGRES - Tank 6* | *1976* |
| *CHALONS SUR MARNE - Tank 6* | *1976* |
| *L'ESPIGUETTE - Tank 5* | *1976* |
| *L'ESPIGUETTE - Tank 7* | *1976* |
| *L'ESPIGUETTE - Tank 4* | *1976* |
| *LA FERTE ALAIS - Tank D7* | *1977* |
| *LANGRES – Tank 9* | *1977* |
| *L'ESPIGUETTE – Tank 6* | *1977* |
| *DUNKERQUE – Tank 4* | *1977* |
| *SAINT BAUSSANT - Bac 9 park A* | *1977* |
| *CAMBRAI - tank 2 park 2* | *1977* |
| *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* |

*Depots France (cont'd)*

*TRAPIL (cont'd) – Tanks bottom in:*

| | |
|---|---|
| *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'ESPIGUETTE - 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* |
| *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* |

*Depots France (cont'd)*

*TRAPIL (cont'd) – Tanks bottom in:*

| | |
|---|---|
| *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* |
| *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'ESPIGUETTE - 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* |

*Depots France (cont'd)*

*TRAPIL (cont'd) – Tanks bottom in:*

| | |
|---|---|
| *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* |
| *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* |

***Depots France** (cont'd)*

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

| | |
|---|---|
| *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* |

## *EXXON*

| | |
|---|---|
| *NICE-COTE D'AZUR* | *1996* |

## *SHELL AVIATION*

| | |
|---|---|
| *PARIS-LE BOURGET* | *1971* |
| *MARSEILLE/MARIGNANE* | *1987* |
| *AEROPORT DE BREST – Cuve 10m3 Jet A1* | *2022* |

*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* |
| *PARIS ROISSY – Chambres Hydrant* | *2021* |

## *TOTAL AVIATION*

| | |
|---|---|
| *AERODROME DE CHAUBUISSON – FONTENAY TRESIGNY* | *2015* |
| *AEROPORT d'Arcachon – cuve11m3 Jet A1* | *2022* |

## *AEROPORT DE CALVI (20)*

| | |
|---|---|
| *AD blue tanks (6) + Jet fuel A1 tank (1) + hydrocarbon liq tank (1)* | *2014* |

# *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* |

## *CSE AVIATION*

| | |
|---|---|
| *OXFORD (England)* | *1990* |

## *ELF AVIATION*

| | |
|---|---|
| *TCHIBANGA (Gabon)* | *1976* |

## *NAFTAL*

| | |
|---|---|
| *ALGER-HOUARI BOUMEDIENNE (Algeria)* | *2006* |

## *ROMANIAN FUEL SERVICES*

| | |
|---|---|
| *BUCAREST (Rumania)* | *1998* |

## *SADCOP*

| | |
|---|---|
| *DAMAS (Syria)* | *2001-02* |

## *SHELL AVIATION*

| | |
|---|---|
| *ABERDEEN (Scotland)* | *1988* |
| *BUCAREST (Rumania)* | *1998* |
| *MANCHESTER (England)* | *1988* |

## *STAR OIL*

| | |
|---|---|
| *CONAKRY (Guinea Conakry)* | *2015 and 2018* |

| | |
|---|---|
| ***WESTERLEIGH** (England)* | *2015* |

# *Service Station tanks*

# *Service station tanks – France*

*AUCHAN – OSNY* (95)
*Service station tank – gasoil* 2015

*BP – RUE DES HAUTES COUTURES – CONFLANS SAINT HONORINE* (78)
*Service station tank – gasoil* 2015

*BP – A10 AIRE D'ORLEANS GIDY VERS PARIS – GIDY* (45)
*Service station tank – gasoil* 2015

*BP – 26 BOULEVARD CAMILLE FLAMMARION – MARSEILLE* (13)
*Service station tank – gasoil* 2015

*BP – 12 BOULEVARD GAMBETTA – POISSY* (78)
*Service station tank – gasoil* 2015

*BP – ROND POINT BONAPARTE – TOULON* (83)
*Service station tank – Géo +* 2015

*ELAN / STATION "1 AVENUE CORPS FRANC POMMIÈS" - FLEURANCE* (32)
*Service station tank - gasoil* 2017

*INTERMARCHE – SAINTES* (17)
*Service station tank – fuel* 2012

*TOTAL / STATION "100, RUE DE COURCELLES" – PARIS* 17è
*Service station tank – gasoil* 2011

*TOTAL / STATION SAINT-JOUAN L'ISLE* (22)
*Service station tank – essence & gasoil* 2011

*TOTAL / STATION "LES DEMOISELLES" – TOULOUSE* (31)
*3 Service stations tanks – gasoil, SP 98-95* 2011

*TOTAL / STATION "RELAIS PONT SAINT JEAN" – VILLEFRANCHE SUR MER* (06)
*Service station tank – SP 98-95* 2011

*TOTAL / STATION ACCESS – NEUILLY* (92)
*Service station tank – SP95* 2013

*TOTAL / STATION ACCESS "BOULEVARD DE L'EUROPE" – BREST* (92)
*Service station tank – SP95* 2013

*TOTAL-CSTJF – PAU* (64)
*Service station tank Hydrocarbons Lab L4* 2014

*TOTAL – NEUILLY SUR SEINE* (92)
*Service station tank – gazole & Géo +* 2014

*TOTAL – A33 AIRE D'ANTHELUPT – VITRIMONT* (54)
*Service station tank – gasoil* 2016

*STATION ELAN - Fleurance (32)*
*Service station tank – gasoil* 2017

*ERI Vaugirard - Paris (75)*
*Cuve* 2019

# *Service station tanks – Export*

| | | |
|---|---|---|
| *TOTAL SOUTH AFRICA* | *61 tanks* | *since 2018* |
| *TOTAL BELGIUM* | *2 tanks* | *2015* |
| *TOTAL BURKINA FASO* | *88 tanks* | *since 2016* |
| *TOTAL CAMEROON* | *93 tanks* | *since 2011* |
| *TOTAL EQUATORIAL GUINEA* | *10 tanks* | *2020* |
| *TOTAL GUINEE CONAKRY* | *37 tanks* | *2019* |
| *TOTAL IVORY COAST* | *166 tanks* | *since 2009* |
| *TOTAL MALI* | *138 tanks* | *since 2008* |
| *TOTAL MOROCCO* | *336 tanks* | *since 2011* |
| *TOTAL NIGER* | *109 tanks* | *2006* |
| *TOTAL NIGERIA* | *60 tanks* | *2013-2014* |
| *TOTAL SENEGAL* | *2 tanks* | *2019* |
| *TOTAL UGANDA* | *7 tanks* | *since 2018* |
| *TOTAL TOGO* | *79 tanks* | *since 2013* |
| *VIVO MOROCCO* | *24 tanks* | *since 2020* |
| *PETROSEN SENEGAL* | *3 tanks* | *2020* |

# *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 0SPF 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*

*COMPAGNIE DE CHAUFFAGE – GRENOBLE (38)*
*Bac à fuel* *2018*

*RENNES METROPOLE – CHAUFFERIE (35)*
*Bac stockage Diester* *2018*

Technical specification

# Appendix 4:

## O.H.G.P.I ‘s circular G32/Rev. 13/2022

## C.E.B.T.P. test report BEB6.O.3010/1

# Circulaire G32
## Rév 13 / 2022

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

**O**FFICE D'**H**OMOLOGATION DES **G**ARANTIES DE **P**EINTURE **I**NDUSTRIELLE
10, avenue de Salonique - 75017 PARIS - FRANCE • Tel. : 01 58 05 07 57 • ohgpi.com • info@ohgpi.com
Association loi 1901 – SIRET : 784 361 800 00047 – Code APE 9499 Z

## 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 homologués 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, (tous grades y compris ceux à base d'éthanol), gazole (y compris les grades contenant des EMAG (esters méthyliques d'acides gras) à hauteur de 10% en volume maximum), kérosène, GPL.

### 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/m2.

### 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 grenaillés 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. |

## 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 [1] homologable

Tableau 1

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

[1] Se référant à un cliché d'enrouillement de ISO 4628-3
[2] 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 subjectile

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 ≤ 400 µ
⇨ à l'**état D** défini au § 0.3 pour les revêtements d'épaisseur > 400 µ.

### 3.2 – Garantie d'aptitude ou d'anticorrosion(1) homologable

Tableau 2

| Surfaces concernées | Epaisseur nominale du revêtement (2) | Garantie maximum selon température du contenu | | | | | |
|---|---|---|---|---|---|---|---|
| | | ≤ 60°C | ≤ 80°C | | ≤ 95°C | | ≤ 120°C |
| | | | Sans calorifuge extérieur | Avec calorifuge extérieur (3) | Sans calorifuge extérieur | Avec calorifuge extérieur (3) | Avec calorifuge extérieur (3) |
| . Fonds<br>. Robes<br>. Sous-faces de toit | ≥ 300 µm | aptitude 2 ans, ou anticorrosion 3 ans Ri2 | | | | | |
| | ≥ 400 µm | aptitude 3 ans, ou anticorrosion 5 ans Ri2 | | | | | |
| | ≥ 600 µm | aptitude 5 ans, ou anticorrosion 6 ans Ri2 | anticorrosion 3 ans Ri2 | aptitude 5 ans | | | |
| | ≥ 800 µm | aptitude 7 ans | anticorrosion 3 ans Ri2 | aptitude 7 ans | | aptitude 5 ans | |
| | ≥ 1 000 µm | aptitude 10 ans | anticorrosion 3 ans Ri2 | aptitude 10 ans | | aptitude 10 ans | aptitude 5 ans |

(1) Se référant à un cliché d'enrouillement de ISO 4628-3
(2) Selon ISO 19840. Les maxima sont indiqués dans les fiches techniques des fabricants.
(3) ***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 subjectile

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 subjectile** | **Corrosion caractérisée par des chancres ou cratères conduisant à une épaisseur de tôle résiduelle en tout point ≥ 2,5 mm (1)** | | | **Corrosion traversante, ou caractérisée par des chancres ou cratères conduisant à une épaisseur de tôle résiduelle < 2,5 mm (1)** | | |
|---|---|---|---|---|---|---|
| **Fibre de verre** | **450 g/m²** | | | **1200 g/m²** | | |
| **Température du contenu (C°)** | **≤ 60** | **60 < t ≤ 95** | **95 < t ≤ 120** | **≤ 60** | **60 < t ≤ 95** | **95 < t ≤ 120** |
| Epaisseur totale (2) minimum (mm / µm) | 1,5<br>1 500 | 2,0<br>2 000 | 2,2<br>2 200 | 3,0<br>3 000 | 3,5<br>3 500 | 3,7<br>3 700 |
| dont finition mini (mm / µm) | 0,3<br>300 | 0,8<br>800 | 1,0<br>1 000 | 0,3<br>300 | 0.8<br>800 | 1,0<br>1 000 |
| Garantie maximum | 10 ans | 10 ans | 5 ans | 10 ans | 10 ans | 5 ans |

(1) Selon définition du CODRES Division 2 révision 2013 du SNCT
(2) Selon ISO 19840. Les maxima sont indiqués dans les fiches techniques des fabricants.

Approuvée par la Commission Technique
à Paris le 9 septembre 2022

**A l'attention de Mme. POTELLE Valérie**

**MAX PERLES**

4 rue du Professeur Dubos
BP n°80439
60119 Hénonville

# Rapport n° BEB6.O.3010/1

**Essais d'immersion de 2 revêtements de peinture dans du Superéthanol E85**

**26 juillet 2024**

Ce rapport d'essais ne vaut que pour l'objet soumis aux essais et ne préjuge pas des caractéristiques de produits similaires.

Sauf autorisation préalable, le présent rapport n'est utilisable, à des fins commerciales ou publicitaires, qu'en reproduction intégrale. Les résultats obtenus ne sont pas généralisables sans justification de la représentativité des échantillons et/ou corps d'épreuves et des essais. Pour déclarer, ou non, la conformité à la spécification, il n'a pas été tenu explicitement compte de l'incertitude associée au résultat.


**Département Enveloppe Du Bâtiment**

**Laboratoire Mastics, Colles et Revêtements**

**ELANCOURT**

Votre interlocuteur :

**Guillaume OLIVERI**

TEL : +33 (0) 7 63 78 22 51

g.oliveri@groupeginger.com


***Le présent rapport comprend 10 pages dont 3 d'annexes***

# SOMMAIRE

# 1. IDENTIFICATION DES ECHANTILLONS

## 1.1. Produit

Les essais d'immersion dans du Superéthanol E85 ont été réalisés sur deux revêtements de peinture (Naphtoperl et Carboperl) sur supports métalliques, pour une durée d'un mois à température ambiante de (23 ± 2) °C.

## 1.2. Essais

Les essais se sont déroulés du 24 mai 2024 au 24 juin 2024.

## 1.3. Corps d'épreuve

Les produits de revêtements ont été réceptionnés chez GINGER CEBTP le 21 février 2024 et enregistrés sous le numéro 149852.

Les supports métalliques ont été réceptionnés chez GINGER CEBTP le 18 avril 2024 et enregistrés sous le numéro 150316.

## 1.4. Nature des essais

Les essais sélectionnés par le client sont les suivants :

- Immersion à température ambiante dans du Superéthanol E85

# 2. CONTEXTE

La société MAX PERLES, représentée par Mme. Potelle, a sollicité le Laboratoire Mastics, Colles & Revêtements de GINGER CEBTP pour lui confier la réalisation d'essais d'immersion de 2 revêtements de peinture, de dénominations commerciales *Naphtoperl* et *Carboperl*, dans du Superéthanol E85.

Les essais ont été réalisés après acceptation du devis n°BEB6.N.0179/1 du 18 décembre 2023.

# 3. DOCUMENTS DE REFERENCE

- **NF EN ISO 2812-1** (déc. 2017) : Peintures et vernis - Détermination de la résistance aux liquides - Partie 1 : immersion dans des liquides autres que l'eau

# 4. OBJET

Le présent rapport a pour objet la synthèse des résultats constatés lors des essais cités ci-dessus.

# 5. INTERVENANTS

## 5.1. Personne effectuant les essais

- Mme LEGAY Maëva GINGER CEBTP

# 6. DESCRIPTION DES PRODUITS TESTES

Au cours de cette étude, les produits Carboperl et le Naphtoperl ont été appliqués sur des supports métal de dimensions 80 mm x 150 mm, revêtus par le client d'un vernis ED1, en conditions de laboratoire à (23 ± 2) °C et (50 ± 5) % HR.

Les applications sur la face A ont été réalisées en condition limite d'utilisation à 30 °C (produit + support), comme demandé par le client. Il est toutefois apparu des difficultés pour que l'application soit homogène en raison d'une prise très rapide du produit. En conséquence et en accord avec le client, les applications sur la face B ont été réalisées en conditions de laboratoire à (23 ± 2) °C et (50 ± 5) %HR.

### 6.1.1. Carboperl

La fiche produit est présentée ci-dessous :

| | Produit A | Produit B |
|---|---|---|
| Référence produit /n° de lot | 24021305 | 24021306 |
| Date de fabrication | 13/02/2024 | 13/02/2024 |
| Date de péremption | 14/08/2025 | 14/08/2025 |
| Durée de vie du produit | 18 mois | 18 mois |
| Désignation commerciale | Carboperl Base | Carboperl Durcisseur |
| Fonction | Intérieur de capacité et de canalisation | Intérieur de capacité et de canalisation |
| Nature chimique | Epoxy novolaque Oxyde synthétique | Polyamine non aromatique |
| Conditionnement | Bidon | Bidon |
| Aspect | Mat | Brillant |
| Taux de gachâge | / | / |
| Ration de mélange | 10 kg pour 20 kg | 10 kg pour 20 kg |
| Temps de repos avant application | / | / |

Chaque système Carboperl est composé d'une couche issue d'un mélange 50/50 de Carboperl base et Carboperl durcisseur, qui est appliqué à la brosse sur les deux faces du support. La consommation théorique à appliquer est de 1100 g/m$^2$.

La consommation réelle des produits appliquées aux 4 éprouvettes rapportée à la consommation théorique est décrite dans le tableau ci-dessous :

| Quantité appliquée par éprouvette (g) | Eprouvette 1 | Eprouvette 2 | Eprouvette 3 | Eprouvette 4 |
|---|---|---|---|---|
| Face A<br>Date : 29/04/2024 | 10.64 | 10.76 | 10.73 | 10.71 |
| Face B<br>Date : 29/04/2024 | 10.73 | 10.59 | 10.67 | 10.60 |

### 6.1.2. Naphtoperl

La fiche produit du revêtement Naphtoperl est présentée ci-dessous :

| | Produit A | Produit B |
|---|---|---|
| Référence produit / n° de lot | 24021502 | 24021503 |
| Date de fabrication | 15/02/2024 | 15/02/2024 |
| Date de péremption | 16/08/2025 | 16/08/2025 |
| Durée de vie du produit | 18 mois | 18 mois |
| Désignation commerciale | Naphtoperl Base | Naphtoperl Durcisseur |
| Fonction | Interieur de capacité et de canalisation | Interieur de capacité et de canalisation |
| Nature chimique | Epoxyde | Polyamine non aromatique |
| Conditionnement | Bidon | Bidon |
| Aspect | Mat | Lisse |
| Taux de gâchage | / | / |
| Ratio de mélange | 10 kg pour 20kg | 10 kg pour 20kg |
| Temps de repos avant application | / | / |

Chaque système Naphtoperl est composé d'une couche issue d'un mélange 50/50 de Naphtoperl base et Naphtoperl durcisseur, qui est appliquée sur les deux faces du support. La consommation théorique à appliquer est de 900 g/m$^2$.

La consommation réelle des produits appliquées aux 4 éprouvettes rapportée à la consommation théorique est décrite dans le tableau ci-dessous :

| Quantité réelle appliquée par éprouvette (g) | Eprouvette 1 | Eprouvette 2 | Eprouvette 3 | Eprouvette 4 |
|---|---|---|---|---|
| Face A<br>Date : 29/04/2024 | 8.90 | 8.69 | 8.70 | 8.72 |
| Face B<br>Date : 30/04/2024 | 9.64 | 8.72 | 8.95 | 8.97 |

# 7. PRINCIPE DES ESSAIS

## 7.1. Détermination de la résistance à l'immersion dans du Superéthanol E85 selon la norme NF EN ISO 2812-1 (déc. 2017)

A la suite de la période de séchage, les éprouvettes ont été entièrement immergées dans du Superéthanol E85 pour une durée d'un mois, à une température de (23 ± 2) °C.

Au terme du délais d'immersion, une observation visuelle a été faite pour constater les éventuelles dégradations.

# 8. RESULTATS DES ESSAIS

## 8.1. Détermination de la résistance à l'immersion dans du Superéthanol E85 selon la norme NF EN ISO 2812-1 (déc. 2017)

Les observations ci-dessous ont été réalisées sur la face A des éprouvettes. Les clichés de ces faces sont disponibles en annexe.

### 8.1.1. Carboperl

| | Observations | | | |
|---|---|---|---|---|
| | **Eprouvette 1** | **Eprouvette 2** | **Eprouvette 3** | **Eprouvette 4** |
| **1 MOIS** | RAS | RAS | RAS (défaut d'application) | RAS |

### 8.1.2. Naphtoperl

| | Observations | | | |
|---|---|---|---|---|
| | **Eprouvette 1** | **Eprouvette 2** | **Eprouvette 3** | **Eprouvette 4** |
| **1 MOIS** | RAS | RAS | Petite bulle ( entourée sur l'eprouvette ) | RAS |

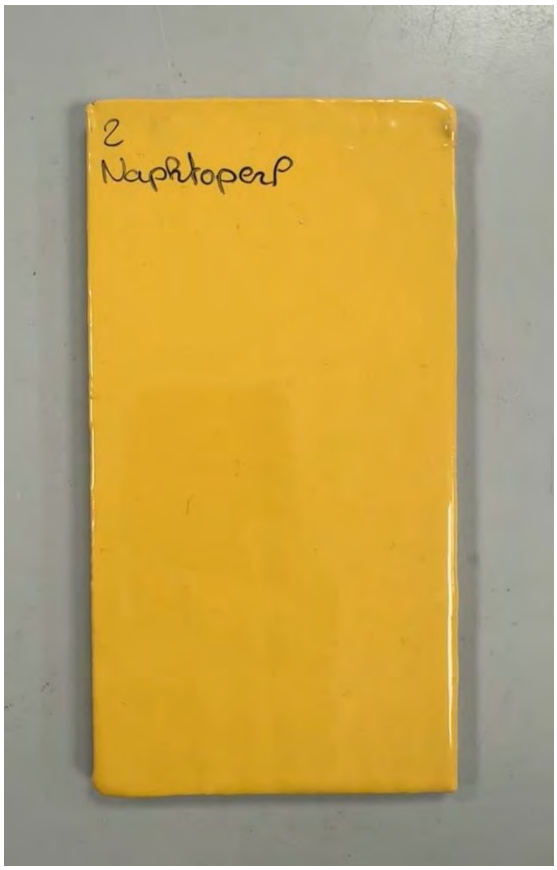
| La Technicienne en charge des essais<br>*Service Mastics, Colles et Revêtements* | Chargé d'affaires<br>*Service Mastics, Colles et Revêtements* |
|---|---|
| P.O. Nathalie BURGUET<br><br>**Maëva LEGAY** | <br><br>**Guillaume OLIVERI** |

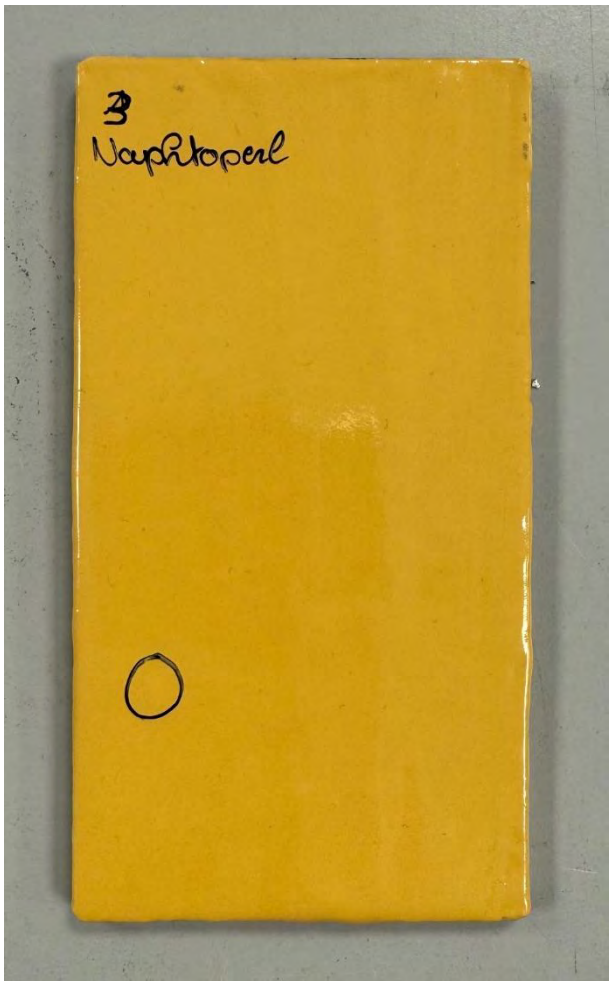
# ANNEXE 1 : PHOTOGRAPHIES DES EPROUVETTES A L'ISSUE DE L'ESSAI

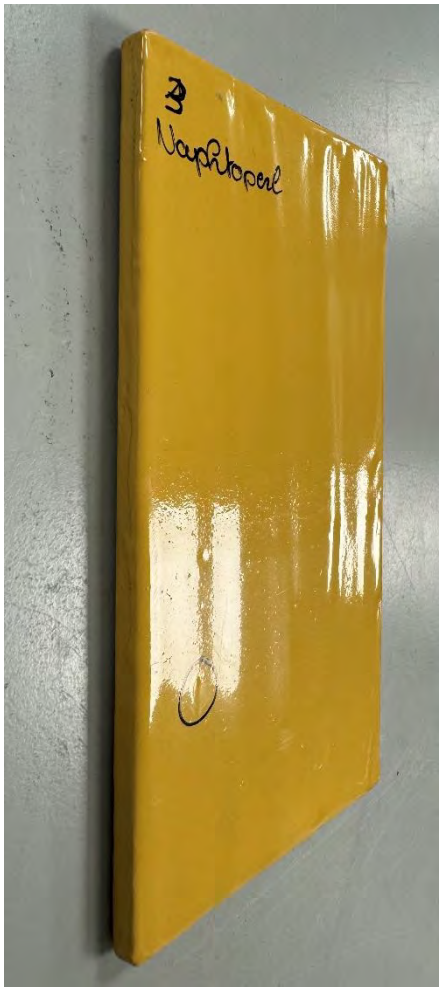
## Carboperl




# Naphtoperl


4.
Naphtoperl