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#### Validity

Users of any Agrément certificate should check its status: all currently valid certificates are listed on the website. In addition, check whether the certificate is Active or Inactive.

The certificate holder is in possession of a confirmation certificate attesting to its status.

**SANS 10400:** *The application of the National Building Regulations*

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#### Subject:

### KRM Water and Liquid Storage Tanks

#### Certificate holder:

### KRM Plastics (Pty) Ltd

PO Box 912, Newcastle, KWAZULU NATAL, 2940

Telephone: 034 341 1360. Fax: 034 341 1361



#### Uses

The certificate covers the use of KRM Water and Liquid Storage Tanks as portable water and approved liquids storage tanks, that can be used in all regions of South Africa for all types of occupancy classification (**SANS 10400:** Table 1 of regulation A (20) (1)).

All liquid storage is as per Sasol Polymers chemical resistance data sheet requirement. KRM Water and Liquid Storage Tanks were not evaluated for underground installation.

This certificate and Agrément South Africa's assessment applies only to KRM Water and Liquid Storage Tanks that are manufactured by KRM Plastics (Pty) Ltd. They must be installed in accordance with the certificate holder's installation brochure and as described and illustrated in this certificate, and where the terms and conditions of certification are complied with.

## General description

KRM Water and Liquid Storage Tanks are prefabricated and rotary moulded tanks. The tanks' wall thicknesses vary from 2.5 mm to 6 mm, depending on the volume and intended use of the tank.

Tanks are manufactured from UV stabilised or colour compounded food grade materials. Depending on the application (indoor or outdoor), the inside of the tanks are lined with a black pigmented inner layer.

They are available different in liquid capacities as illustrated in Table 4.

The tanks are available in different colours and are supplied with the standard fittings depending on the application.

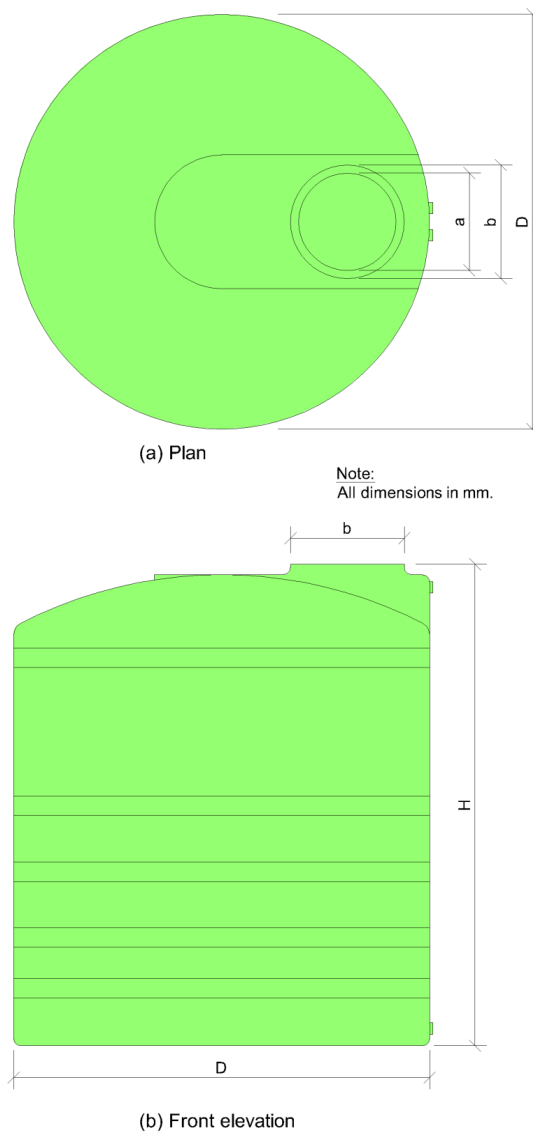


Figure 1: Plan & elevation - KRM tank

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## PREAMBLE

This certificate is issued by Agrément South Africa in terms of the powers granted to it by the Minister of Public Works. This certificate:

- has been granted after a technical appraisal of the performance of the KRM Water and Liquid Storage Tanks for the [uses](#) covered by the certificate,
- is independent of any patent rights that may or may not subsist in the subject of the certificate, and
- does not relieve the user from the obligation to obtain the prior approval of the relevant authority concerned for the use of the subject.

Agrément South Africa considers that the quality and performance of the KRM Water and Liquid Storage Tanks will be satisfactory, provided that the requirements stipulated in this certificate are adhered to. However, Agrément South Africa does not on behalf of itself, or the State, or any of its employees or agents guarantee such quality or performance.

Responsibility for compliance with the requirements of this certificate and the quality of the finished product resides with the certificate holder.

No action for damages, or any other claim whatsoever, lies against Agrément South Africa, its members, the State or any of its employees should the said material fail to comply with the standard set out in this certificate.

Interested parties or users who are in any doubt about any detail or variation should contact [Agrément South Africa](#).

The validity of this certificate is reviewed every three years. The certificate shall remain valid as long as Agrément South Africa is satisfied that:

- the certificate holder complies with the general and specific conditions of certification and the technical requirements stipulated in the certificate
- the performance-in-use of the subject is acceptable
- any changes in building legislation, regulations, relevant standards or Agrément performance criteria have not invalidated the technical assessment which formed the basis of certification.

Agrément South Africa reserves the right to withdraw the certificate at any time, should reasonable cause exist.

Notices affecting the validity of this certificate will be published in the *Government Gazette*.

## PART 1: CONDITIONS OF CERTIFICATION

KRM Water and Liquid Storage Tanks as described in this certificate must be:

- manufactured by the certificate holder
- installed in accordance with:
  - the technical description set out in [Part 3](#)
  - the certificate holder's installation manual and
  - good building practice.

Any change to the material formulation, the production process, or the installation techniques set out in the certificate holder's brochure could result in various aspects of the performance of this product no longer complying with the conditions of the certificate. Any change not authorised by Agrément South Africa in writing prior to its implementation will invalidate this certificate and the certificate can then not be used to demonstrate compliance with the National Building Regulations.

As published in Government Notice R711, *National Building Regulations and Standard Act, 1977* (Government Gazette No 34586 dated 9 September 2011),

### General conditions

#### Marking

The KRM Water and Liquid Storage Tanks must be suitably marked with a sticker of Agrément South Africa's identification logo together with the number of this certificate.

#### Validity

The continued validity of this certificate is subject to a satisfactory review by Agrément South Africa every three years.

#### Quality monitoring

The certificate holder is required to participate in Agrément South Africa's post-certification quality-management system, which requires:

- that the certificate holder shall continuously implement and manage the quality management system approved by Agrément South Africa in the assessment of the KRM Water and Liquid Storage Tanks
- the co-operation of the certificate holder in facilitating post-certification quality monitoring by Agrément South Africa or its authorised agents.

#### Reappraisal

- must be requested by the certificate holder prior to implementing changes to the product

#### KRM Water and Liquid Storage Tanks

Tested and approved fit-for-purpose when used as specified in

**CERTIFICATE 2014/462**



- will be required by Agrément South Africa if there are relevant changes to the National Building Regulations.

This certificate may be withdrawn if the certificate holder fails to comply with these requirements.

On behalf of the Board of Agrément South Africa

A handwritten signature in black ink, appearing to be 'M. Pieterse', written in a cursive style.

Chairperson  
July 2014

## **PART 2: ASSESSMENT**

### **Scope of assessment**

This assessment applies to the innovative aspects of KRM Water and Liquid Storage Tanks. These aspects have been assessed as an integral part of a product that comprises both innovative and conventional aspects.

The innovative aspects are:

- the materials used in the manufacture of the liquid storage tanks,
- the design of the tanks and the cover lids and
- the functionality of the tanks

### **Assessment**

In the opinion of Agrément South Africa, KRM Water and Liquid Storage Tanks as described in the certificate are suitable for the uses specified (see page 1).

The performance-in-use of the products will be such that the storage tanks will satisfy Agrément South Africa's performance criteria and the requirements of the National Building Regulations stated in Table 1. Any regulation not specifically referred to is considered to be outside the scope of this certificate and must be applied by the local authority in the normal manner. Agrément South Africa's detailed comments on the assessment are set out in Table 1, 2 and 3 below. Each aspect of performance was assessed by experts in that field.

**Table 1: Compliance with National Building Regulations**

Aspects of performance	Opinion of Agrément South Africa	National Building Regulations satisfied
<b>Materials</b>	Satisfactory.	The materials used in the KRM Water and Liquid Storage Tanks are deemed to satisfy the requirements of Regulation <b>A13 (1) (a)</b> : Materials.
<b>Behaviour in fire</b>	Satisfactory. Users should not expose the tanks to naked flames, including burning cigarettes.	The material is classified as combustible. It was tested in accordance with <b>SANS 10177-9</b> . Deemed-to-satisfy rule TT5.2 (c), <b>SANS 10400</b> : <i>The application of the National Building Regulations</i> . <b>SANS 10177-9: Fire testing of materials, components and elements used in buildings- Part -9: Small- scale burning characteristics of building materials: ignition, flame spread and heat contribution</b>

**Table 2: Assessment**

Aspects of performance	Opinion of Agrément South Africa	Explanatory notes
<b>Structural strength (tank loading test)</b>	Satisfactory. The functionality of the tanks is adequate and from a structural point of view the tanks are safe.	Results were based on an analysis and tests conducted on a 2500 litre vertical tank. The internal pressure was increased at the bottom by a factor greater than 1.5. The tank did not show any signs of distress.
<b>Chemical resistance</b> <b>Sasol Polymers: A business unit of Sasol (Pty) Ltd.</b>	Satisfactory. Provided they are used as illustrated in this certificate.	The HR411 and HR486 grades of linear low density polyethylene (LLDPE) polymer have acceptable physical properties and chemical resistance properties as specified in the <b>SASOL Polymers</b> data sheets available from the certificate holder.
<b>Resistance to thermal cycling</b>	Satisfactory.	Acceptable for use in areas where temperatures will not exceed 60°C for prolonged periods of time.
<b>Resistance to abrasion and mechanical damage</b>	Satisfactory given normal use. However, tanks may be damaged by abrasion or impact from sharp objects.	Tanks should be protected from abuse and accidental damage during transportation and installation processes.
<b>Durability</b>	Satisfactory for the purposes envisaged and as long as used as illustrated in this certificate.	Agrément South Africa is of the opinion that no significant deterioration of the product will take place when KRM Water and Liquid Storage Tanks are used as set out in this certificate and the lifespan will be satisfactory.
<b>Accelerated weathering</b>	Satisfactory.	Agrément South Africa is of the opinion that no significant surface weathering of the tanks should occur within 5 years of manufacturing.
<b>Seal rings</b>	Satisfactory.	Seal rings to the tanks are made from natural rubber with permanent set characteristics, formulated for ultra-violet, chemical and abrasion resistance.



**Table 3: Quality management system**

Aspects of performance	Opinion of Agrément South Africa	Explanatory notes
<b><i>Quality management system</i></b>	Satisfactory. The certificate holder's quality management system complies with Agrément South Africa's requirements.	<p>Agrément South Africa's requirements, based on <b>SANS 9001:2008</b>.</p> <p>Properly applied, the quality management system will ensure that acceptable standards are maintained in the manufacture and installation of the KRM Water and Liquid Storage Tanks.</p> <div style="border: 1px solid green; padding: 5px; margin: 10px auto; width: fit-content;"> <p><b>SANS 9001:2008- Quality management systems- Requirements</b></p> </div>

## PART 3: TECHNICAL DESCRIPTION

### General description

KRM Water and Liquid Storage Tanks are prefabricated and rotary moulded tanks. The material thickness varies from 2.5 mm to 6 mm, depending on the volume and intended use of the tank.

Tanks are manufactured from UV stabilised or colour compounded food grade materials. Depending on the application (indoor or outdoor), the inside of the tanks are lined with a black pigmented inner layer.

They are available and in liquid capacities as illustrated in Tables 4. Tanks are generally green in colour but are also available in other colours and are supplied with the following standard fittings depending on the application:

- a 50 mm, 40 mm or 20 mm diameter connector at the bottom
- an inlet on top (side) with a 50 mm, 40 mm or 20 mm diameter fitting (female) and or
- a 50 mm or 32 mm diameter overflow and
- a 450 mm diameter lid on top of the tank which may also have a leaf trap.

**Table 4: Tank sizes**

Type	D	H	a	b
220 litre storage drum	670	777	425	495
220 litre metro drum	670	777	425	495
500 litre water	770	1 100	425	495
850 litre compact water	750	1 960	425	495
1 000 litre water	1 200	1 200	425	495
2 000 litre water	1 310	1 585	425	495
2 500 litre water	1 410	1 670	425	495
4 000 litre water	1 640	2 050	425	495
5 000 litre water	1 810	2 100	425	495
6 000 litre water low profile	2 210	1 805	425	495
10 000 litre water	2 210	2 900	425	495
15 000 litre water	2 600	3 400	425	495
20 000 litre water	2 650	3 750	425	495

D = Diameter

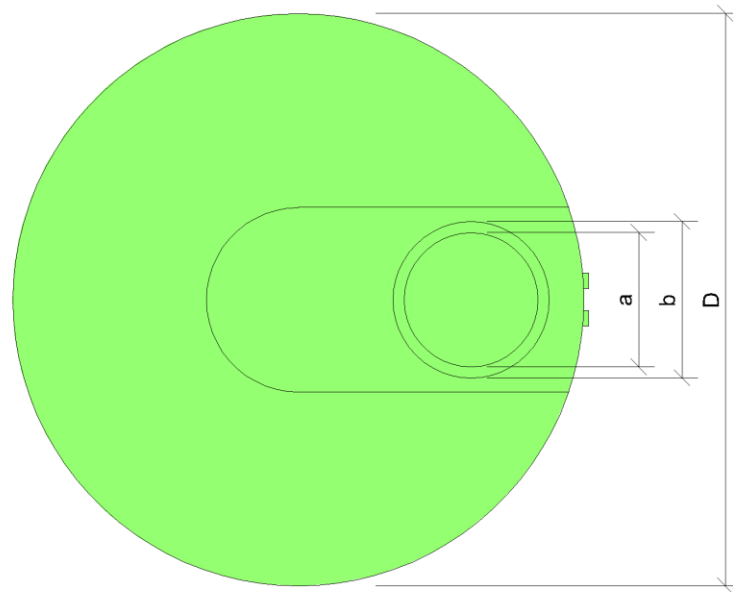
H = Height

a = Inside diameter of lid

b = Outside diameter of lid

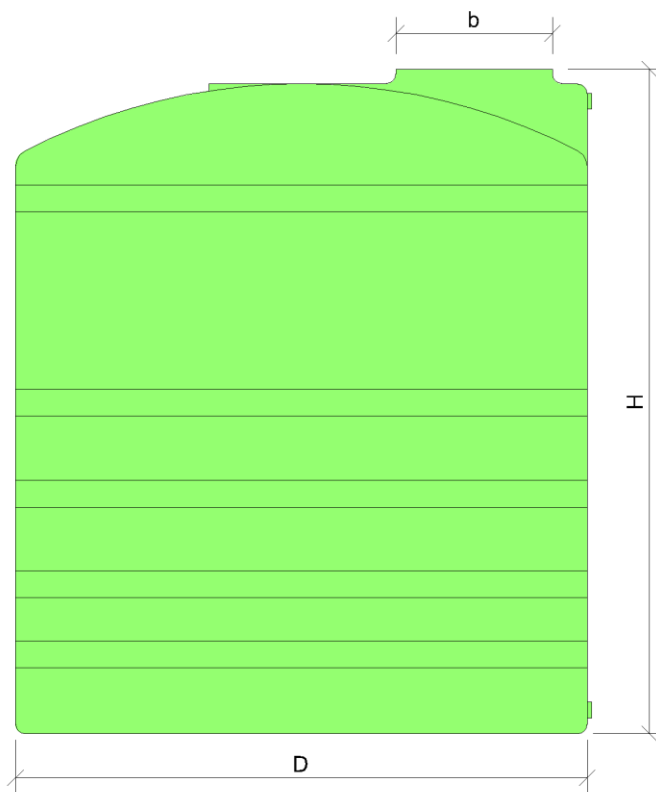
Note:

All dimensions in mm.



(a) Plan

Note:  
All dimensions in mm.



(b) Front elevation

Figure 1: Plan & elevation - KRM tank

## General conditions

The following aspects need to be taken into consideration in relation to the installation and use of the KRM Water and Liquid Storage Tanks:

- the local municipality needs to be contacted for rules, regulations and approval before purchasing of the tanks
- regular annual checks are recommended in accordance with the manufacturer's specifications when the storage tank has been in use for a period of four to five years.

## Manufacturing requirements

When utilizing polyethylene to design and manufacture containers for substances, the following factors need to be taken into consideration:

- container shape and design
- pressure development during storage
- changes of the material with time
- extraction of additives from the polymer
- exposure of the container to UV in addition to the chemical environment
- compound effects on polyethylene from mixtures
- changes in the polymer during processing
- storage temperature
- manufacturing process
- effects of any additional additives incorporated prior to processing, e.g. pigments, which may be subdivided into:
  - plasticisation or swelling
  - oxidation (chemisorption of oxygen into the polymer chain) and
  - stress-cracking (defined by **ASTM D883** as an internal or external crack in a plastic caused by tensile stresses less than its short-time mechanical strength.

**ASTM D883:** *Standard terminology relating to the testing of plastics.*

The requirements below highlight details of the KRM Water and Liquid Storage Tanks that require special attention during the manufacturing process:

- the quality of all incoming materials must be adequately controlled and all records kept and maintained to demonstrate achievement of the required quality and effective operation of the certificate holder's quality management system

- adequate records must be kept of routine inspections and tests carried out to ascertain that the quality of all manufactured components are as specified.

## Manufacturing process

Raw material is received mostly in pellet form from Sasol Polymers and the colour compound from Lomotek and Rotoflow, for special colours. Sasol HR486 LLDPE Roto Moulding Grade with UV stabiliser or SCG E-LENE M9001 RW is used. This is manufactured, supplied and technically supported by Sasol Polymers.

The LLDPE is converted into finished product by means of the rotational moulding process resulting in a one piece almost seam free and watertight tank.

The raw material is pre-weighed before being placed into the mould. Each product is made according to a designated and computer controlled recipe which determines oven-time, cooling time and rotation speed. Once filled with raw materials, the mould is placed in an oven for the designated process period while rotating at the designated ratio. It is then removed from the oven where it cools according to the designated cooling time. Once cooled to the appropriate temperature, the set product is then de-moulded.

Once de-moulded, the product proceeds to the finishing department where the wall thicknesses and smoothness are checked.

The attestation of material and product conformity shall be the responsibility of KRM Plastics (Pty) Ltd. A Certificate of Analysis and Certificate of Compliance to be made available on request and comply with SANS 17050-1:2013 and in accordance with the documentation requirements of SANS 17051-2:2013.

**SANS 17050-1: Supplier's declaration of conformance .**

**SANS 17051-2: Supplier's declaration of conformance .**

## Installation requirements

It is essential that the tanks are installed as per the installation instructions in the installation manual which cover the basic requirements such as:

- the storage tanks should be supported on a level base that can bear the weight of the tank when it is full
- the base should be free from sharp objects such as nails, bolts and unlevelled concrete stone
- where an elevated platform is used. This platform should be robust and strong enough to withstand the forces applied to it by wind. It must be securely anchored to the ground in which case an engineer should take responsibility of that support

- when installed outdoors, the tank should not be placed where they could be damaged by traffic or vehicles such as forklifts and other machinery
- they should not hinder access to the property and not be placed near combustible materials, e.g. long dry grass
- when installed indoors, tanks should be placed:
  - in demarcated areas or in isolation from the rest of the structure by means of a wall or bund. Adequate floor drainage is recommended
  - on a suitably strong raft platform which can bear the weight. Caution should be taken where tanks are installed in multi-storey buildings that the structure can accommodate the intended weight. An engineer should always be consulted in these instances
  - away from high voltage installations and in a manner that does not hinder or restrict access
- pipe fittings should be connected correctly and be stress free. Care should be taken not to over tighten or cross thread. Appropriate thread sealer should be used
- the filling rate should not exceed the overflow rate

## Installation procedure

Tanks should preferably be installed on raised platforms for ease of discharging.

Tanks should carefully be placed on designated areas and rotating them so that the inlet and outlet are in their correct positions.

Rain water tanks should be placed in a manner to facilitate the connection of gutters and outlet/drainage taps.

Vertical tanks are supplied with tie down “hoops” located on the top periphery of the tank for ease of securing to the base platform.

These hoops assist in securing the tanks in place, especially when the tanks are empty and are most likely to be displaced.

The tank may be installed manually or alternatively by mechanical means (viz, by crane or forklift) if the support structure exceeds 1.5 m high.

## Handling

KRM Water and Liquid Storage Tanks are manufactured to withstand normal handling during transportation and installation. To avoid unnecessary damage, care should be exercised in handling the tanks which should never be:

- dragged over an abrasive surface
- transported in a manner whereby a point load is exerted on the tank or it rests upon a sharp object
- over-tightened during transport to the extent that a visible deflection is noticed
- dropped when offloaded

## **Storage**

Tanks should be stored in a manner that does not compromise the structural integrity of the tanks and preferably standing as if installed. viz, on their bases in a vertical position.

Tanks should not be exposed to direct heat and non-UV protected tanks must be kept away from sunlight or alternatively covered with a 100% shade net or similar if prolonged exposure to direct sunlight is anticipated.

## **Maintenance**

KRM Water and Liquid Storage Tanks require little maintenance so long as they are used appropriately. KRM Plastics (Pty) Ltd offers a 5 year guarantee period on all their tanks and this is feasible if tanks are used for their intended purpose. Tanks should not be painted.