



JOINT SEALANTS

BERSEAL PU 501 (2K)

2 - Components Polyurethane Sealant

DESCRIPTION

Berseal PU 501 (2K) is 2 - components part gun grade / pouring grade low modules polyurethane sealant, which cures at room temperature 25 °C to an environmentally safe, tough flexible sealant. This sealant has better shelf life and is advisable in high humidity areas in place of its single component version.

FUNCTIONS

Use in expansion and contraction joints on bridge decks, floor joints & construction joints. Other applications are boat, yacht building, window & door frames, and ducting systems. Extreme bonding properties with a movement capacity $\pm 25\%$

ADVANTAGES

- High performance polyurethane sealant
- Excellent weather resistance during storage / logistics
- Highly durable
- Excellent adhesion to concrete surfaces as well as brick, steel, glass, aluminum and wood
- Good chemical resistance
- Accommodates the movements of joints
- Resistant to ozone and ultra violet radiations
- Easy to use

USES

The material has excellent resistance to bio-degradation due to bacterial attack in sewage tank & reservoir.

METHOD OF APPLICATION

TEST METHOD:

Color:	White, Grey, Black
Specific gravity:	1.1
Consistency:	Non-slump ASTM c639 - 5
Pot life:	8 hour @ 25 °C
Skin forming time, 50% RH:	90 - 120 mins
Tensile strength:	250 psi, 4 Mpa (ASTM D412)
Ultimate elongation:	600%
Elasticity modulus:	48 psi
Hardness shore A:	25 (ASTM C661)
Temperature resistance:	-20 °C to 90 °C

METHOD OF APPLICATION

SURFACE PREPARATION:

The adhesion of Berseal PU 501 is greatly impaired if the surface is not prepared thoroughly. The surface must be cleaned by chiseling or high-pressure water cleansing or brushing. All joints should be thoroughly cleaned and any foreign matter blown out.

All old caulk or sealant should be removed. Care should be taken to remove any surface alkaline deposit from cement or concrete surface.

PRIMING OF JOINTS:

Apply at least one coat of Berseal PU Primer on all faces of joints. Make sure any surface should not remain unprimed as it greatly affects the adhesion of sealant with surface.

MIXING AND APPLICATION

MIX PROPORTION:

Berseal PU 501 (2K) is based on two component in 4:1 (Resin : Hardner) ratio. Component B should be thoroughly mixed in Component A for 10 minutes by using slow speed drill. After mixing, sealant starts to behave like single component moisture cure sealant and has almost 8 hours of pot life. After 90 minutes a fine layer (skin) will be formed but underneath remaining mix will remain workable for another 5 - 6 hours.

Gun grade Berseal PU 501 (2K) should be applied using caulking gun. It is advisable to use more guns simultaneously for bulk packs. It can also be applied using spatula or scarper manually.

STORAGE

Storage temperature ranges from 5 °C - 28 °C in cool & dry conditions. Shelf life is 12 months.

PACKING

12 Kg set (2.6 Kg Hardener, 9.4 Kg Resin)

BERSEAL PU JP8

Jet Fuel & Blast Resistant Traffic Grade Sealant

Berseal PU JP8 is designed specifically for sealing joints in airport runways, terminal ramps, hangars and transportation storage areas but is equally effective in driveways, parking decks, sidewalks or other areas where various fuels and liquids may come into contact.

DESCRIPTION

Berseal PU JP8 is a self levelling two part modified polyurethane elastomeric sealant that when mixed and poured in place cures to form a tough, resilient joint seal that resists penetration, abrasion and remains unaffected by jet fuel, hydraulic fluids, oil or lubricants.

ADVANTAGES

- Easy-to-use
- Pourable and self leveling, with good flow property
- Rapid cure. Tacks free in less than 4 hours at 25 °C
- Excellent bonding holds bond even after immersion in water and jet fuel
- Good tear resistance
- Flame and fuel resistant

APPLICATIONS

- Airplane tarmacs
- Terminal & parking ramps
- Concrete & metal expansion joints
- Pavements, sidewalks & decks
- Cantilever decks
- Industrial applications

SPECIFICATIONS

- ASTM C 920, Type M, Grade P, Use T & M
- Federal Specification TT-S-00227E, Type I, Class A
- Federal Specification SS-S200D (Jet Fuel Resistant)

INSTALLATION

SURFACE PREPARATION:

Clean all surfaces from oil, grease, curing compound, residue, rust, tar, asphalt, loose aggregate, frost, form release agents, decorative and protective coatings or other foreign materials by sandblasting or mechanical blasting. By applying masking tape the along edges of joint slot neat and straight edges are obtained. But tape should be removed immediately after sealant levels.

PRIMING:

Never a substitute for proper surface preparation, joint surfaces must be primed with Berprimer before sealing. If the surfaces are other than masonry and concrete, test first to determine adhesion. Priming is not required on glass or anodized aluminum and is usually not necessary on most of the other common building materials.

MIXING:

Berseal PU JP8 is a two component system and must be thoroughly mixed before use.

Transfer part B to the container of part A using a spatula. Thoroughly mix for 3 - 4 minutes with the help of a slow speed drill or a sealant mixing paddle.

Move paddle from top to bottom and around sides to ensure complete mixing which results in a uniform color.

APPLICATION:

Should be applied within eight hours after priming; otherwise, it will be necessary to re-prime:

- Because architectural stones such as marble and granite vary considerably in porosity, some bleeding of the sealant into the substrate is a possibility. A field or laboratory test to confirm this possibility is recommended.
- All caulking and sealing should be performed when temperatures are above 4 °C. Ideally, the temperature at the time of application should be the median of temperature extremes when the joint width opening is at its mid-point.
- Fill joints from the bottom; avoid bridging of the joint which may form air voids.
- For large joints, the sealant grade may be poured directly from the can.
- For smaller joints, fill the joint by injecting the sealant from a bulk loading gun.
- Do not use soap or solvent.

CLEANING & CURING

Use mineral spirits or xylene to remove excess sealant before it cures and to clean equipment.

Curing time will vary with humidity and temperature. Initial cure is within 24 hours and complete cure takes approximately 7 days.

PHYSICAL PROPERTIES @ 25 °C

Test Property	Value	Test Procedure
100% Modulus (psi)	65	ASTM D412-75
Adhesion-in-Peel (pli)	20	ASTM C920
Bond durability-class 25	Pass	ASTM C920
Hardness, shore A (15-50)	35	ASTM C920
Service temperature range	-29 °C to 82 °C	
Stain and color change	Passes	ASTM C920
Tack free time	6 - 12 Hrs	ASTM C679
Tensile strength (psi)	125	ASTM D412-75
Ultimate elongation (%)	240	ASTM D412-75
Weep and sag (max 3/16")	Passes	ASTM C920
Weight loss after heat aging (max 10%)	Passes	ASTM C920
VOC (g/L)	<100	ASTM D3960

*Test results are averages obtained under laboratory conditions, reasonable variations expected.

COVERAGE

Berseal PU JP8

Two part polyurethane

Length of joint, in meters, filled per 1 litre of material

Depth of Joint	Width of Joints (mm)				
(mm)	10	15	20	25	30
10	10	6.7	5	4.4	3.33
15		4.45	3.33	2.67	2.23
20			2.5	2	1.67
25				1.6	1.33

SHELF LIFE

12 months in sealed containers under normal conditions. Storage temperature range is 5 °C to 28 °C in cool & dry conditions.

STORAGE LIFE

One-Part urethanes are extremely moisture and heat sensitive. Berseal PU JP8 has a shelf life of one year from the date of shipment from the factory when stored in original packing at conditions not exceeding 27 °C (80 °F), 50% R.H.

- Contains diisocyanates. Contact with uncured sealant, with vapors generated during curing, or with dust formed from cured sealant may cause eye, skin, or respiratory tract irritation or allergic reaction.
- Do not breathe fumes, dust, vapors or mist. Keep container closed. Use only with adequate ventilation and wear an appropriate respirator.
- Harmful if swallowed. Do not get it in eyes, on skin or on clothing. Wash thoroughly after handling. Repeated contact may, without symptoms, increase susceptibility of these effects.
- Highly combustible material, keep away from excessive heat, flame and sources of ignition.

PACKING:

4kg Set (Base 0.96kg, Hardner 3.04kg)

TECHNICAL SERVICES:

A trained Berger representative is available to assist in the preparation of specification and the resolution of problems in the field.



FLOORINGS & COATINGS

BERCEMFLOOR

DESCRIPTION

Bercemfloor is a high quality two component bond levelling screed based on Portland cement of high density for internal and external applications.

ADVANTAGES / USES

Bercemfloor is a versatile and durable sub floor cementitious screed which can be applied manually or pump to achieve rapid, flat economic substrate levelling prior to the application of the final floor finish.

- Typical uses are in warehouses, factories, manufacturing facilities, hospitals, commercial buildings, and domestic buildings
- For fast track floor repairs
- Levelling precast concrete beams and planks
- Self-smoothing and high fluid
- Pumpable or manual application
- Rapid drying
- 5 hours walk on time (at 20 °C)
- Levels and renovates old floors
- Excellent durability for resin flooring, tiles and sheets systems
- Suitable for use in hot and tropical climates
- It can be used as a moisture barrier

PRODUCT DATA

Form	Powder
Color	Dark Grey
Packaging	24kg (A+B) Part 1 Powder, Part 2 Liquid
Storage conditions	Store in cool and dry environment
Shelf life	Minimum 1 year from the date of production if stored in original unopened containers

TECHNICAL DATA

Chemical base	Polymer-modified Portland cement
Layer thickness	4mm to 12mm

APPLICATION DETAILS

Condition of substrate: The cementitious substrate should be sound and of sufficient compressive strength (minimum 25 N/mm²) minimum pull off strength 1.5 N/mm². The surface must be dry and free of all contaminants e.g. oils, grease, surface treatments and coatings, etc.

Surface preparation: The substrates must be prepared mechanically to achieve an open textured fine gripping surface, free of cement laitance. Weak concrete should be removed and surface defects such as blowholes and voids must be fully exposed. All dust; loose and friable material must be completely removed from all surfaces before application of the coating preferably by brush and vacuum. If sealed with an impervious material, ensure that an effective damp proof membrane is in place before installation of Bercemfloor.

APPLICATION INSTRUCTIONS

Mixing: Mix the dry powder (20kg) with liquid (4kg) and add clean water for required consistency with the help of mechanical drill machine.

COLOR

Available in Dark Grey shade and other shades as per demand.

COVERAGE

0.7kg per sq. ft. at 4mm thickness

CURING TIME

Touch dry	1 hour
Surface dry	4 - 6 hours
Complete dry	36 hours

SHELF LIFE:

Up to one year in closed container if stored properly.

BERCRETE PU

Four component polyurethane self-levelling product

AREA OF APPLICATION

Bercrete PU is used as a colored mortar coating for industrial floors with high mechanical and hygienic demands. Bercrete PU floors exhibit excellent properties, good wear resistance and an outstanding resistance to chemicals.

It is suitable for medium stress, such as commercial surfaces, slaughterhouses, dry processing areas of the food industry, food and beverage storage areas, tobacco processing plants, production plants for printed circuits, chemical production plants, pharmaceutical production plants and others.

PRODUCT DESCRIPTION

Bercrete PU is a four component, self-smooth coating of high-grade polyurethane resin. The product exhibits a very high level of resistance against a large number of acids, solvents and other chemicals as well as a high abrasion resistance combined with excellent hygienic properties.

BERCRETE PU SYSTEMS

Bercrete PU serves as mortar for the Bercrete system: Bercrete standard.

MAINTENANCE

In order to retain the qualities of the PU mortar coating for a long time we recommend regular maintenance. The floor can be steam-cleaned.

NOTE

The characteristic data are approximate values calculated by us. They do not represent warranted characteristics. Consequently, no liability claims of any kind may be derived from the Technical Data Sheet.

(A) TECHNICAL DATA	
Liquid product (A+B+C+D)	
1. Solids content	99%
2. Density (20 °C)	1.9 g/cm ³
3. Viscosity (20 °C)	A+B 500-1000 Mpas
4. Packaging size (four component container)	20kg
5. Colors	Assorted
6. Shelf life	12 months at 15 °C to 20 °C in closed original container
7. Storage	Dry at 10 °C to 30 °C, avoid direct sunlight

(B) TECHNICAL DATA

Cured material

1. Bending tensile strength (DIN EN 196 / ASTM C190)	18 N/mm ²
2. Compressive strength (DIN EN 196 / ASTM C109)	58 N/mm ²
3. Tensile strength (ISO R 527 / ASTM D638)	10 N/mm ²
4. Adhesive pull strength (DIN ISO 4624)	> 2.5 N/mm ² (crack in concrete)
5. Abrasion resistance (DIN 53754 / ASTM D1044)	1210 mg/1000 cycles (Taber H22)
6. Heat expansion coefficient (DIN EN 1770 / ASTM C531)	3.5 x 10 ⁻⁵ / °C
7. Heat conductivity (DIN 52612 / BS 874)	0.91 W/m °C
8. Water absorption (8CP.BM 2/67/2)	0ml
9. Temperature resistance 4mm Dry: Wet:	85 °C 60 °C

BER HARDFLOOR

Heavy duty non-metallic abrasion resistant concrete floor hardener

DESCRIPTION

Ber Hardfloor is a ready to use composition consisting of polymer modified binders and graded quartz aggregates, formulated for dry shake on application and for trowel embedment on fresh concrete surface requiring high degree of abrasion resistance.

FUNCTION

Ber Hardfloor ensures a non-metallic abrasion resistant surface to concrete floors by the dry shake-on system. It bonds monolithically with the base concrete, ensuring high levels of performance.

ADVANTAGES

- High performance surface hardener
- Provides highly abrasion resistant surface to concrete floors by the dry shake on system
- Resistant to oil and grease penetration
- Can handle heavy duty traffic without durable wearing, spilling and dusting
- Ensures hard wearing surface
- Ready-to-use
- Bonds monolithically with base concrete

USES AND APPLICATION

- Ber Hardfloor treated surface is capable of handling heavy duty traffic and is resistant to wearing, dusting, spalling and deterioration.
- Ber Hardfloor is designed to effectively reinforce indoor and outdoor concrete floors for light, medium and heavy duty industries and other areas requiring durable and abrasion resistant concrete floors.
- Ber Hardfloor can be used at the time of floor construction or when retopped with at least 25mm properly bonded new concrete.
- Ber Hardfloor adds to the hardness and greatly extends the life of good concrete floors or pavements.
- The use of Ber Hardfloor compensates for normal concrete aggregate segregation and surface weakening.
- Ber Hardfloor is recommended for use in indoor and outdoor floors, pavements in public and industrial places, warehouses, production areas, loading bays, shopping centres, schools and institutions, commercial complexes, garages, showrooms, laundries, parking lots, plazas, recreation areas, etc.

METHOD OF APPLICATION

The base concrete shall be laid and finished as per the standard concrete construction practice. The required profile shall be ensured at the time of concreting. Care shall be taken to ensure complete compaction at bay edges. Ber Hardfloor can be broadcast on the base concrete as soon as it stiffens to the level where light foot traffic can be allowed with minimum imprint of 2 to 3mm.

Two-third quantity of Ber Hardfloor shall be broadcast initially and shall be floated as soon as the absorption of surface moisture is complete. The balance quantity shall be broadcast preferably at right angles to the first application and floating repeated to get uniform finish. For floating, wooden floats or in large area the disc of the power float can be used. The final finish of the floor can be done by using power float, fitted with blades.

CURING:

The standard practice as adopted for curing concrete structures shall be adopted for Ber Hardfloor treated surfaces.

SURFACE TREATMENT

If colored coatings are required on Ber Hardfloor treated surfaces please contact Berger Technical Cell.

COVERAGE

Depending on the type of the industry, suitable quantity of Ber Hardfloor can be selected. The indicative rate of application for different types of industry is given below.

Light duty	2.5kg/m ²
Medium duty	3.5kg/m ²
Heavy duty	5.0kg/m ²

STORAGE

Ber Hardfloor will retain its properties for at least 12 months when kept in the original packing. Please consult Berger Technical Cell for further details.

SAFETY:

Ber Hardfloor is alkaline in nature. Avoid contact with skin for prolonged period. Any contact with eye, wash immediately with plenty of water.

PACKAGING

25 kg Polythene lined bags.

BERSHIELD SL 1 (1MM - 1.5MM)

Self-levelling epoxy flooring

DESCRIPTION

Hygienic self-smoothing resin floor finish

ADVANTAGES

- Attractive, enhances working environment
- Seamless and hygienic finish, no crevices where dirt and bacteria can dwell
- Hygienic & easy-to clean
- Non-tainting, non-dusting
- Hard wearing floor finish
- Abrasion resistant

USES

Dry process areas where the floor is subjected to light to medium duty foot and trolley traffic. Typical uses include laboratories, showrooms, hospitals, kitchens, warehouses, electronics, food and beverages, printing and pharmaceutical plants.

COVERAGE

125 gm / sq. ft. at 1mm thickness

182 gm / sq. ft. at 1.5mm thickness

PACKAGING

20 kg packs, consisting of Base A, Hardener B and Filler C.

COLOR & FINISH

Available in standard range of colors in Gloss finish. Batch to batch color variation may occur. Ensure that materials for final application are always drawn from the same batch.

SPECIFICATION

SURFACE PREPARATION:

Totally enclosed sand / grit blasting, light scarification or grinding. All residues must be removed to provide a dry, dust free open textured surface. Concrete or screed substrate should be a minimum of 25N/mm², free from laitance, dust and other contamination. The substrate should be dry to 75% RH as per BS 8204 and free from rising damp and ground water pressure. Water proofing products can be incorporated directly beneath the Bershield SL system.

PRIMING

All kinds of substrates except metals require one coat Primer. Porous substrate may require two coats.

NOTE

Uneven floors may need levelling before application of prime coat.

MIXING

Pack components are pre-weighed for optimum performance. Never split or proportion packs. Do not mix by hand. Add Hardener B to Base A container. Mix with a slow speed drill for 2 minutes, taking care not to entrain air. Transfer to another container and re-mix. Add Component C in portions mixing well prior to each addition.

APPLICATION

Spread Bershield SL to desired thickness using a notched trowel. Immediately after spreading, Bershield SL should be rolled with a spiked roller to remove air bubbles.

SYSTEM PERFORMANCE GUIDE

The table shows how well the system complies with different characteristics. Complies with BS 8204-6/FeRFA category 5.

5 Excellent, 4 Very Good, 3 Good (Pass), 2 Fair, 1 Poor

Fire safety	4	Impermeability	5
Slip resistance	1	Cleanability	5
Impact resistance	4	Wear resistance	4
Thermal resistance	3	Chemical resistance	3
Heavy traffic	5	Scratch resistance	3

TECHNICAL INFORMATION

The figures that follow are typical properties achieved in laboratory tests at 25 °C and at 50% relative humidity

Fire resistance	BS 476:Part 7: Surface spread of flame - Class 2 (indicative)
Slip resistance value	Method described in BS 7976-2. (SRV) Dry 67 Wet 26 (typical values for 4-S rubber slider)
Abrasion resistance	BS 8204-2 Class AR2 – Medium duty industrial and commercial
Temperature resistance	Tolerant of sustained temperatures up to 50 °C
Water permeability	Nil (impermeable)
Compressive strength	35 N/mm ² (BS 6319)
Flexural strength	25 N/mm ² (BS 6319)
Tensile strength	10 N/mm ² (BS 6319)
Bond strength	Greater than cohesive strength of 25 N/mm ² concrete. >1.5 MPa
Toxicity (when cured)	Taint free to sensitive foodstuffs

SPEED OF CURE

	10 °C	20 °C	30 °C
Light traffic	24 hrs	12 hrs	12 hrs
Full traffic	72 hrs	48 hrs	24 hrs
Full chemical cure	12 days	7 days	7 days

AFTERCARE - CLEANING AND MAINTENANCE

Clean regularly using a single or double headed rotary scrubber drier in conjunction with a mildly alkaline detergent.

EQUIPMENTS:

Vacuum recovery shot blasting machine	Grinder
Masking tape / Polythene sheets	Industrial vacuum
Heaters for cold weather works	Spiked roller
Slow speed drill with suitable paddle	Spiked shoe
Brushes or short nap hair rollers	Pin screed
Scarifier (Errut / Von Arx)	Lights

STORAGE AND SHELF LIFE

Stored unopened in dry conditions at 10 - 25 °C. Shelf life will be 12 months.

ENVIRONMENTAL CONSIDERATIONS:

The finished system is assessed as non-hazardous to health and the environment. The long service life and seamless surface reduce the need for repairs, maintenance and cleaning. Environmental and health considerations are controlled during manufacture and application of the products by fully trained and experienced applicators under guidance of Berdex.

HEALTH & SAFETY

Some of the components of this product may be hazardous during mixing and application, please consult the relevant health & safety data sheets.

BERSHIELD SL (2MM - 4MM)

Self-levelling epoxy flooring

DESCRIPTION

Hygienic self-smoothing resin floor finish

ADVANTAGES

- Attractive, enhances working environment
- Seamless and hygienic finish, no crevices where dirt and bacteria can dwell
- Hygienic & easy-to-clean
- Non-tainting, non-dusting
- Hard wearing floor finish
- Abrasion resistant
- Antistatic version also available

USES

Dry process areas where the floor is subjected to medium to heavy duty foot, trolley, pallet truck and rubber wheeled fork lift traffic. Typical uses include laboratories, showrooms, hospitals, textile factories, kitchens, warehouses, electronics, aerospace, automotive, food & beverages, printing, studios / TV studios, news room and pharmaceutical plants.

COVERAGE

290gm per sq. ft. at 2mm thickness 430gm per sq. ft. at 3mm thickness 600gm per sq. ft. at 4mm thickness.

COLOR & FINISH

Available in standard range of colors in Matt and Glossy finish. Batch to batch color variation may occur. Ensure that materials for final application are always drawn from the same batch.

SPECIFICATION

SURFACE PREPARATION:

Totally enclosed sand / grit blasting, light scarification or grinding. All residues must be removed to provide a dry, dust free open textured surface.

Concrete or screed substrate should be a minimum of 25N/mm², free from laitance, dust and other contamination. The substrate should be dry to 75% RH as per BS 8204 and free from rising damp and ground water pressure. Water proofing products can be incorporated directly beneath the Bershield SL system.

PRIMING

All kinds of substrate require one coat Primer. Porous substrate may require two coats.

NOTE

Uneven floors may need levelling before application of prime coat.

MIXING

Pack components are pre-weighed for optimum performance. Never split or proportion packs. Do not mix by hand. Add Hardener B to Base A container. Mix with a slow speed drill for 2 minutes, taking care not to entrain air. Transfer to another container and re-mix. Add Component C in portions mixing well prior to each addition.

APPLICATION

Spread Bershield SL to the required thickness using a notched trowel. Immediately after spreading, Bershield SL should be rolled with a spiked roller to remove air bubbles.

SYSTEM PERFORMANCE GUIDE

The table shows how well the system complies with different characteristics. Complies with BS 8204-6/FeRFA category 5.

5-Excellent, 4-Very good, 3-Good (pass), 2-Fair, 1-Poor

Fire safety	4	Impermeability	5
Slip resistance	1	Cleanability	5
Impact resistance	3	Wear resistance	4
Thermal resistance	3	Chemical resistance	3
Heavy traffic	5	Scratch resistance	3

TECHNICAL INFORMATION

The figures that follow are typical properties achieved in laboratory tests at 25 °C and at 50% relative humidity

Fire resistance	BS 476:Part 7: Surface spread of flame - class 2 (indicative)
Slip resistance value	Method described in BS 7976-2. (SRV) Dry 67 Wet 26 (typical values for 4-S rubber slider)
Abrasion resistance	BS 8204-2 Class AR2 – Medium duty industrial and commercial
Temperature resistance	Tolerant of sustained temperatures up to 50 °C
Water permeability	Nil (impermeable)
Compressive strength	35 N/mm ² (BS 6319)
Flexural strength	25 N/mm ² (BS 6319)
Tensile strength	10 N/mm ² (BS 6319)
Bond strength	Greater than cohesive strength of 25 N/mm ² concrete. >1.5 MPa
Toxicity (when cured)	Taint free to sensitive foodstuffs

SPEED OF CURE

	10 °C	20 °C	30 °C
Light traffic	24 hrs	12 hrs	12 hrs
Full traffic	72 hrs	48 hrs	24 hrs
Full chemical cure	12 days	7 days	7 days

AFTERCARE - CLEANING AND MAINTENANCE

Clean regularly using a single or double headed rotary scrubber drier in conjunction with a mildly alkaline detergent.

EQUIPMENTS

Vacuum recovery shot blasting machine	Grinder
Masking tape / Polythene sheets	Industrial vacuum
Heaters for cold weather works	Spiked roller
Slow speed drill with suitable paddle	Spiked shoe
Brushes or short nap hair rollers	Pin screed
Scarifier (Errut / Von Arx)	Lights

STORAGE AND SHELF LIFE

Stored unopened in dry conditions at 10 – 25 °C. Shelf life will be 12 months.

ENVIRONMENTAL CONSIDERATIONS

The finished system is assessed as non-hazardous to health and the environment. The long service life and seamless surface reduce the need for repairs, maintenance and cleaning. Environmental and health considerations are controlled during manufacture and application of the products by fully trained and experienced applicators under guidance of Berdex.

HEALTH & SAFETY

Some of the components of this product may be hazardous during mixing and application, please consult the relevant health & safety data sheets.

BERTOP 810

DESCRIPTION

Bertop 810 is a colored, ready-to-use, watery dispersion coating compound of epoxy resin. Bertop 810 produces tough, non-porous, food gradient seamless, anti-slip highly hygiene coatings, which permit steam diffusion. It has a characteristic orange-peel structure, which is easy to clean and exhibits a good resistance against fuels, lubricants, most solvents and many chemicals.

USE

Bertop 810 is used as a rolled coating on masonry, cement, anhydrite and magnetite substrata, with or without prior priming. Bertop 810 is specially designed for warehouses floors, car parking areas and walls.

CP CRETE LAYER SYSTEM

1st layer:	Bertop 810
2nd layer:	Bertop 810
Possible layering for wall coatings	
1st layer:	Bertop 810 with glass fabric (optional)
2nd layer:	Bertop 810

MAINTENANCE

In order to retain the quality of the synthetic resin flooring for a long time we recommend regular maintenance.

NOTE

The characteristic data are approximate values calculated by us. They do not represent warranted characteristics. Consequently, no liability claims of any kind may be derived from the Technical Data Sheet.

(A) Technical Data

Liquid mixture (A+B)

1.	Solids content	68%
2.	Solvents / additives	32%
3.	Density (20 °C)	1.31 g/cm ³
4.	Packaging size (2-component container)	20kg
5.	Colors	Assorted
6.	Shelf life / storage	6 months at 15 °C to 20 °C
7.	Pot life	100 minutes
8.	VOC	Less than 50

(B) Technical Data

Cured material

1.	Adhesive pull strength (DIN ISO 4624)	> 3.5 N/mm ²
2.	Abrasion resistance (DIN 53754 / ASTM D 1044)	97 mg/1000 cycles
3.	Light-fastness (DIN EN ISO 105-B02)	6 (Scale 1-8, 8=best)
4.	Dry time	3-5 hours
5.	Water resistant	4 Months
6.	Solvent resistant	Fuel, lubricants, most solvents and chemicals
7.	Thickness	200-250 Microns

PROCESSING INSTRUCTIONS

SUBSTRATE PREPARATION:

The substrate must be clean and free of dust and loose particles. All traces of contaminants such as oils, fats, greases, paint residues, chemicals, algae and laitance should be removed. Cracks and cavities must be properly repaired. Before application the substrate must be well ground and then vacuumed thoroughly.

PROCESSING

The product is supplied in proportionate quantities in 2-component containers. The A-component is stirred for at least 1 - 2 minutes. Then the entire contents of the B-component are emptied into the A-component container and both are stirred for about 2 - 3 minutes using a suitable electrical stirrer. The inclusion of air in the stirring process must be avoided. The mixture should be poured into a different container and stirred again briefly.

For vertical surfaces add 1 - 3 % per weight of floating agent X965. Bertop 810 is poured onto the surface in portions and applied over the entire area with a roller. The formation of puddles should be avoided. In order to guarantee a fast evaporation of the water, the relative air humidity should not exceed 85% during processing and drying.

REWORKING

If reworking within 36 hours after application the coating need not be sanded. Reworking later than that is only possible after sanding it carefully.

HEALTH & SAFETY

Appropriate health and safety advice can be found in the Material Safety Data Sheets. Users are advised to wear gloves and eye protection when mixing or applying Bertop 810.

(C) Technical Data

Liquid mixture (A+B)		
1.	Mixing ratio A:B	100:33
2.	Processing time (20 °C)	approx. 35 minutes
3.	Processing temperature	15 °C - 25° C (min. 3 °C above dew point)
4.	Material consumption (depending on substrate)	150 - 250 g/m ²
5.	Can be walked on (20 °C)	After approx. 22 hours
6.	Consecutive layer (20 °C)	Within 24 - 48 hours
7.	Fully capable of withstanding stress mechanical (20 °C) chemical (20 °C)	After 7 days After 28 days

BERTOP (500 MICRON)

Epoxy floor coating

DESCRIPTION

Two packs, solvent free epoxy floor coating applied up to 0.5mm thickness, designed to protect concrete floors and timber in light to medium duty situations.

ADVANTAGES

- Attractive, enhances working environment
- Seamless and hygienic finish, no crevices where dirt and bacteria can dwell
- Hygienic - easy to clean
- Non-tainting, non-dusting, abrasion resistant
- High build, up to 0.5 mm in one coat
- Excellent chemical resistant to acid and sugar
- Easy to maintain, solvent free, low odor
- Economical and Fast installation

USES

It gives good general protection to concrete floors in light to medium duty situation. It is easy to clean, chemical resistant floor coating with non-slip finish and can be back rolled with fine aggregate for further strength. Typical uses include laboratories, showrooms, hospitals, manufacturing, fish, meat and food processing, commercial kitchens, beverages & pharmaceutical plants and warehousing areas subjected to heavy foot and rubber wheel traffic.

COVERAGE

50gm per sq. ft. at 500 Micron thicknesses

COLOR & FINISH

Available in standard range of colors in Gloss / textured (back rolled) finish. Batch to batch color variation may occur. Ensure that materials for final application are always drawn from the same batch.

SPECIFICATION

SURFACE PREPARATION:

Totally enclosed sand / grit blasting, light scarification or grinding. All residues must be removed to provide a dry, dust free open textured surface. Damaged areas / cracks in substrate and moving joints should be levelled with Bertex Mortar. If substrate movement occurs after application Bertop will reflect the cracks. Concrete or screed substrate should be a minimum of 25 N/mm² and above 10 °C, free from laitance, dust and other contamination. The substrate should be dry to 75% RH as per BS 8204 and free from rising damp and ground water pressure. Water proofing products can be incorporated directly beneath the Bertop system.

PRIMING

All kinds of substrate require at least one coat of Primer. Porous substrate may require two coats.

NOTE

Uneven floors may need levelling before application of prime coat otherwise its impressions will be visible on Bertop's final surface.

MIXING

Pack components are pre-weighed for optimum performance. Never split or proportion packs. Do not mix by hand. Add Hardener B and Base A container. Mix with a slow speed drill for 2 minutes, taking care not to entrain air. Aggregate would be added to if back rolled textured finish is required.

APPLICATION

Bertop should be immediately applied, after mixing, using a brush over primed substrate. Alternatively it can be spread through squeegee and finished through roller. All undulation, laitance, oil, grease or debris should be removed before priming the substrate to ensure good adhesion. Good ventilation and air movement is essential to assist drying especially in damp atmosphere.

SLIP RESISTANT FINISH (BACK ROLLED)

Where superior slip resistance and load bearing surface is required Bertop is rolled with selected aggregates. This back rolled application ensures excellent slip and chemical resistant surface.

SYSTEM PERFORMANCE GUIDE

The table shows how well the system complies with different characteristics. Complies with BS 8204-6/FeRFA category 5.

5 Excellent, 4 Very Good, 3 Good (Pass), 2 Fair, 1 Poor

Fire safety	4	Impermeability	5
Slip resistance	2	Cleanability	5
Impact resistance	2	Wear resistance	3
Thermal resistance	3	Chemical resistance	4
Heavy traffic	3	Scratch resistance	2

TECHNICAL INFORMATION

Impact resistance	< 0.5mm
Abrasion resistance	< 0.02mm C&CA Abrasion resistance test as per BS8204
Water permeability	Nil (impermeable)
Bond strength	Cohesive strength of concrete
Decontamination	Good (BS4247:Part1: Test A)
Classification	

SPEED OF CURE

	10 °C	20 °C	30 °C
Pot Life	80 mins	40 mins	25 mins
Light traffic	48 hrs	24 hrs	24 hrs
Full traffic	72 hrs	48 hrs	48 hrs
Full chemical cure	12 days	7 days	7 days

AFTERCARE - CLEANING AND MAINTENANCE

Clean regularly using a single or double headed rotary scrubber drier in conjunction with a mildly alkaline detergent. Bertop topcoat can easily be reapplied over abraded surface after extensive use to revive it original appearance and finish.

EQUIPMENT

Vacuum recovery shot blasting machine	Grinder
Masking tape / Polythene sheets	Industrial vacuum
Heaters for cold weather works	Rollers
Slow speed drill with suitable paddle	Squeegee
Brushes or short nap hair rollers	Lights

STORAGE AND SHELF LIFE

Store unopened in dry conditions at 10 °C - 25 °C. Shelf life will be 12 months.

ENVIRONMENTAL CONSIDERATIONS

The finished system is assessed as non-hazardous to health and the environment. The long service life and seamless surface reduce the need for repairs, maintenance and cleaning. Environmental and health considerations are controlled during manufacture and application of the products by Berdex staff and fully trained and experienced contractors.

HEALTH & SAFETY

Some of the components of this product may be hazardous during mixing and application, please take all precautionary measures to avoid any contact with eyes, mouth, skin and foodstuff. For further information consult the relevant health & safety data sheets.

BERTEX MORTAR

Solvent-free epoxy screed

DESCRIPTION

Multi-component, heavy duty, solvent-free epoxy resin based screed system designed to provide continuous protection and repair solution for concrete floor in medium to heavy duty situations.

ADVANTAGES

- Attractive & enhances working environment
- Durable, high mechanical strength and impact resistance and can form coves
- Bond strength higher than cohesive strength of concrete
- Hygienic - easy to clean
- Non-tainting & non-dusting
- Abrasion, slip resistant and hard wearing floor finish
- Suitable for patch repairs and joint repairs

USES

Bertex Mortar floors have excellent mechanical properties and chemical resistance. It provides superior load bearing, wear resistant properties for areas subjected to heavy and abrasive traffic. The system can also be used as repair material for damaged floors and to form coved skirting. Bertex Mortar may be used for all kind of process areas where the floor is subjected to medium to heavy duty foot, trolley, pallet truck and abrasive traffic. Typical uses include chemical production and processing areas, textile factories (bleaching and dying), automotive, metal processing & engineering facilities, warehouses, food processing and manufacturing plants.

COVERAGE

1.11kg per sq. ft. at 1.5mm thickness

PACKAGING

30.15 kg packs, consisting of base A, hardener B and filler C.

COLOR & FINISH

Available in standard colors in semi glossy and textured finish. Batch to batch color variation may occur. Ensure that materials for final application are always drawn from the same batch.

SPECIFICATION

SURFACE PREPARATION:

Substrate should be prepared by totally enclosed sand / grit blasting, light scarification or grinding. All residues must be removed to provide a dry, dust free open textured surface. Concrete substrate should be of good strength, have temperature greater than 10 °C and free from laitance, dust and other contamination. The substrate should be dry to 75% RH as per BS 8204 and free from rising damp and ground water pressure. Water proofing products can be incorporated directly beneath the Bertex Mortar System.

PRIMING:

All kinds of substrates require one coat Primer. Porous substrate may require two coats.

NOTE:

Uneven floors may need levelling before application of prime coat.

MIXING:

Pack components are pre-weighed for optimum performance. Never split or proportion packs. Do not mix by hand. Add Hardener B to Base A container. Mix with a slow speed drill for 2 minutes while taking care not to entrain air. Transfer to another container and re-mix. Add Component C in portions mixing well prior to each addition.

APPLICATION

Spread Bertex Mortar to the required thickness over primed surface. Use a Steel bladed trowel to finish. Lightly rolled finished surface with sponge roller to get a semi gloss finished surface. For coving place material to form a vertical edge then lay the base level with the edge of floor topping. Form the cove using a coving trowel.

TECHNICAL INFORMATION

The figures that follow are typical properties achieved in laboratory tests at 25 °C and at 50% relative humidity

Fire resistance	BS 476:Part 7: Surface spread of flame - class 2 (indicative)
Impact resistance value	0.9 Kg steel sphere test. Rated as excellent
Abrasion resistance	BS 8204-2 class AR2 - Medium duty industrial and commercial
Water permeability	Nil (impermeable)
Compressive strength	55 N/mm ² (BS 6319)
Flexural strength	20 N/mm ² (BS 6319)
Tensile strength	8 N/mm ² (BS 6319)
Bond strength	Greater than cohesive strength of 25 N/mm ² concrete >1.5 MPa
Toxicity (when cured)	Taint free to sensitive foodstuffs

STORAGE & SHELF LIFE

Stored unopened in dry conditions at 10 - 25 °C. Shelf life will be 12 months.

SYSTEM PERFORMANCE GUIDE

The table shows how well the system complies with different characteristics. Complies with BS 8204-6/FeRFA category 5.

5 Excellent, 4 Very Good, 3 Good (Pass), 2 Fair, 1 Poor

Fire safety	4	Impermeability	5
Slip resistance	3	Cleanability	4
Impact resistance	4	Wear resistance	4
Thermal resistance	3	Chemical resistance	4
Heavy traffic	5	Scratch resistance	3

SPEED OF CURE

	10 °C	20 °C	30 °C
Pot life	90 mins	60 mins	40 mins
Light traffic	36 hrs	24 hrs	24 hrs
Full traffic	48 hrs	36 hrs	36 hrs
Full chemical cure	10 days	7 days	7 days

AFTERCARE - CLEANING AND MAINTENANCE

Clean regularly using a single or double headed rotary scrubber drier in conjunction with a mildly alkaline detergent.

EQUIPMENT

Vacuum recovery shot blasting machine	Grinder
Masking tape / Polythene sheets	Industrial vacuum
Heaters for cold weather works	Sponge roller
Slow speed drill with suitable paddle	Lights
Brushes or short nap hair rollers	Steel trowels
Scarifier (Errut / Von Arx)	

ENVIRONMENTAL CONSIDERATIONS

The finished system is assessed as non-hazardous to health and the environment. The long service life and seamless surface reduce the need for repairs, maintenance and cleaning. Environmental and health considerations are controlled during manufacture and application of the products by Berger staff and fully trained and experienced contractors.

HEALTH & SAFETY

Some of the components of this product may be hazardous during mixing and application, please consult the relevant health & safety data sheets.

BER SCREED EP

Monolithic seamless epoxy topping system

DESCRIPTION

Ber Screed EP is a three component epoxy system specially formulated to provide chemical and abrasion resistant topping for industrial floors, corrosion resistant lining in chemical industries, for foundation protection, run ways, roads, etc.

FUNCTIONS

The epoxy resins react with hardeners or curing agents and harden to form the thermosetting polymers with network structures. The hardened system is extremely abrasion resistant, chemical resistant as well as exhibits high flexural, compressive and tensile strengths.

ADVANTAGES

- High flexural, compressive and tensile strengths
- Excellent chemical resistance
- Impact and abrasion resistant
- Easy to use

USES

- Ber Screed EP is ideally suitable as a floor topping material for industrial plant and processing areas, petrochemical industries, battery rooms, breweries, food processing and pharmaceutical industries, workshops, pathways, painting shops, etc.
- Ber Screed EP is also recommended for structural repairs and rehabilitation of corrosion affected structures, dilapidated RCC structures, honey-combed zones of structural elements and in areas where impact resistance and chemical resistance are required.
- Ber Screed EP can be used for repair and rehabilitation of runways, roads, etc.

METHOD OF APPLICATION

SURFACE PREPARATION:

It is important to prepare the surface by removing all loose and deleterious matters, oil and grease, etc. before treating with Ber Screed EP. Chemical etching and wire brushing is recommended when Ber Screed EP is to be provided on the old existing floor.

When Ber Screed EP is to be laid on a new concrete surface it is essential that the concrete is cured for 28 days and is dry before application.

PRIMING:

As a general practice, to ensure positive bond between the concrete surface and Ber Screed EP it is necessary to prime the surface using Ber Screed EP.

MIXING & APPLICATION:

Ber Screed EP Part A & B shall be mixed in the proportion of 2:1 and applied on the surface using a stiff brush. The primer shall be allowed to dry for 3 - 6 hours and Ber Screed EP shall be laid when a tack free primed surface is obtained.

Ber Screed EP 1kg Part A resin & 600gm Part B hardener shall be mixed in a plastic container. A slow speed drill fitted with paddle can be used for mixing. Part C, the filler shall be added slowly to obtain a consistent mortar. The mortar thus prepared shall be used within 30 minutes.

MIX PROPORTION

BER PRIMER EP:

Mix proportion	Part A	Part B
	200 gm	20 gm
Pot life	45 min	

BER SCREED EP:

Mix proportion	Part A	Part B	Part C
	1 kg	600 gm	12 kg
Workability	70 min		
Gel time	2 hours		

NOTE

Cement is not recommended with epoxies. Hence we cannot incorporate cement in the mix.

COVERAGE

Ber Primer EP: 3 to 4 m²/kg

Ber Screed EP: 13.6 kg - 1.0m² for 6 mm thickness and 1.5 m² for 3 mm thickness

PROPERTIES

Compressive strength: (ASTM D 695)	60 N/mm ²
Flexural strength:	25 N/mm ²
Tensile strength: (ASTM D 638)	10 N/mm ²
Pot life:	45 min
Initial hardness:	18 hours
Full cure:	7 days
Fresh wet density:	2000 kg/m ³ (Approx.)
Chemical resistance:	Excellent chemical resistance in aggressive environments because of low permeability

Ber Screed EP shows excellent resistance against diluted and concentrated acids, alkalis, solvents, detergents, grease and oil. However the resistance against ketons and hydrocarbons is fairly low.

PACKAGING

13.6 kg / unit

SHELF LIFE

Ber Screed EP can be stored for 6 months in sealed packs.

BERPRIMER UNDERCOAT

DESCRIPTION

Berprimer Undercoat is a two component, solvent free epoxy resin coating designed for application as a primer or a sealing coat.

ADVANTAGES

- Solvent free
- Available in bulk quantities
- Low viscosity
- Good penetration ability
- High bond strength
- Easy application
- Short waiting times
- Multi-purpose
- No batching errors. Consistency from pack to pack
- Seamless and hygienic finish, no crevices where dirt and bacteria can dwell
- Hygienic - easy to clean
- Economical & durable
- Non-tainting & non-dusting
- Hard wearing floor finish
- Abrasion resistant
- Non-hazardous & environmental friendly
- Economical and fast installation

USES

- For priming concrete substrates, cement screeds and epoxy mortars
- For normal to strongly absorbent surfaces
- Primer for all Berger Epoxy floorings
- Binder for levelling mortars and mortar screeds

COVERAGE

9-10 m² per litre per coat

PACKAGING

5 kg unit consist of base A & hardener B.

COLOR & FINISH

Available in standard transparent colors in glossy finish.

METHOD OF APPLICATION

SURFACE PREPARATION:

Totally enclosed sand / dirt blasting, light scarification or grinding. All residues must be removed to provide a dry, dust free open textured surface. Damaged areas / cracks in substrates and moving joints should be levelled with Bertex Mortar.

The substrates should be dry. Berger waterproofing system can be incorporated directly beneath the Berprimer Undercoat.

NOTE

Uneven floors may need levelling before application of prime coat otherwise its impressions will be visible on Berprimer Undercoat's final surface.

MIXING:

Pack components are pre-weighted for optimum performance. Never split or proportion packs. Do not mix by hand. Add hardener B to base A container. Mix with a slow speed drill for 4 minutes, taking care not to entrain air.

APPLICATION PROCEDURES:

Berprimer Undercoat should be immediately applied after mixing using a roller over primed substrate. Alternatively, it can be spread through squeegee and finished through roller. All undulation, laitance, oil, grease, or debris should be removed before priming the substrate to ensure good adhesion. Good ventilation and air movement is essential to assist drying especially in damp atmosphere.

SPEED OF CURE

	10 °C	20 °C	30 °C
Light traffic	48 hrs	36 hrs	24 hrs
Full traffic	72 hrs	48 hrs	36 hrs
Full chemical cure	24 hrs	12 hrs	8 hrs

AFTERCARE – CLEANING AND MAINTENANCE

Clean regularly using a single or double headed rotary scrubber drier in conjunction with a mildly alkaline detergent.

EQUIPMENT

- Vacuum recovery shot blasting machine
- Masking tape, polythene sheets, heaters, for cold weather works
- Slow speed drill with suitable paddle, brush or short nap hair rollers, grinder
- Industrial vacuum cleaner, spiked roller and spiked shoes

STORAGE AND SHELF LIFE

Store unopened in dry conditions at 10 °C - 25 °C. Shelf life will be 12 months.

ENVIRONMENTAL CONSIDERATIONS

The finished system is assessed as non-hazardous to health and the environment. The long service life and seamless surface reduce the need for repairs, maintenance and cleaning.

Environmental and health considerations are controlled during manufacture and application of the products by Berger staff and fully trained and experienced contractors.

SAFETY PRECAUTIONS

Avoid contact with eyes or sensitive skin. Wash thoroughly if eyes or sensitive skin gets affected.

NOTICE

Berger Paints Pakistan Ltd. is a manufacturer and supplier of materials and cannot therefore act in an engineering capacity in giving of advice or diagnosis of structural or related problems. Thus it cannot accept any liability arising either directly or indirectly from the use of its products whether or not in accordance with any advice recommendation or information, written or otherwise, supplied by it. The above information is based on the present available knowledge and may be changed/ amended with the new developments.

BERSHIELD ANTISTATIC T580

AREA OF APPLICATION

Bershield Antistatic T580 is used as a conductive surface coating system for industrial floors with high demands in terms of electrostatic discharge, especially in explosion proof areas and fire protection zones.

Areas of application are chemical plants, places where organic (flammable) solvents are stored and surrounding areas, hospitals, operating theatres electronic manufacturing and packing and others.

PRODUCT DESCRIPTION

Bershield Antistatic T580 is a pigmented, ready-to-use, solvent-free 2-component floor coating system of high-grade epoxy resin. Bershield Antistatic T580 used with the conductive layers CP-Primer 280 AS, produces tough, electrically conductive coatings according to DIN 51953 / DIN EN 1081 / DIN IEC 93, which are easy to clean and exhibit a good level of resistance to fuels and lubricants, most solvents and many chemicals.

MAINTENANCE AND CARE

In order to retain the quality of the synthetic resin flooring for a long time we recommend regular cleaning, care, and maintenance program.

NOTE

The characteristic data are approximate values calculated by us. They do not represent warranted characteristics. Consequently, no liability claims of any kind may be derived from the Technical Data Sheet.

(A) TECHNICAL DATA	
Liquid Product (A+B)	
1. Solids content	98%
2. Solvents / additives	2%
3. Density (20°C)	1.50 g/cm ³
4. Viscosity (20°C)	2800 – 3800 mPas
5. Packaging size (2-component container AB)	25 kg A 21.30 kg B 3.70 kg
6. Colors	Color chart & other colors upon request
7. Shelf life / storage	1 year at 15 – 20°C

(B) TECHNICAL DATA

Cured Material

1. Bending tensile strength (DIN EN 196 / ASTM C190)	45 N/mm ²
2. Compressive strength (DIN EN 196 / ASTM C109)	73 N/mm ²
3. Adhesive pull strength (DIN ISO 4624)	> 2.5 N/mm ² (concrete failure)
4. Abrasion resistance (DIN 53754 / ASTM D1044)	79 mg / 1000 cycles
5. Shore-D-hardness (DIN 53505 / ASTM D 2240)	82
6. Earth leakage resistance (DIN 51953 / DIN EN 1081)	< 106 Ohm
7. Light-fastness (DIN EN ISO 105-B02)	7(Scale 1 – 8, 8=best)

PROCESSING INSTRUCTIONS

SUBSTRATE PREPARATION:

The substrate must be clean and free of dust and loose particles. All traces of contaminants such as oils, fats, greases, paint residues, chemicals, algae and laitance should be removed.

Bershield Antistatic T580 is poured onto the conductive layers CP-PRIMER 280. The conductive coating layer Bershield Antistatic T580 must be applied no later than 24 hours after the previous layer has been laid.

PROCESSING:

The A-component must be stirred for at least 1 - 2 minutes. Then the entire content of the B-component is emptied into the A-component container and the two components are homogeneously mixed using a suitable electric stirrer (for at least 2 - 3 minutes). The inclusion of air in the mixing process is to be avoided. The mixture is poured into another container and briefly stirred again. Bershield Antistatic T580 is poured onto the surface and spread over the entire area using a serrated spatula (tooth size No. 25) (layer thickness control). The fluid coating can be rolled with a spiked roller, as required. The operative wears spiked shoes to walk on the still wet coating. It may be necessary to activate the floor coating electrically after it has fully cured.

REWORKING:

If reworking the coating layer within 24 hours after application the layer need not be ground. Reworking after that is only possible after grinding it carefully.

HEALTH & SAFETY

Appropriate health and safety advice can be found in the Material Safety Data Sheets. Users are advised to wear gloves and eye protection when mixing or applying Bershield Antistatic T580.

Possibilities for layering and detailed information about the application of CP Crete products can be found in the CP Crete Technical Guide.

(C) TECHNICAL DATA

Liquid Mixture (A+B)	
1. Mixing ratio A : B	100 : 19 by weight
2. Processing time (20°C)	20 – 25 min
3. Processing temperature	15-25 °C (min 3 °C above dew point)
4. Material consumption	Approx. 1800 g/m ²
5. Can be walked on (20°C)	After approx. 24 hours
6. Consecutive layer (20°C)	Within 12 - 24 hrs
7. Fully capable of withstanding stress mechanical (20°C) chemical (20°C)	After 7 days After 28 days

BERTOP PU

2k Polyurethane Based Floor & Wall Coating

DESCRIPTION

Bertop PU is two part modified polyurethane floor and wall coating that offers excellent abrasion resistance as well as chemicals and solvent resistance. It is suitable for internal and external applications.

ADVANTAGES

- Attractive, enhances working environment
- Hygienic and seamless finish. No crevices where bacteria and fungus can dwell
- Economical & durable
- Excellent bonding to most substrates like concrete, Plaster, steel and Plastic
- Excellent chemical resistance
- Excellent solvent resistance
- Excellent moisture and weather resistance
- Non hazardous & environment friendly
- Abrasion resistant
- Corrosion resistant
- Non-tainting & non-dusting
- Easy and fast installation

USES

It gives good general protection to concrete floors in light to medium duty situations. It is easy to clean chemical, solvent, abrasion and corrosion resistant coating with non-slip finish and can be back rolled with fine aggregate for further strength. Typical uses include:

- Pharmaceutical and beverages
- Hospitals and laboratories
- Textiles and warehouses
- Pavements, sidewalks & decks
- Cantilever decks
- Chemical manufacturing plants
- Offshore areas
- High humidity areas
- Electronic and aerospace
- Automotive and printing industry
- Food and milk processing plants, etc.

COVERAGE

8 - 10 m²/kg per coat

INSTALLATION

SURFACE PREPARATION:

Clean all surfaces of oil, grease, curing compound, residue, rust, tar, asphalt, loose aggregate, frost, form release agents, decorative and protective coatings or other foreign materials by sandblasting, mechanical blasting, grinding/wire brushing or by light scarification. All residues must be removed to provide a dry, dust free surface.

Concrete and screed substrate should be a minimum of 25 N/mm², free from laitance, dust and other contaminations.

PRIMING:

All kind of substrates require one coat of primer. Porous substrates may require two coats.

NOTE:

Uneven floors may need levelling before application of prime coat otherwise its impressions will be visible on Bertop PU final surface.

MIXING:

Pack components are pre-weighted for optimum performance. Never split or proportion packs. Do not mix by hand. Add hardener to base container. Mix with a slow speed drill for 2 minutes, taking care not to entrain air. Aggregate would be added to if back rolled textured finish is required.

APPLICATION:

Bertop PU should be immediately applied after mixing using a brush, roller or airless spray over primed substrate. All undulation, laitance, oil, grease, or debris should be removed before priming the substrate to ensure good adhesion. Good ventilation and air movement is essential to assist drying especially in damp atmosphere.

SLIP RESISTANT FINISH:

Where superior slip resistance and load bearing surface is required Bertop PU is rolled with selected aggregates. This back rolled application ensure excellent slip and chemical resistant surface.

ENVIRONMENTAL CONDITIONS:

The finished system is assessed as non-hazardous to health and the environment. The long service life and seamless surface reduce the need for repairs.

MAINTENANCE AND CLEANING:

Environmental and health conditions are controlled during manufacture and application of the products by Berger staff and fully trained and experienced contractors.

HEALTH & SAFETY:

Some of the components of this product may be hazardous during mixing and application, consult the relevant health & safety data sheets.

SHELF LIFE

12 months in sealed containers under normal conditions. Storage temperature range is 5 °C to 28 °C in cool & dry conditions.

TECHNICAL SERVICES

A trained Berger Representative is available to assist in the preparation of specification and the resolution of problems in the field.

BERTOP T1

DESCRIPTION

Bertop T1 is a unique formulation, which produces hard chemical resistant, aesthetically pleasing colored floor and wall coatings.

ADVANTAGES / USES

- Excellent adhesion
- Abrasion resistant and smooth
- Resistant to a wide range of chemicals
- Hygienic/anti-bacterial
- Improved aesthetics
- Easily washable

FUNCTION

Bertop T1 is a chemically cured epoxy floor coating system where the interwoven polymer films aid in better mechanical properties and chemical resistance.

USES

- Bertop T1 floor coating forms a smooth and aesthetically pleasing film having excellent adhesion to the substrate and good resistance to wide range of minerals and organic acids, alkalis, oils, fats, etc.
- Bertop T1 can also be applied on vertical surfaces and ceilings of buildings to resist aggressive chemicals and to produce hygienic environment.
- Bertop T1 can be applied as a colored coating for floors and walls in industrial buildings.
- Bertop T1 can be used as a hygienic surface coating for food processing industries, swimming pools, operation theatres, etc.
- Bertop T1 serves as a protective coating on concrete and steel structures exposed to aggressive chemical environment, battery rooms, chemical handling areas, etc.
- Bertop T1 can be used as a decorative sealer coat on Ber Screed surfaces.

METHOD OF APPLICATION

SURFACE PREPARATION:

The adhesion of Bertop T1 film is greatly impaired if the surface is not prepared thoroughly. Remove dirt, oil residues and existing paint if any by scrubbing with coarse wire brush or by chipping off the top layer. Grease & oil if present should be cleaned by chemical means or by sand blasting and water jetting. New concrete should be cured for minimum 28 days prior to the application of Bertop T1. The concrete should be fully dried before application of Bertop T1. To find the moisture content in concrete, a hygrometer reading shall be obtained. It is advisable to carry out the epoxy coating when the hygrometer reading is less than 75. Presence of moisture can also be determined by placing a polyethylene sheet on the floor, sealed on all sides and allowed to remain in place for 24 hours.

APPLICATION

Prior to application of Bertop T1, the cracks, joints, etc. shall be sealed with epoxy sealant. Bertop T1 as primer shall be applied on the prepared surface and allowed to dry. The base and curing agent of Bertop T1 shall be mixed in proportion and applied in 2 coats leaving sufficient time between each coat of application. Tools and equipments should be cleaned with Cerosol immediately after application.

CURING

At 36 °C cure time is 2 - 4 hours and full curing takes 4 days.

PROPERTIES

A trained Berger Representative is available to assist in the preparation of specification and the resolution of problems in the field.

Specific gravity	1.2
Application	10 °C - 40 °C
Colors	Grey, sky blue, green, yellow, red

CHEMICAL RESISTANCE

Bertop T1 is resistant to most of the industrial chemicals. In case of temperature exceeding 70 °C please consult Berger Technical Cell.

Bertop T1 has excellent resistance to various chemicals such as 50% solution of Sulphuric Acid, Phosphoric Acid, Hydrochloric Acid, Sodium Hydroxide, 10% solution of Ammonia and Urea, Saturated sugar, Kerosene, Petrol and Diesel.

POT LIFE

The working time of Bertop T1 depends upon the temperature. At 36 °C pot life is about 60 minutes.

STORAGE

12 months if stored below 36 °C.

PACKAGING:

10 kg

PRECAUTION

Smoking, naked flame or light should strictly not be allowed during application or in the area of storage.

HEALTH & SAFETY

Appropriate health and safety advice can be found in the Material Safety Data Sheets. Users are advised to wear gloves and eye protection when mixing or applying Bertop T1. Possibilities for layering and detailed information about the application of Berger products can be found in the Berger Technical Guide.



TECHNICAL DATA SHEET

DIRECTIONS FOR USE OF BER HARDFLOOR CEMENTITIOUS DRY SHAKE FLOOR PRODUCTS

1. THE DRY SHAKES

These products are factory-prepared ready-to-apply shakes:

- Ber Hardfloor (pre-mixed)
- Ber Hardfloor (pre-mixed)
- Ready-to-use do not mix with cement or add other materials

2. PLACING CONCRETE

MONOLITHIC (SINGLE COURSE) METHOD:

Concrete of the required strength design, with 75 mm slump or less and with not more than 3% entrained air, should be carefully deposited between previously placed screed points with the least possible handling. A small spud vibrator ('pencil type') inserted vertically is recommended to consolidate concrete at corners and sides of forms and bulkheads particularly when keyed joints are involved.

NOTE: For heavy duty traffic areas concrete designed for at least 31 MPa (4 500 psi) should be used.

NOTE: To minimize cracking concrete should contain a water-reducing agent.

NOTE: At temperatures below 15 °C

- Provide a tight enclosure and heat as required to maintain the temperature of concrete in place at 10° C or above make certain fumes from heaters are vented to the outside.
- Do not add calcium chloride to concrete over which Berger plate will be applied.

NOTE: At temperatures over 32 °C low humidity or placing concrete without protection from the wind or sun, adjust slump and mix design to cope with rapid evaporation but maintain specified strength. Under these conditions it is preferable to delay the floor work until after the roof is erected.

NOTE: In areas bordering sea water do not use salt water or salt contaminated aggregate in concrete over which Berger plate will be applied.

3. STRIKING OFF CONCRETE

Move concrete into place using square tipped shovels or other solid bladed tools. Do not use rakes. Vibrators when used should be inserted vertically and should not be used to move concrete but to consolidate it. The concrete should be struck off to level with a true wooden strike-off bar.

4. LEVELLING CONCRETE

Immediately behind the strike-off operation the concrete should be further levelled and consolidated with a wooden bull float or in limited access areas with a wooden darby. This operation must be completed before any free moisture (bleeding) rises to the surface.

5. FIRST FLOATING

Concrete adjacent to forms, columns, pits, doorways and walls should be floated first because it stiffens faster than the concrete in the overall areas.

NOTE: In arid climates areas exposed to sun or 25 mm – 38 mm thick toppings exposed to temperatures over 12° C omit balance of Operation No. 5 and start Operation No. 6.

Float the overall areas as soon as the concrete will bear the weight of a finisher and a light trowelling machine (equipped with float blades) without digging in.

NOTE: If free bleed water remains on the surface at this time it must be removed prior to the floating. A rubber hose dragged slowly over the surface is the best method.

6. APPLYING THE FIRST SHAKE

The first shake should be applied to the floated concrete adjacent to walls, forms, columns and doorways as soon as possible since these areas lose moisture very rapidly. Immediately behind the first floating of the overall areas as it proceeds apply two-thirds of the total shake specified. Spread the shake evenly. Do not throw the shake.

NOTE: When Berger's colored floor products are properly applied according to these directions using reasonable care and skill, attractive uniformly colored floors will be obtained. Berger cannot be responsible for diluted or mottled color resulting from careless or improper application of the shake finishing or curing or from failure to protect the finished floor from staining and damage by construction trades until turned over to owner.

7. FLOATING FIRST SHAKE

Float the shake on concrete adjacent to walls, forms and columns as soon as possible. Other finishers using mechanical trowels with float blades should float shake on overall areas as soon as the shake has taken moisture as indicated by a darkening of the surface and as soon as the float blades do not dig into the surface. Float just enough to ensure moisture being brought completely through the shake from the base concrete. Time floating operations so it will not be necessary to sprinkle water on the surface.

8. APPLYING SECOND SHAKE

Immediately behind floating of first shake apply final one-third of shake as floating proceeds. Spread shake evenly.

9. FLOATING SECOND SHAKE

Using a mechanical trowelling machine equipped with float blades or disk float soon enough and long enough to bring moisture completely through the second shake.

NOTE: If a coarse non-slip finish is desired omit operations No. 10 to No. 14 inclusive and proceed with operation No. 15 curing.

10. ADDITIONAL FLOATING

The surface may be further compacted by a third mechanical floating if time and setting characteristics of the concrete permit it to be floated.

NOTE: If a medium non-slip finish is desired omit Operations No. 11 to No. 14 inclusive and proceed with operation No. 15 curing.

11. FIRST TROWELLING

When the surface has further stiffened and lost some of its sheen it should be trowelled by hand or mechanical trowel keeping the trowel blades relatively flat.

NOTE: If a fine non-slip finish is desired omit operations No. 12 to No. 14 inclusive and proceed with operation No. 15 curing.

12. SECOND TROWELLING

When the surface has tightened up further, it should be trowelled again by hand or mechanical trowel. The blades may be raised slightly in this operation. For light colored floors such as metallic white, a stainless steel trowel must be used for the second and subsequent trowellings.

13. THIRD TROWELLING

When little paste will cling to the trowel blades a third trowelling may be given to the floor. All marks, pinholes and other blemishes should be removed in this hard trowelling operation.

14. BURNISH TROWELLING NATURAL COLORED FLOORS

If desired a hard burnish trowelling may be given by hand when no paste clings to the trowel. This operation produces a shiny smooth surface.

NOTE: Do not burnish trowel korocron floors.

15. CURING

Just as soon as the finish will not be marred by the application, apply the curing compound manufactured by Berger for the type of surface and use involved. Do not cure with salt water. Apply the proper curing compound in accordance with the directions on the container. For smooth trowelled surfaces coverage should not exceed the amounts shown below.

For natural colored floors finished with: Berhard

Cure is Berpolycure curing compound at a rate not exceeding 11 m² per litre.

APPLICATION RATES

Natural Colored Berhard: at 5 - 7 or 9 kg per m²

Colored Berhard: at 7 or 9 kg per m²

Berhard: at 2-3-4 or 5 kg per m²

SPECIAL NON-SLIP FINISHES

Coarse non-slip finishes – After operation No. 9 omit operation No. 10 to No. 14 inclusive and proceed to operation No. 15 curing.

Medium non-slip finishes – After operation No. 10 omit operations No. 11 to No. 14 inclusive and proceed to operation No. 15 curing.

Fine non-slip finish – After operation No. 11 omit operations No. 12 to No. 14 inclusive and proceed to operation No. 15 curing.

NOTE: Always obtain the client's approval on a sample panel for the type of finish and color before starting the main floor.

BERLATEX SBR

Screeding system

Screed - minimum 10mm thick

Components:

3 : 1 sand to cement v/v

1 : 3 Bertalex SBR to water v/v

Mix to the required consistency.

Maintain a W/C ratio of > 0,4

Slurry must be wet during application.

Never featheredge, always provide a minimum of 10mm vertical saw cut into the surface for repair systems.

Slurry - mix thoroughly to a smooth consistency

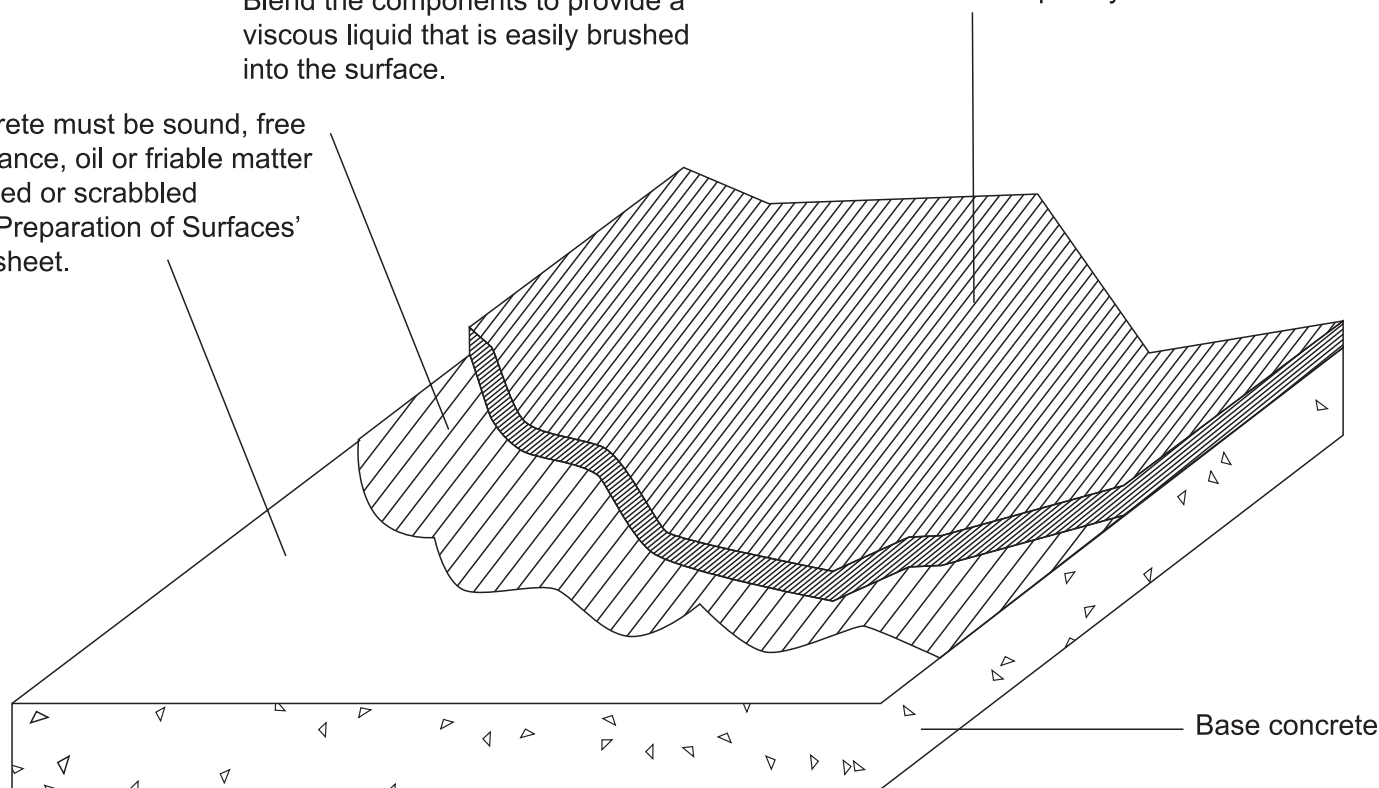
Components:

1 : 1 Bertalex SBR to water v/v

1 : 1 sand to cement v/v

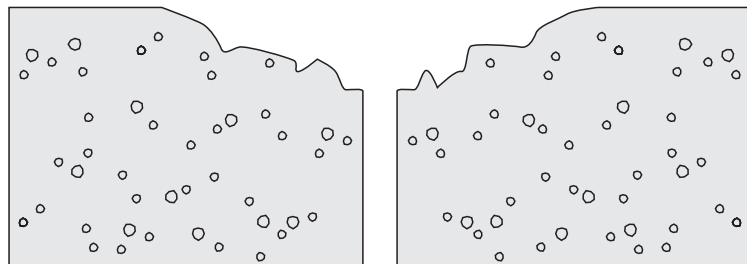
Blend the components to provide a viscous liquid that is easily brushed into the surface.

Concrete must be sound, free of laitance, oil or friable matter - etched or scrubbed
See 'Preparation of Surfaces' data sheet.

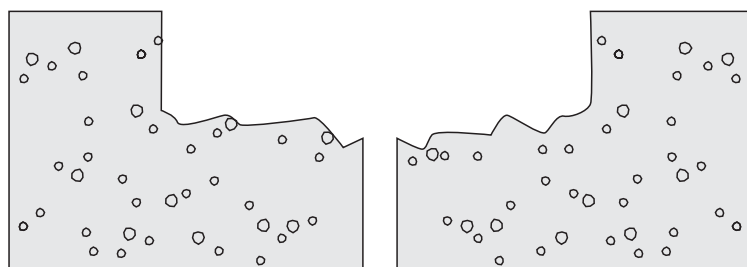


See relevant data sheets for details

FLOOR JOINT NOSING REPAIR



Damaged floor joint



Cut out affected areas perpendicular to the edge of spalled area as shown, then cut and roughen to a depth of > 50mm to receive the repair material like **Berggrout** or as advised

Use a wet to dry epoxy adhesion in conjunction with cementitious repairs - typically **Berggrout EP**

At repair depths i.e. 16mm the use of epoxy systems may be considered - typically **Epoxy grouts**

Never featheredge these products

Check data sheets for joint geometry

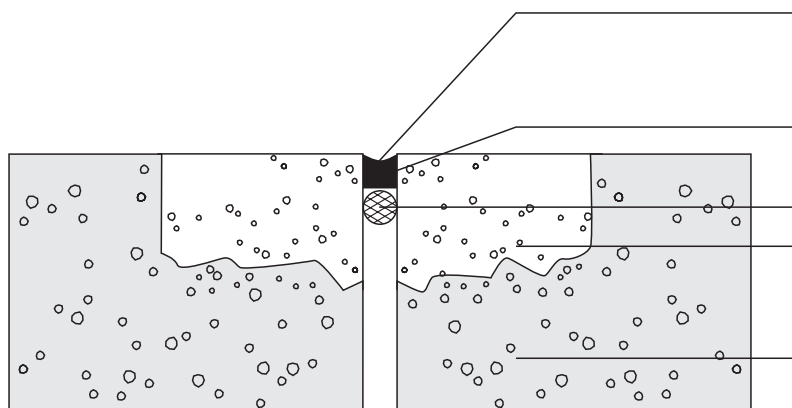
Use the selected sealant and related primer based on the movement factor

Sealant primer

Backing material - **Berrod**

Repair material - for heavy duty applications consider **Berggrout EP**

Base concrete



CHEMICAL RESISTANCE CHART

Bertex Mortar, Bershield, Bertop

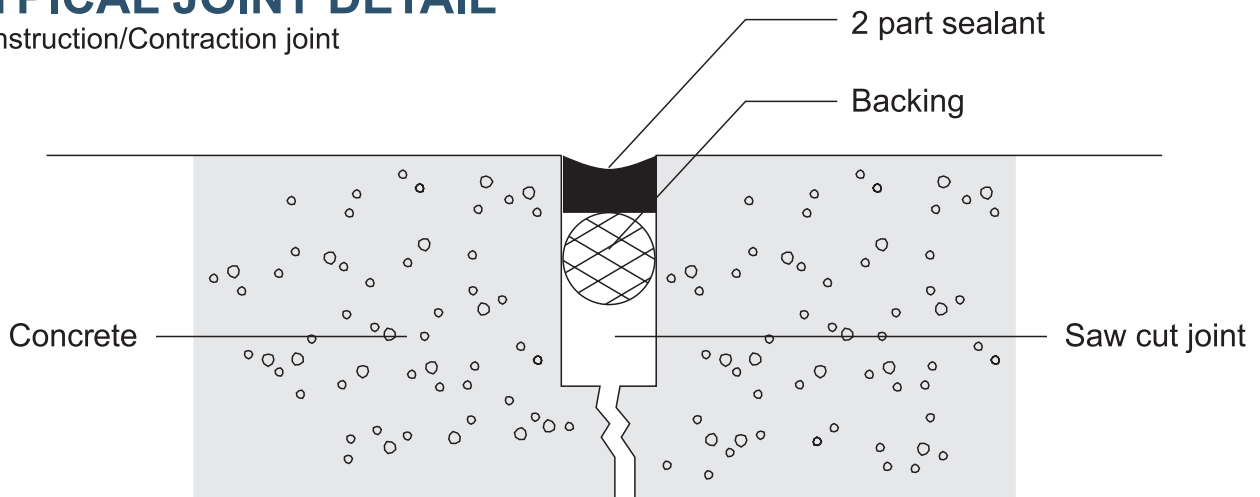
ACETIC ACID	5%	OK
ACETIC ACID	10%	Chips and breaks
AMMONIA	10%	OK
APPLE JUICE		OK
CAUSTIC	10%	OK
CAUSTIC	40%	OK
COKE		OK
DIESEL		OK
DISTILLED WATER		OK
HYDROCHLORIC ACID	10%	OK
HYDROCHLORIC ACID	30%	OK
LACTIC ACID	5%	OK
LACTIC ACID	10%	OK
LINSEED OIL (RAW)		OK
LUBRICATING OIL		OK
MALEIC ANHYDRIDE		OK
MEK		Crumbles initially, completely destroyed ± 17 months
METHYLATED SPIRITS		Bleached, OK
NITRIC ACID	5%	Bleached, chips off & breaks when forced
NITRIC ACID	10%	Bleached, breaks when forced
ORANGE JUICE		OK
PETROL		OK
PHOSPHORIC ACID	10%	OK
PHOSPHORIC ACID	40%	Flexible, breaks easily
PHTHALIC ANHYDRIDE		Severely attacked after 3 days
STYRENE		Softened badly after 1 month
SULPHURIC ACID	10%	OK
SULPHURIC ACID	40%	OK
VEGETABLE OIL		OK
WHITE SPIRITS		OK
XYLOL		OK

Date of issue: 24 Oct, 2017

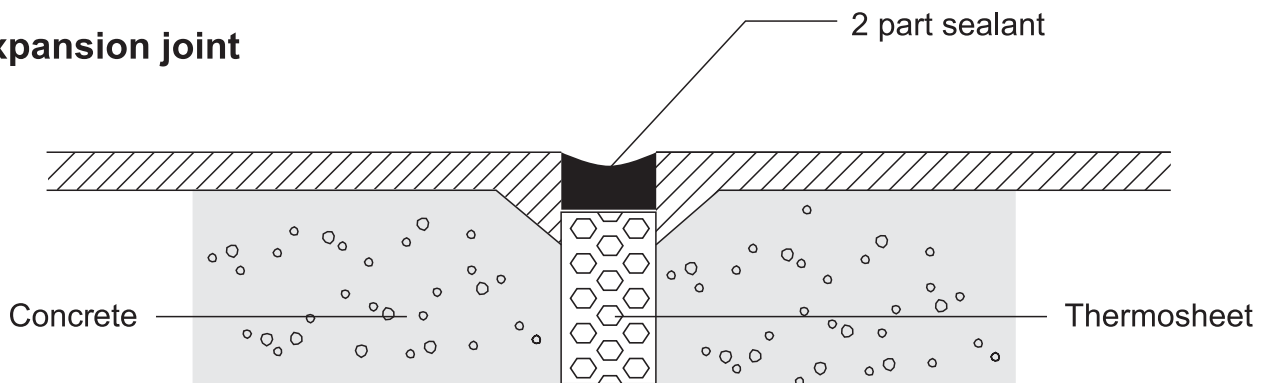
This Technical Data Sheet supersedes those previously issued.

TYPICAL JOINT DETAIL

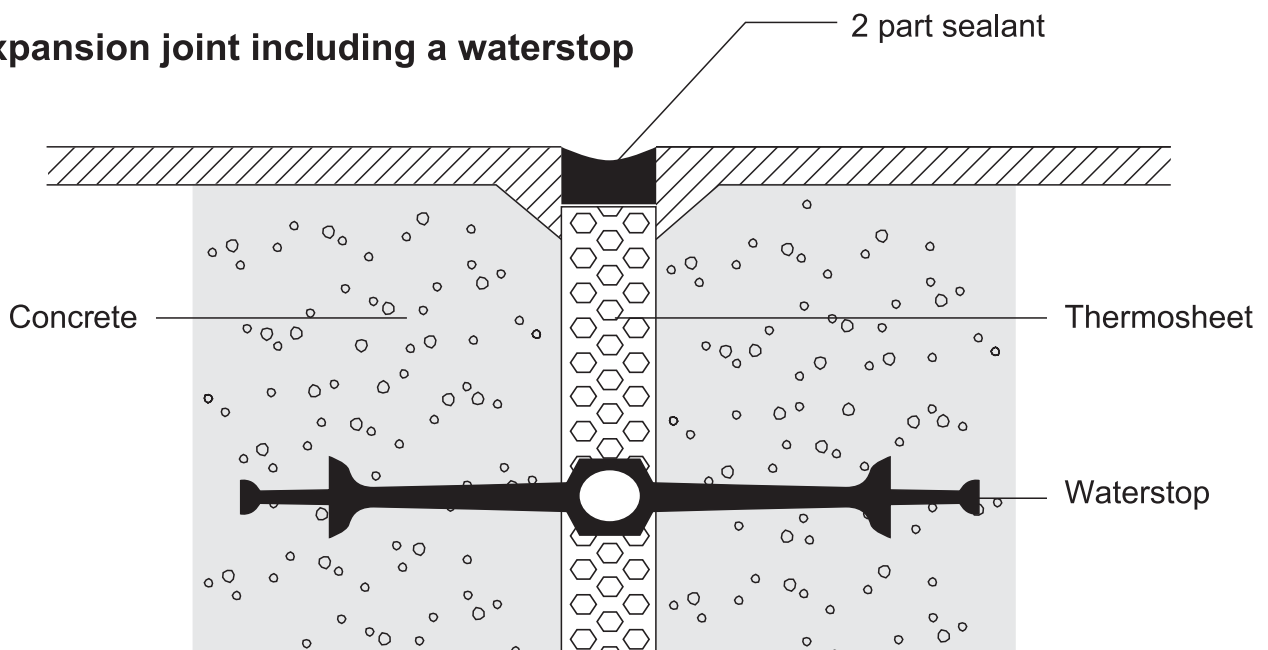
Construction/Contraction joint



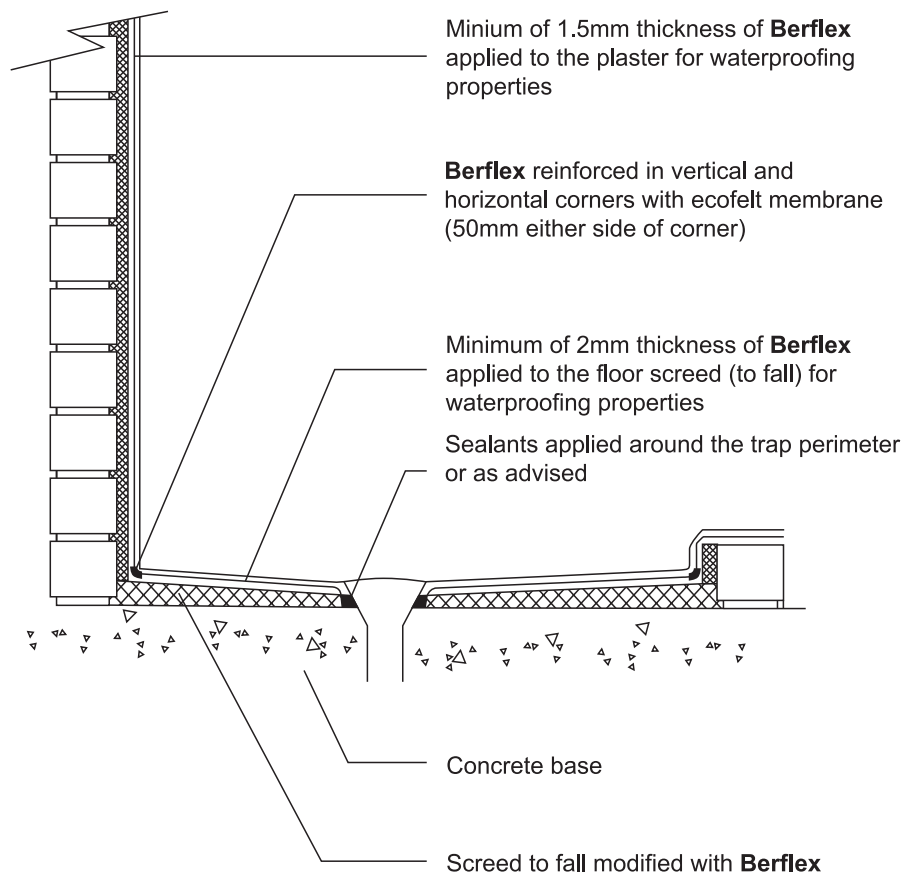
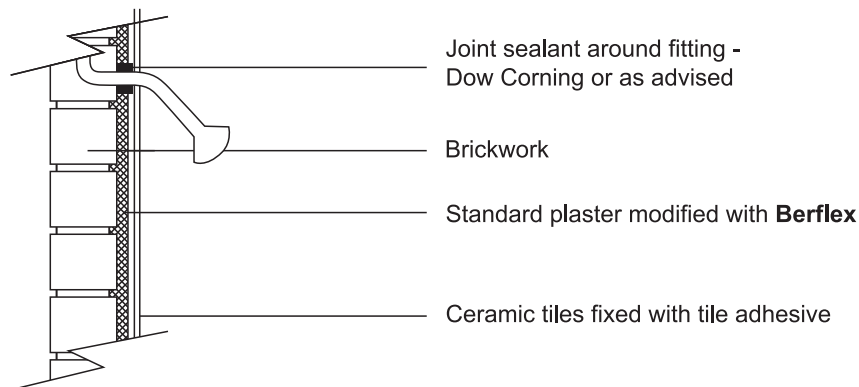
Expansion joint



Expansion joint including a waterstop



SHOWER WATERPROOFING



See relevant data sheets for details

SAFETY PRECAUTIONS

Since many Berger products are solvent borne based on resins which can be dermatitic require heating before use it is in all users' interests to observe certain simple and basic safety precautions.

VENTILATE WORK AREA

Always provide adequate ventilation and air flow around any working area, particularly in confined spaces.

Air flow:

- Ensures removal of solvent vapors
- Speeds drying of solvent and water carried compounds
- Removes toxic vapor

Maintain such ventilation until the material has set.

SKIN PROTECTION

Operators should use barrier creams and wear gloves when handling resin based compounds. These are known to be possible causes of dermatitis. Avoid prolonged or repeated skin contact with such materials. If resin/skin contact occurs, hard to remove spots may be cleaned with Berger Hand Cleaner. If this does not work, recourse must be made to wiping with a cloth moistened with the minimum amount of Berger Super Brush Cleaner followed by thorough soap and warm water washing.

Repeated use of this method removes natural skin oils which will induce cracking and increase risk of dermatitis. Combat cracking by a daily use of a lanolin based cream. When working with resins, personal cleanliness must always be maintained and hands must be washed with soap and water before eating, smoking or visiting the toilet.

EYES

Goggles should be worn. If materials are splashed into the eyes, flush with copious quantities of clean water and consult a doctor without delay.

A particularly dangerous practice is acid etching concrete surfaces without eye protection.

BURNS

When handling hot compounds such as molten bitumen, burns due to splashing or spillage are always a possibility. This risk can be reduced by operators wearing long-sleeved overalls, gloves and goggles.

NOTE:

Always refer to specific Material Safety Data Sheet.

NON-SLIP FLOOR FINISHES

Non-slip finishes for epoxy and polyurethane floors

DESCRIPTION

Berger non-slip aggregate is aluminium oxide aggregate for hard-wearing non-slip finishes.

USES

Non-slip finishes can be applied to new and old concrete, metal and wood surface in conjunction with the appropriate epoxy or polyurethane system. Typical areas include :

- Ramps, stairways, walkways and floors
- Aircraft hanger floors
- Animal enclosure walkways, zoos, animal farms & dairy milking parlours
- Boat decks
- Restaurant kitchens
- Industrial/manufacturing plants around machines
- Garage forecourts and workshops
- Hospital/clinic ablutions/bathrooms

FEATURES & BENEFITS

- Extremely hard wearing
- Will not fracture like silica sands
- Translucent, maintains floor colour unless totally blinded in application
- Degree of non-slip dictated by quantity and particle size of aggregate selected

NOTE

The non-slip texture is for a given purpose and the coarser the finish the ease of cleaning diminishes.

APPLICATION

NOTE:

In all processes cleanliness of the operation is important so as not to have dirt tracked or blemishes in the finish. All finishes are to be agreed by the client by means of a sample for acceptance of degree of texture before the main application commences.

TYPICAL PHYSICAL PROPERTIES	
Hardness (MOH scale)	9
Relative density	3.95

OPTION 1: COARSE FINISHES 0.5 TO 1 MM (35 TO 18 MESH)

FRACTION SIZE

To the finished epoxy/polyurethane surface, within the respective products window period, apply a coat of product at approximately 5 m² per litre. While the resin is still wet totally blind the surface with the dry aggregate at an approximate rate of 2 kgs/m² and allow to cure. Once cured sweep off the excess material, brush the surface with stiff broom to remove all loose particles and vacuum. This is followed by two coats of clear or colored resin, allowed to cure between coats. The more coats of resin applied the smoother the surface will become.

OPTION 2: FINER FINISHES 0.100 TO 0.200 MM (150 TO 70 MESH)

FRACTION SIZE

To the finished epoxy/polyurethane surface within the respective products window period, apply a coat of resin, colored or clear at approximately 5 m² per litre. While the resin is still wet evenly broadcast the dry aggregate onto the surface at an approximate rate of 30 to 100 grams/m² followed by rolling the wet surface with a short knap roller to assist in dispersing the aggregate evenly and allow to cure. The finer aggregate and quantity applied provides a finer texture.

CLEANING SMALL TOOLS

Use Berger super brush cleaner to remove uncured resins. Cured resins will have to be removed by mechanical means.

PACKAGING

Aluminium oxide is supplied in 5 kg packs.

HANDLING & STORAGE

Indefinite, keep clean and dry.

HEALTH & SAFETY

Aluminium oxide is inert, non-flammable and non-toxic.

IMPORTANT NOTE

This data sheet is issued as a guide to the use of the product(s) concerned. Whilst Berger Construction Chemicals endeavors to ensure that any advice, recommendation, specification or information is accurate and correct, the company cannot - because Berger has no direct or continuous control over where and how Berger products are applied - accept any liability either directly or indirectly arising from the use of Berger products, whether or not in accordance with any advice, specification, recommendation, or information given by the company.

FURTHER INFORMATION

Where other products are to be used in conjunction with this material, the relevant technical data sheets should be consulted to determine total requirements. Berger Construction Chemicals has a wealth of technical and practical experience built up over years in the company's pursuit of excellence in building and construction technology.

INSTRUCTIONS FOR LAYING

Bercemfloor cementitious levelling screeds

These instructions should be read together with the relevant product data sheets and safety data sheets.

INTRODUCTION

These screeds are all cement-based and protein-free levelling screeds which are laid by hand, (but for larger areas Berceam may be laid by pump). They are always laid with bonded All will require a suitable floor finish, such as carpet, vinyl, tiles or similar.

There are no British Standards specifically covering the use of this type of screed, but reference may be made to:

BS8204: Part 1:1987 'Code of Practice for Concrete and Screed Bases to receive Resilient Flooring'

BS8000: Part 9:1986 'Workmanship on Building Sites, Screeds

PRODUCTS

BERCEAM FLOOR

4 to 12mm screed. Fast drying, ideal for hand application work or can be pumped in larger areas (pumped thickness 12mm).

BERCEAM FLOOR PRIMER

A high performance acrylic primer. Generally this will be the specified primer for these screeds.

SITE INSPECTION

Before screeding the building must be weatherproof with doors and windows fitted (or covered) so there is no possibility of rainwater ingress or excessive draughts. The site should be visited and the floor should be surveyed to establish that the base is suitable to receive the specified primers and screeds. All gaps must be sealed to prevent primer or screed from dripping through to floors below or running out at edges. Where applicable the base must have an effective damp proof membrane. Note that damp concrete bases (e.g. with residual construction moisture) can result in considerably extended drying times for a screed laid over that base. Consideration should therefore be given to the need for a dpm over the base. The designer and main contractor are responsible for determining the need for a dpm. The moisture content of the base measured by hair hygrometer to BS8203 1996, must not exceed 90% RH. Where moisture sensitive floorings and adhesives are to be laid shortly after the Ber Screed SLC Screed, then the moisture content of the base must not exceed 75% RH. Non-cementitious bases may be suitable. Consult Berger's Technical Department for advice on suitability and choice of correct primer.

LEVELS

The levels of the base must enable the screed to be laid within the maximum and minimum depth range of the product. It is also important to record any areas of the base that are high or low, as a significant increase in material consumption may result if the average screed thickness exceeds the specified nominal thickness. Finished screed levels can be flat rather than truly level, or can tend to follow existing base levels rather than be constant. Such screeds can be within the specified level deviations and can be all that the client requires. This should be discussed with the client as it can often result in considerable saving in material, and hence cost.

Surface Regularity to SR2 of BS8204: Part1:1987 should be readily achieved. Superflat floors (as TR34) will be very difficult to achieve.

BASE PREPARATION

HIGH DEGREE OF BOND:

For heavily trafficked areas:

(Category A to BS 8204)

Remove laitence and surface contamination by shot blasting or mechanical scabbling to cleanly expose the main aggregate. (For precast bases, scabbling is not usually permitted. A satisfactory bond can be achieved to un-prepared precast concrete planks provided they have no laitence, they have a brushed texture finish and they are not contaminated with mud, plaster or any other dirt which might impair the bond). Remove dust and debris by vacuum immediately prior to screeding.

LESSER DEGREE OF BOND:

For lightly trafficked areas:

(Category B to BS 8204)

A satisfactory bond can be achieved to un-prepared concrete provided there is little laitence and the base is not contaminated with mud, plaster or any other dirt which might impair the bond. Any areas with laitence or other contamination will require mechanical preparation by shotblaster, scabbler or planer. Remove dust and debris by vacuum immediately prior to screeding.

OLD FLOORING ADHESIVES:

Existing floors (concrete or screed) that have had a previous floor finish removed, must be planed or otherwise prepared to remove all old adhesives and levelling compounds.

TILED BASES:

Ceramic tiles, quarry tiles, terrazzo and similar must first be checked for soundness and any loose or damaged tiles removed.

(For larger applications two bags may be mixed at one time in a dustbin or similar drum, but note that the mixed material weight will be around 60 kg).

Access to the screed should be restricted for at least 12 (preferably 24) hours to prevent damage to the screed surface. Thereafter light foot traffic should be possible.

Sound tiles are then to be cleaned with a grinder or floor sanding machine and vacuum cleaned. A bond adequate for Category B screed use can be achieved heavily trafficked areas Ber Screed Berceam Floor primer may be used.

EPOXY RESIN PRIMERS:

Bases that are to be primed with epoxy or polyurethane primers must first be mechanically prepared by shotblasting.

PRIMING

Priming improves the adhesion of the screed to the base, prevents the formation of air bubbles in the screed and improves the flow and self-levelling of the screed by stopping water from the screed soaking into the base.

On porous bases such as concrete or screed use Ber Screed Berceam Floor Primer diluted at 1 part primer to 5 parts clean potable water. Brush the primer out over the floor with a soft broom. Avoid ponding of the primer, any pools to be brushed out. Repeat the priming on very porous surfaces such as lightweight concrete or old, dry screeds. On non-porous bases, such as tiles or terrazzo, the dilution of primer should be 1 part primer to 3 parts water. Allow the primer to dry before applying the screed compound. Under reasonable drying conditions on a concrete or screed base, the primer may take 2 - 3 hours to dry.

PRIMING WITH EPOXY AND POLYURETHANE PRIMERS

Berceam Floor Epoxy Primer or any other epoxy or polyurethane primer see the relevant product data sheet for detailed installation instructions.

Often the specification will require the resin primer to be broadcast to full cover with Berger silica sand No.1 while the resin is still wet. Just prior to screeding, any excess sand is to be swept off and the base vacuum cleaned.

BATCHING AND MIXING - HAND APPLICATION

Mix one bag of the material with the appropriate amount of water (see table) with a heavy duty electric drill and a helical mixer or plaster mixer, in a large bucket or tub. Mix thoroughly for at least 2 minutes to give a uniform smooth creamy material. (For larger applications two bags may be mixed at one time in a dustbin or similar drum, but note that the mixed material weight will be around 60 kg). Always put the water into the mixing tub before the powder. The volume of water can be gauged by measuring jug. With the a Berceam Floor some flow tests should be carried out to check that the flow of the material is within the recommended values.

Do not mix more material than can be applied within 10 minutes.

LAYING AND FINISHING - HAND APPLICATION

Pour the material onto the floor against the wet edge of previously laid material. The width of a bay being screeded should be limited to about 6 metres with a temporary stop edge (of timber or self-adhesive foam strip).

Finish the screed with a steel trowel but do not over-trowel as this can bring bleed water to the surface. A spiked roller may also be used if preferred. If a second layer is to be laid to build up the thickness re-prime the surface of the first layer (typically on the day after laying the first layer) and allow primer to dry before laying the second layer.

TABLE OF FLOW RATES AND WATER CONTENTS

Material	Flow rate (mm)	Approx. water per 24 kg
Berceam Floor	230-250	4,5-5 litre

AFTER SCREEDING

It may be found necessary to use a sanding machine (or hand stone) on the surface of the completed and hardened screed to remove any surface defects such as drip marks and to smooth across the line of temporary joints at bay edges and doorways. Sanding is most easily done just one day after screeding before the material has gained its full strength but may be left longer.

CURING

The area to be screeded must be weather-tight (i.e. all roofs, windows and doors are covered). The screed should be protected from draughts and strong sunlight during and for 24 hours after the screed is laid.

TRAFFICKING

Access to the screed should be restricted for at least 12 (preferably 24) hours to prevent damage to the screed surface. Thereafter light foot traffic should be possible. Normal site traffic and erection of partitions on the screed is permitted after the screed has hardened typically 24 to 48 hours. These times may be extended in cold weather.

PROTECTION

These Berceam Floor screeds are not intended to be a wearing surface, and must therefore be protected by suitable sheet material in areas where it may be subjected to intensive or heavy use before the final floor finish is laid. The responsibility for this protection should be made that of the main contractors. The screeds are quick drying and once dried are suitable to receive floor finishes directly. Consideration should be given to programming their application later in the contract period to minimize the construction traffic they carry.

DRYING

Screed drying time is typically 1 day to 1 week depending on which material is used and on thickness, in warm and well ventilated drying conditions. A screed that is wetted (by rain or leaks) will have a considerably extended drying time. Completed screeds should be kept dry and any accidental spillage cleared immediately.

FLOOR FINISHES

It is the responsibility of the main contractor to check the moisture content or relative humidity of the base before floor finishes are laid. The screed and base should be checked to establish that it meets the requirements of the flooring material. The British Standard for testing a base to receive a resilient floor covering is to use a hair hygrometer to the method defined in BS8203:1996. For correct results, the BS8203 method must be strictly adhered to including the use of a correctly sized and insulated box sealed to the floor a sufficiently long test for equilibrium to be reached and the use (where appropriate) of an impervious sheet around the instrument.

GROUTING OF BASES

Cementitious grouting of bearing plates, steel columns, precast wall panels, beams, columns and machine bases

SUGGESTIONS ON PREPARATION

Prepare surface to receive the grout. Remove dirt, oil, grease and unsound concrete. Saturate surface with water for 24 hours. Set bearing plate or steel column over anchor bolts, plumb and adjust nuts and shims to required elevation. Precast concrete columns are generally moved into position and aligned immediately after the bolt holes have been filled with grout, but before the grout stiffens. Forms as required to receive grout and to facilitate placement. Caulk the form to prevent leakage and loss of bearing. Forms should be saturated at the time grout is placed or made non-absorbent by coating with oil or other suitable sealer. Whenever possible holes should be grouted first to prevent water from being trapped in them and rising after grouting is completed to form voids under the item being supported. In cases where bond is not required concrete surfaces may be coated with a resin base-curing compound to prevent absorption of the water from the grout by the concrete.

SHUTTERING

The method of shuttering should be compatible with the method of placing the grout. Both should facilitate rapid continuous and complete filling of the space to be grouted. Use methods that will enable the grout to flow by gravity between the surfaces from one side to the other and keep the plastic grout in full contact with these surfaces until the grout has hardened. Always ensure that the 'head' of the shutter on one side is sufficient to allow the grout to flow over the entire distance required.

TEMPERATURE CONTROL

Temperature affects setting time of the grout and the rate of increase in strength. A temperature of 21 °C for the structural member foundation and grout is desired for normal grouting procedures. A high temperature reduces setting time and requires more rapid placement of the grout. Low temperature delays set and can cause bleeding that will result in loss of bearing. For successful grouting, do what is necessary to maintain a temperature of 16 °C - 24 °C of both the grout and all the concrete and steel in contact with the grout in place prior to during and for at least 48 hours after grouting. Grout temperatures below 16 °C are not recommended because setting and strength gain will be retarded and bleeding might occur.

PREDETERMINING 'WORKING TIME' OF THE GROUT

For large jobs or where difficult placing is involved it is helpful to know the approximate time available for placing and working the grout. Factors affecting working time are the consistency, temperature of the grout and the size and volume of the area to be grouted. Prepare a small non-absorbent shutter that will hold grout of the proposed thickness. Seal the joints between the shutter and surfaces of the prepared foundation or structural member. If the 'working time' is short in relation to the time expected take steps necessary to speed up the mixing and placing of the grout.

Consider lowering the temperature of the grout to delay the stiffening while maintaining agitation of the grout in place by slow continuous strapping until the area to be grouted is filled. If free water bleeds to the surface before stiffening, reduce the amount of mixing water and/or raise the temperature of the grout structural member and foundation. Do not use grout at a consistency or under job or climatic conditions which results in grout bleeding free water. Never retemper grout discard the batch and mix a new batch.

MIXING THE GROUT

For producing a grout of a given consistency paddle-type mortar mixers or revolving drum concrete mixers can be used. Do not mix by hand. Use one or mixers of size and capacity that permits mixing and placing operations to proceed simultaneously and without interruption in either operation. Mix the grout as close as possible to the structure being grouted. Have sufficient material, manpower and equipment to make the placement rapid and continuous.

Measure the required water accurately so each batch has the same consistency. To avoid lumping, especially when using drum mixers, add all the water to the mixer then add the grout, sifting it slowly into the mixer while the blades or drum revolves. Do not let large quantities of material drop in at one time as balling will result. Mix the grout for 3 minutes after all the material is added and place the grout immediately. Do not mix more grout at one time than can be placed in approximately 10 minutes and never retemper by adding water and remixing the grout. Continuous agitation will extend the fluid life of the grout but do not use any grout that has thickened severely due to delay in placing. Where grout must travel over 1.5 meters horizontally or for special shuttering and placing suggestions, contact your local Berger branch.

SUGGESTIONS ON PLACING GROUT

Saturate prepared surface for 24 hours then remove free water from surface and bolt-holes. Grout bolt-holes first if possible. Place grout rapidly, continuously and in a manner that assures filling the space being grouted. Work the grout if necessary to help it flow beneath the plate. Vibration from nearby machines can be transmitted into the foundation of the structure being grouted. Consider shutting down such machines until after the grout takes its final set. Vibration can cause bleeding and settlement and can affect setting time and early strength gain. Vibration can be detected by observing any disturbances of the surface water in a shallow pan set on the structure to be grouted. Place the grout quickly and continuously to avoid the undesirable effects of overworking which may cause segregation bleeding and change in the final set. Do not use vibrators in the grout at any time. See the individual product data sheets for specific details like strength, yield, water content and application thicknesses. Some grouts state that they can be placed at thicknesses of 25mm. Beware: do not attempt these thicknesses where large areas are concerned for difficulty of achieving easy material flow over longer distances. It is recommended that a minimum of 50mm vertical gap be provided in these circumstances. The grout 'head' must be sufficient to achieve the desired flow distance and complete filling of the void intended. For additional information consult your local Berger branch for suggestions.

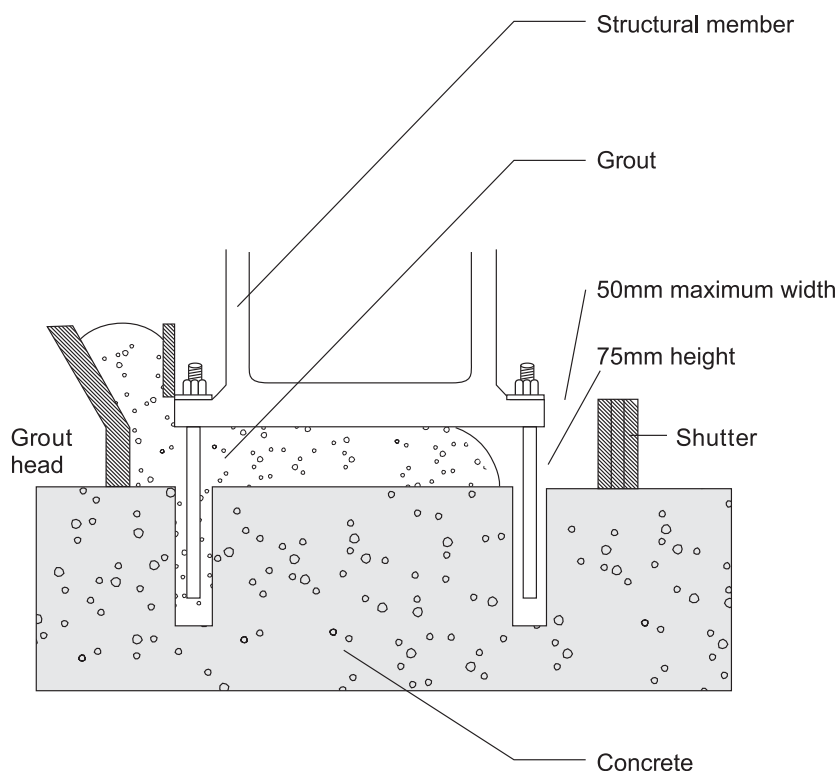
CURING, FINISHING OR TRIMMING OF GROUT SHOULDERS

Grouts must be fully wet cured. Grout shoulders may be finished and left in place. If desired grout shoulders may be cut or trimmed flush or at an angle at the proper time.

Timing of both immediate curing (ponding) and long-term curing (membrane) is very important.

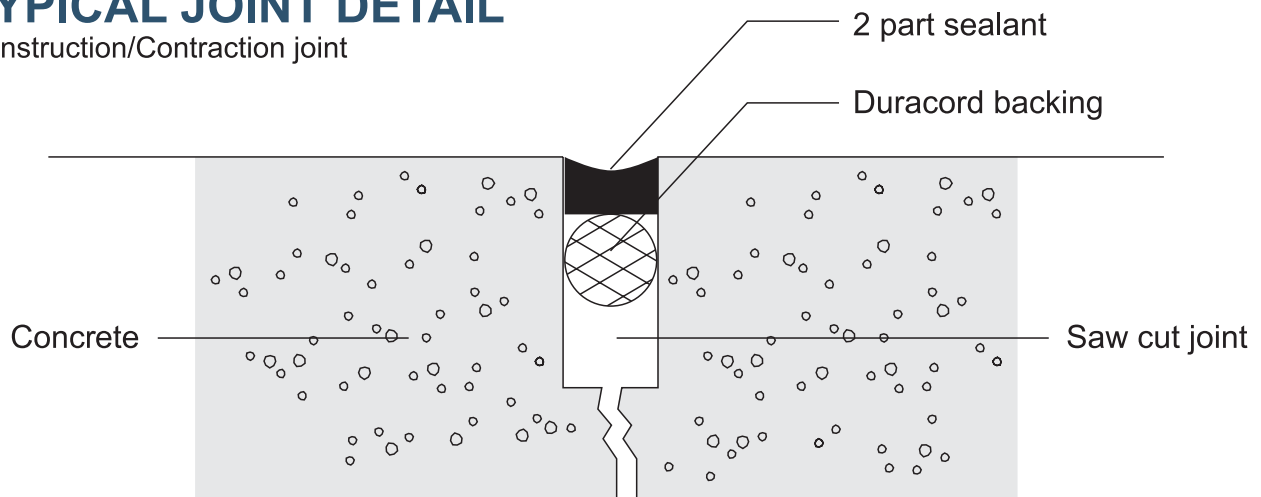
When trimming shoulders never remove shutters or cut grout below the level of the underside of the grouted structure until the grout has hardened sufficiently that it cannot be penetrated by a masons (pointed) trowel. Removing shutters or cutting grout too early can result in 'sagging' of the unhardened grout causing loss of bearing between the grout and structural member.

Immediate prevention of rapid water loss from the grout is necessary and should be accomplished by carefully pouring water (ponding) over the exposed grout in shutters as soon as the grout thickens and turns dull (about 20 minutes). Under exposure to sun low humidity or at above normal temperatures ponding water should be replenished as necessary until the grout is to be finished or trimmed. Grout shoulders should never exceed 50 mm beyond the member horizontally. After the grout has been ponded for several hours, remove the ponding water as well as the spilled or excess grout from the structural member and shutters and at the appropriate time finish the edges. As soon as the grout will not be marred apply the recommended curing membrane to the exposed surfaces of the grout for long-term curing.

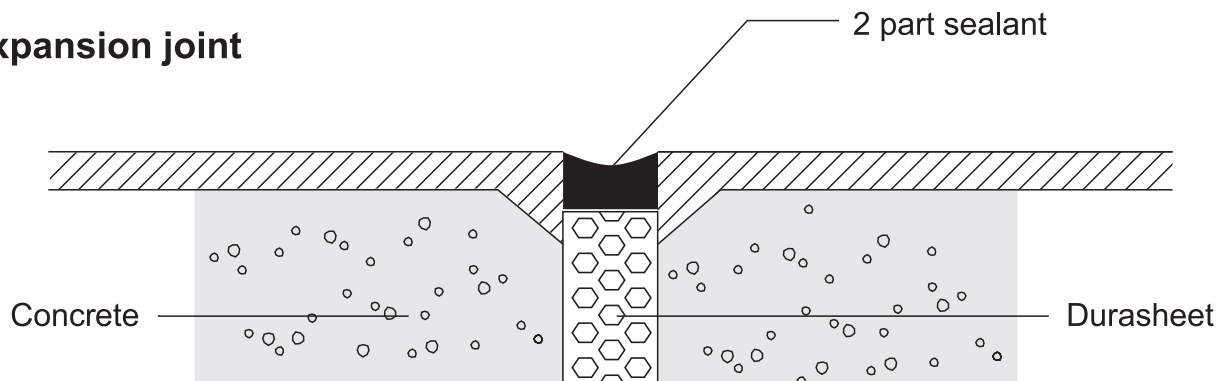


TYPICAL JOINT DETAIL

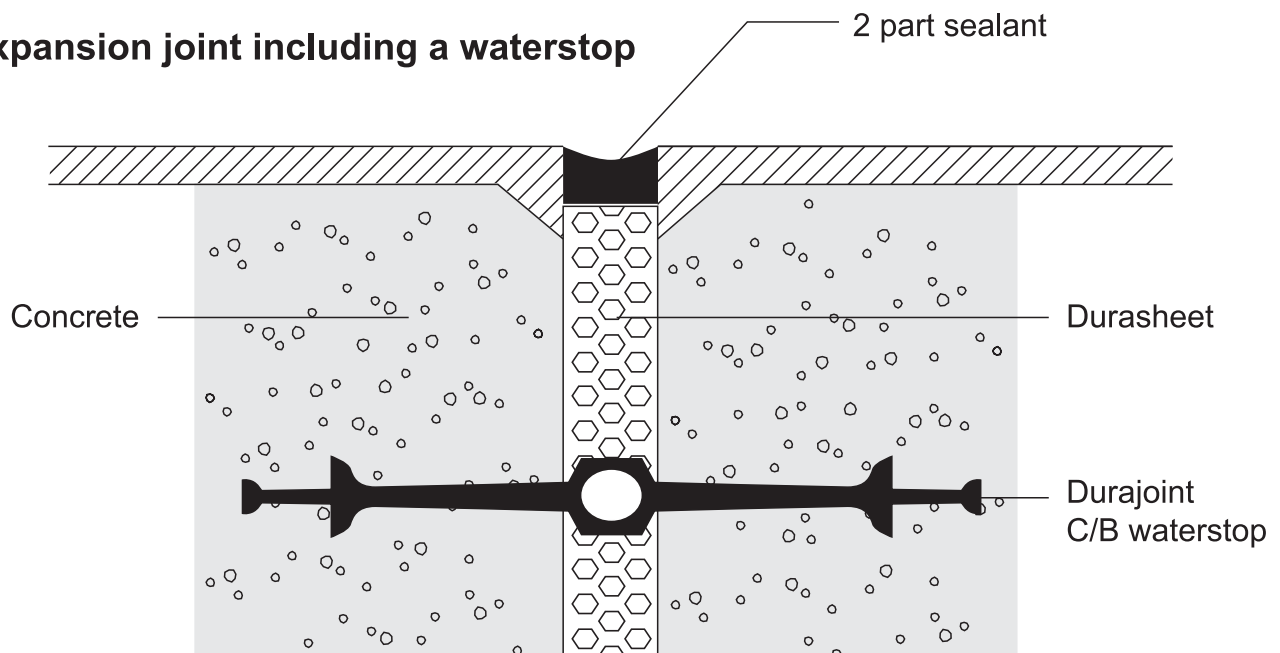
Construction/Contraction joint



Expansion joint



Expansion joint including a waterstop



PREPARATION OF SURFACES

For any compound to adhere properly to a substrate the surface needs to be correctly prepared. Such a preparation must produce a surface that is Clean and Sound and unless a moisture compatible product is being used, the surface must also be Dry prior to the compound being applied. To define these terms:

CLEAN:

Means that a surface must be free of all foreign matter e.g. oil, grease, wax, old paint, dust, debris, shutter release, curing membrane and any other contaminant originating from outside the surface.

SOUND:

Means that a surface must be free of all unsound matter originating from the surface itself e.g. millscale, rust, laitance, loose particles, white rust, oxide layers.

DRY:

Means that a surface must be:

- Free of ponding and surface moisture.
- Free of moisture rising through capillaries in the surface.
- At equilibrium with the atmosphere (applicable to porous surfaces such as concrete, plaster and wood) at a surface temperature at least three degrees above the dew point.

CLEAN

To free a surface of foreign matter it may be depending on the type of surface and nature of contaminant:

- Washed with detergent followed by thorough water washing to remove residues.
- Washed with a surfactant treated solvent such as Berger super brush cleaner, followed by thorough water washing to remove all surfactant residues.
- Stubborn oil and grease deposits, as on a floor, can often be successfully removed by saturating sawdust with the solvent, applying it to the area involved and leaving it to absorb the contaminant; cleaned with a paint remover - do not use a wax-based remover as this causes further problems; steam cleaned; or vapor degreased - a typical system being Trichlorethylene.

If none of the foregoing remove the contamination, it will be necessary to do this mechanically by means of:

- Wet or dry abrasive blasting - waterblasting
- Grinding
- Scabbling or chipping

Dust and debris should preferably be removed by vacuum cleaning rather than by sweeping or compressed air blowing which tend to redistribute contaminants rather than remove them. Fungus contamination must be completely removed. Scrub thoroughly with detergent and water - bleach any residual staining with a proprietary hypochlorite bleach - wash under running water - finally wash with a fungicidal solution e.g. 10% Dettol. Allow to dry.

SOUND

To free a surface of unsound matter originating from the surface itself, it is usual to use mechanical means. These include:

- Abrasive blasting (grit or shot) through an oil free air pressure system or centrifugal wheel.
- Air pressure blasting may be carried out with a water wetted medium to obviate dust hazards. To prevent re-rusting of metal substrates, an inhibitor, which must be compatible with the surface treatment to be applied, is added to the blasting medium.
- Water blasting, with the same re-rusting precaution as above.
- Hand abrasion: Emery abrasion may be used on metals such as aluminium, and on glass, fibreglass laminates and for rubbing down filled areas prior to coating. Hand wire-brushing can be used to remove loose rust. It will not remove tight millscale from steel since it tends to burnish the surface.
- Needle descaling: This will remove rust millscale from steel.
- Power grinding: While satisfactory on concrete, it may tend to burnish when used on steel.
- Scrubbing with surfactant treated solvent made into a paste with the addition of a proprietary abrasive detergent. This when applied with an abrasive pad, is used to remove white rust and white rust preventative oils from galvanized surfaces.
- Scabbling and chipping: These will not only remove laitance from concrete but will also produce exposed aggregate to improve bond of flooring systems and adhesives to the concrete.
- Avoid etching: This is used to free concrete of laitance and is detailed under Concrete (see overleaf).

All mechanical methods on metals must be preceded by solvent degreasing. If no anchor pattern is produced cleaning should be followed by further solvent washing to remove debris.

Where an anchor pattern is produced, as in abrasive blasting the surface must be blown off with oil-free, dry compressed air or vacuum cleaned.

DRY

Unless a water based compound or a moisture tolerant epoxy is to be used, surfaces must be completely dry before the compound is applied.

Since porous surfaces may be apparently dry but still contain too much moisture to allow a successful application it is essential to test for moisture. This may be done by using:

- A suitable moisture meter with facilities not only to measure moisture at the surface but also to probe into the body of the substrate.
- The 'plastic sheet' test. This test is performed on large flat areas by laying sheets of impervious plastic about one metre square in tight contact with the substrate. Do this in the late afternoon. First thing the following morning lift the sheets and examine:
 - The underside of the sheet for condensation;
 - The color of the test area in comparison to an adjacent area.

Freedom from condensate and freedom from color change denote a 'dry' surface. On very large areas, such as walls and floors, run one test per 50m of area. On non-porous surfaces, such as metals, moisture problems may be experienced if the substrate is at, or around, the dew point. The dew point is that temperature at which moisture from the atmosphere will condense. Such moisture can cause freshly cleaned metal to rust or it can be entrapped as a thin, often invisible film, between successive applications.

The dew point temperature is read off from psychometric tables or charts using an input of wet and dry bulb thermometer readings. The temperature of the surface is taken using a contact thermometer and if such temperature is within 3 °C of the established dew point application of compound must not be proceeded.

SOME NOTES ON PREPARATION OF SPECIFIC SURFACES

(It is assumed that the surface has been freed of any prior treatment)

ALUMINIUM: Must be degreased, abraded, solvent re-washed and treated immediately.

FIBRE CEMENT: Must be freed of all surface dust.

BRICK: Must be free of all dust and loose particles.

CONCRETE: Must be freed of all laitance, loose particles, fractured aggregate on surface, shutter release oil and curing membranes. If holes in concrete have been wet- drilled they must be freed of all residues of slurry. Concrete to be coated is best treated by means of water blasting or wet abrasive blasting. Concrete floors requiring resin treatment must be clean and sound. This is best achieved by scabbling, grinding or wet blasting. As a last resort, acid etching may be used.

This is carried out by:

1. Dilute commercial concentrated hydrochloric acid (38%) with 2 volumes clean water (approximately 13% strength etch). N.B. Always Add Acid To Water.
2. Flood the concrete with clean water. Squeegee off excess.
3. Apply the 13% solution at a rate of 2 m² per litre.
4. Spread evenly over the surface and leave to react.
5. When effervescence ceases hose off residues, broom with a stiff broom to loosen attached material.
6. Wire brush the still wet surface to ensure all unsound material is loosened.
7. Rewash to remove residues.
8. If texture is not adequate repeat acid etching procedure.
9. After completion allow floor to dry. Wire brush to remove weak material. Vacuum to remove all debris.
10. After cleaning ensure that floor is not re-contaminated before epoxy application.
11. Dryness of concrete must be proved by plastic sheet test.

To prove concrete to be dust free, it may be wiped with a piece of black velvet. Velvet should remain black.

CERAMIC (UNGLAZED): The surface must be free of contamination and should be dry.

COPPER: Degrease, water wash, alcohol rinse; the surface may also be mechanically abraded to roughen.

GLASSFIBRE: Solvent

LAMINATES: Degrease

WITH EPOXY BINDER: Mechanically roughen, solvent wash.

LAMINATED: Degrease

WITH POLY- ESTER BINDER: Abrade deeply enough to expose fibre reinforcing, solvent wash.

PLASTER: Abrade to remove all loose material followed by removal of all debris. If bonding to plaster remember that it has very poor cohesive strength.

PLASTICS (POLYSTYRENE): Ensure cleanliness

PLASTICS (POLYETHYLENE P.V.C.): Are not suitable candidates.

PLASTICS/ PERSPEX: Degrease, abrade, solvent wash.

PREMIXED ASPHALT: Free of all dust and debris. Ensure that volatiles (solvent or water) have left the premix film.

PUTTY/PLASTER: Abrade well to remove loose material and dust. Do not bond or coat with high performance coatings. Coat only with bitumen or acrylic/PVA coatings.

RUBBER AND NEOPRENE: Degrease, abrade, rewash with solvent.

STEEL: Degrease and abrasive blast. Treat before steel starts to rust. Any lower standard of treatment will produce correspondingly lowered performance of the treatment.

STAINLESS STEELS: Are not suitable candidates.

STONE: Must be free of contamination.

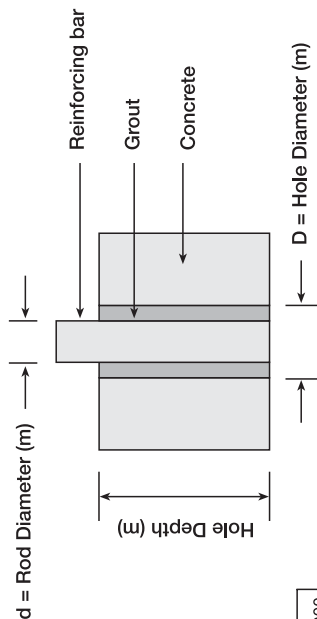
TIMBER: Oily timber such as teak must be acetone washed to free the surface of oil. For coating, timber should be as smooth as possible. For bonding, timber should be roughened by coarse abrasives or by rasping.

FACTORS TO CALCULATE VOLUMES

(=Litres) (Hole depth must be in metres)

Rod and hole diameter (mm)

	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
10	0.0000																				
11	0.0165	0.0000																			
12	0.0346	0.0181	0.0000																		
13	0.0542	0.0377	0.0196	0.0000																	
14	0.0754	0.0589	0.0408	0.0212	0.0000																
15	0.0982	0.0817	0.0636	0.0440	0.0228	0.0000															
16	0.1225	0.1060	0.0880	0.0683	0.0471	0.0243	0.0000														
17	0.1484	0.1319	0.1139	0.0942	0.0730	0.0503	0.0259	0.0000													
18	0.1759	0.1594	0.1414	0.1217	0.1005	0.0778	0.0534	0.0275	0.0000												
19	0.2050	0.1885	0.1704	0.1508	0.1296	0.1068	0.0825	0.0565	0.0291	0.0000											
20	0.2356	0.2191	0.2011	0.1814	0.1602	0.1374	0.1131	0.0872	0.0597	0.0306	0.0000										
21	0.2678	0.2513	0.2333	0.2136	0.1924	0.1696	0.1453	0.1194	0.0919	0.0628	0.0322	0.0000									
22	0.3016	0.2851	0.2670	0.2474	0.2262	0.2034	0.1791	0.1532	0.1257	0.0966	0.0660	0.0338	0.0000								
23	0.3369	0.3204	0.3024	0.2827	0.2615	0.2388	0.2144	0.1885	0.1610	0.1319	0.1013	0.0691	0.0369	0.0000							
24	0.3738	0.3574	0.3393	0.3197	0.2985	0.2757	0.2513	0.2254	0.1979	0.1689	0.1382	0.1060	0.0723	0.0369	0.0000						
25	0.4123	0.3958	0.3778	0.3581	0.3369	0.3142	0.2898	0.2639	0.2364	0.2073	0.1767	0.1445	0.1107	0.0754	0.0385	0.0000					
26	0.4524	0.4359	0.4178	0.3982	0.3770	0.3542	0.3299	0.3039	0.2765	0.2474	0.2168	0.1846	0.1508	0.1155	0.0785	0.0401	0.0000				
27	0.4940	0.4775	0.4595	0.4398	0.4186	0.3958	0.3715	0.3456	0.3181	0.2890	0.2584	0.2262	0.1924	0.1571	0.1202	0.0817	0.0416	0.0000			
28	0.5372	0.5207	0.5027	0.4830	0.4618	0.4390	0.4147	0.3888	0.3613	0.3322	0.3016	0.2694	0.2356	0.2003	0.1634	0.1249	0.0848	0.0432	0.0000		
29	0.5820	0.5655	0.5474	0.5278	0.5066	0.4838	0.4595	0.4335	0.4061	0.3770	0.3464	0.3142	0.2804	0.2450	0.2081	0.1696	0.1296	0.0880	0.0448	0.0000	
30	0.6283	0.6118	0.5983	0.5741	0.5529	0.5301	0.5058	0.4799	0.4524	0.4233	0.3927	0.3605	0.3267	0.2914	0.2545	0.2160	0.1759	0.1343	0.0911	0.0463	0.0000

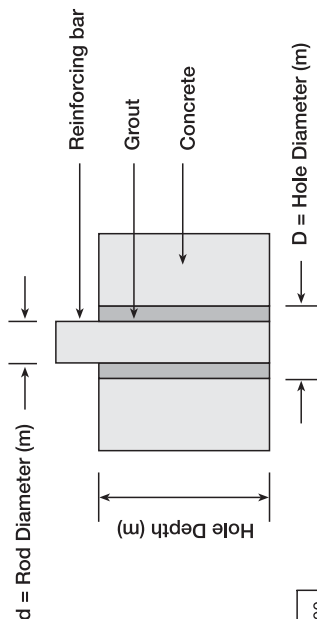


FACTORS TO CALCULATE VOLUMES

(=Litres) (Hole depth must be in metres)

Rod and hole diameter (mm)

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
31	0.0000																				
32	0.0495	0.0000																			
33	0.1005	0.0511	0.0000																		
34	0.1532	0.1037	0.0526	0.0000																	
35	0.2073	0.1579	0.1068	0.0542	0.0000																
36	0.2631	0.2136	0.1626	0.110	0.0558	0.0000															
37	0.3204	0.2710	0.2199	0.1673	0.1131	0.0573	0.0000														
38	0.3793	0.3299	0.2788	0.2262	0.1720	0.1162	0.0589	0.0000													
39	0.4398	0.3903	0.3393	0.2867	0.2325	0.1767	0.1194	0.0605	0.0000												
40	0.5019	0.4524	0.4013	0.3487	0.2945	0.2388	0.1814	0.1225	0.0620	0.0000											
41	0.5655	0.5160	0.4650	0.4123	0.3581	0.3024	0.2450	0.1861	0.1257	0.0636	0.0000										
42	0.6307	0.5812	0.5301	0.4775	0.4233	0.3676	0.3102	0.2413	0.1909	0.1288	0.0652	0.0000									
43	0.6974	0.6480	0.5969	0.5443	0.4901	0.4343	0.3770	0.3181	0.2576	0.1956	0.1319	0.0668	0.0000								
44	0.7658	0.7163	0.6652	0.6126	0.5584	0.5027	0.4453	0.3864	0.3259	0.2639	0.2003	0.1351	0.0683	0.0000							
45	0.8357	0.7862	0.7351	0.6825	0.6283	0.5726	0.5152	0.4563	0.3958	0.3338	0.2702	0.2050	0.1382	0.0699	0.0000						
46	0.9071	0.8577	0.8066	0.7540	0.6998	0.6440	0.5867	0.5278	0.4673	0.4053	0.3416	0.2765	0.2097	0.1414	0.0715	0.0000					
47	0.9802	0.9307	0.8796	0.8270	0.7728	0.7171	0.6597	0.6008	0.5404	0.4783	0.4147	0.3495	0.2827	0.2144	0.1445	0.0730	0.0000				
48	1.0548	1.0053	0.9543	0.9016	0.8474	0.7917	0.7343	0.6754	0.6150	0.5529	0.4893	0.4241	0.3574	0.2890	0.2191	0.1477	0.0746	0.0000			
49	1.1310	1.0815	1.0304	0.9778	0.9236	0.8679	0.8105	0.7516	0.6912	0.6291	0.5655	0.5003	0.4335	0.3652	0.2953	0.2238	0.1508	0.0762	0.0000		
50	1.2087	1.1592	1.1082	1.0556	1.0014	0.9456	0.8883	0.8294	0.7689	0.7069	0.6432	0.5781	0.5113	0.4430	0.3731	0.3016	0.2286	0.1539	0.0778	0.0000	
51	1.2881	1.2386	1.1875	1.1349	1.0807	1.0249	0.9676	0.9087	0.8482	0.7862	0.7226	0.6574	0.5906	0.5223	0.4524	0.3809	0.3079	0.2333	0.1571	0.0793	0.0000

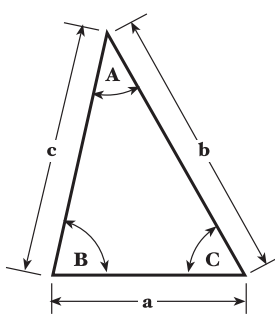


Factor X Hole Depth in Metres X No of Holes = Litres Reqd

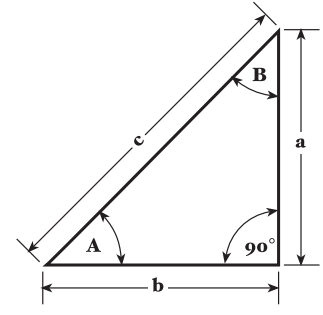
Volume (litres) = $\frac{1}{4} (D^2 - d^2) \times \text{Depth} \times 1000 \times \text{No. of Holes}$

TRIGONOMETRY TABLES

Oblique Triangle

to find	given	formula	OBLIQUE TRIANGLE			to find	given	formula
A	B, C	$180^\circ - (B + C)$				C	A, B	$180^\circ - (A + B)$
sin A	a, b, B	$\frac{a \sin B}{b}$				sin C	a, c, A	$\frac{c \sin A}{a}$
sin A	a, c, C	$\frac{a \sin C}{c}$				sin C	b, c, B	$\frac{c \sin B}{b}$
cos A	a, b, c	$\frac{b^2 + c^2 - a^2}{2bc}$				cos C	a, b, c	$\frac{a^2 + b^2 - c^2}{2ab}$
tan A	a, b, C	$\frac{a \sin C}{b - a \cos C}$				tan C	a, c, B	$\frac{c \sin B}{a - c \cos B}$
tan A	a, c, B	$\frac{a \sin B}{c - a \cos B}$				tan C	b, c, A	$\frac{c \sin A}{b - c \cos A}$
B	A, C	$180^\circ - (A + C)$				b	a, A, B	$\frac{a \sin B}{\sin A}$
sin B	a, b, A	$\frac{b \sin A}{a}$				b	a, c, B	$\sqrt{c^2 + a^2 - 2ac \cos B}$
sin B	b, c, C	$\frac{b \sin C}{c}$				b	c, B, C	$\frac{c \sin B}{\sin C}$
cos B	a, b, c	$\frac{a^2 + c^2 - b^2}{2ac}$				c	a, A, C	$\frac{a \sin C}{\sin A}$
tan B	a, b, C	$\frac{b \sin C}{a - b \cos C}$	to find	given	formula	c	a, b, C	$\sqrt{a^2 + b^2 - 2ab \cos C}$
tan B	b, c, A	$\frac{b \sin A}{c - b \cos A}$	a	b, c, A	$\sqrt{b^2 + c^2 - 2bc \cos A}$	c	b, B, C	$\frac{b \sin C}{\sin B}$
			a	b, A, B	$\frac{b \sin A}{\sin B}$			
			a	c, A, C	$\frac{c \sin A}{\sin C}$			

Right Angled Triangles

to find	given	formula	RIGHT ANGLED TRIANGLE			to find	given	formula
sin A	a, b	$\frac{a}{\sqrt{a^2 + b^2}}$				cos A	a, b	$\frac{b}{\sqrt{a^2 + b^2}}$
	a, c	$\frac{a}{c}$					a, c	$\frac{\sqrt{c^2 - a^2}}{c}$
	b, c	$\frac{\sqrt{c^2 - b^2}}{c}$					b, c	$\frac{b}{c}$
tan A	a, b	$\frac{a}{b}$				cot A	a, b	$\frac{b}{a}$
	a, c	$\frac{a}{\sqrt{c^2 - a^2}}$					a, c	$\frac{\sqrt{c^2 - a^2}}{a}$
	b, c	$\frac{\sqrt{c^2 - b^2}}{b}$					b, c	$\frac{b}{\sqrt{c^2 - b^2}}$
sec A	a, b	$\frac{\sqrt{a^2 + b^2}}{b}$				cos A	a, b	$\frac{b}{\sqrt{a^2 + b^2}}$
	a, c	$\frac{c}{\sqrt{c^2 - a^2}}$					a, c	$\frac{c}{a}$
	b, c	$\frac{c}{b}$					b, c	$\frac{c}{\sqrt{c^2 - b^2}}$
a	b, sin A	$\frac{b \sin A}{\sqrt{1 - \sin^2 A}}$	to find	given	formula	c	a, sin A	$\frac{a}{\sin A}$
	b, tan A	$b \tan A$	b	a, sin A	$\frac{a \sqrt{1 - \sin^2 A}}{\sin A}$		a, tan A	$\frac{a \sqrt{1 + \tan^2 A}}{\tan A}$
				a, tan A	$\frac{a}{\tan A}$			

Date of issue: 24 Oct, 2017

This Technical Data Sheet supersedes those previously issued.

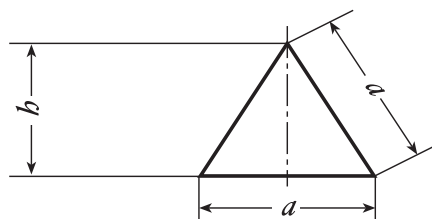
FORMULAE

(Equilateral Triangle, Pentagon, Hexagon, Octagon, Polygon)

$$A = \frac{a^2}{4} \sqrt{3}$$

$$b = \frac{a}{2} \sqrt{3}$$

Equilateral triangle



$$A = \frac{5}{8} r^2 \sqrt{10 + 2\sqrt{5}}$$

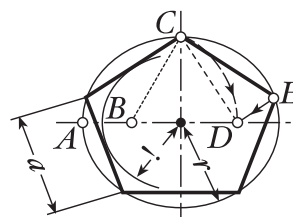
$$a = \frac{1}{2} r \sqrt{10 - 2\sqrt{5}}$$

$$! = \frac{1}{4} r \sqrt{6 + 2\sqrt{5}}$$

Construction:

$$\overline{AB} = 0.5 r, \quad \overline{BC} = \overline{BD}, \quad \overline{CD} = \overline{CE}$$

Pentagon



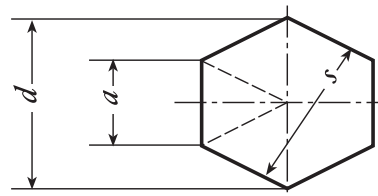
$$A = \frac{3}{2} a^2 \sqrt{3}$$

$$d = 2 a$$

$$= \frac{2}{\sqrt{3}} s = 1.155 s$$

$$s = \frac{\sqrt{3}}{2} d = 0.866 d$$

Hexagon



$$A = \frac{3}{2} a s = 0.83 s^2$$

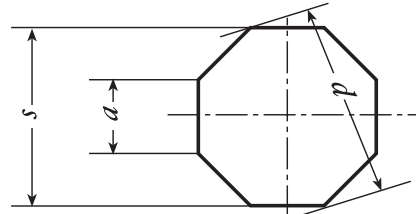
$$= \frac{2}{2 s} \sqrt{d^2 = s^2}$$

$$a = s \times \tan 22.5^\circ \approx 0.451 s$$

$$s = d \times \cos 22.5^\circ \approx 0.942 d$$

$$d = \frac{s}{\cos 22.5^\circ} \approx 1.083 s$$

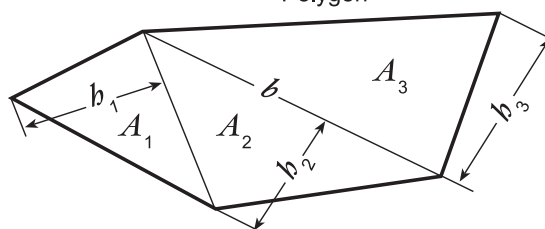
Octagon



$$A = A_1 + A_2 + A_3$$

$$= \frac{ab_1 + bb_2 + bb_3}{2}$$

Polygon



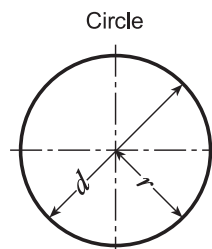
FORMULAE

(Circle, Annulus, Sector of a Circle, Segment of a Circle, Ellipse)

$$A = \frac{\pi}{4} d^2 = r^2$$

$$\approx 0.785 d^2$$

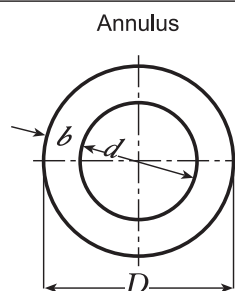
$$U = 2 r = d$$



$$A = \frac{\pi}{4} (D^2 - d^2)$$

$$= (d + b) b$$

$$b = \frac{D - d}{2}$$



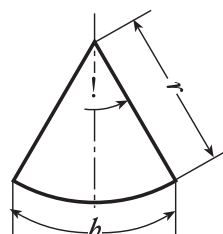
$$A = \frac{\pi}{360} r^2 \theta = \frac{\widehat{a}}{2} r^2$$

$$= \frac{b r}{2}$$

$$b = \frac{\pi}{180} r a$$

$$\widehat{a} = \frac{\pi}{180} a \quad (\widehat{a} = a \text{ in circular measure})$$

Sector of a Circle



$$s = 2 r \sin \frac{a}{2}$$

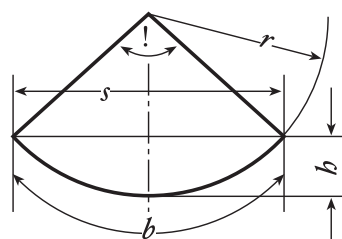
$$A = \frac{b}{6 s} (3 b^2 + 4 s^2) = \frac{r^2}{2} (\widehat{a} - \sin a)$$

$$r = \frac{b}{2} + \frac{3^2}{8 b}$$

$$b = r \left(1 - \cos \frac{a}{2} \right) = \frac{s}{2} \tan \frac{a}{4}$$

$$\widehat{a} = \frac{\pi}{180} a \quad (\widehat{a} = a \text{ in circular measure})$$

Segment of a Circle

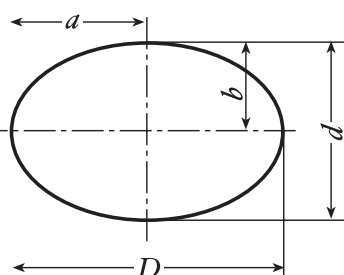


$$A = \frac{\pi}{2} D d = a b$$

$$U \approx \frac{D + d}{2} d^2 \cdot 0.785$$

$$= (a + b) \left[1 + \frac{1}{4} \#^2 + \frac{1}{64} \#^4 + \frac{1}{256} \#^6 + \frac{25}{16384} \#^8 + \dots \right], \text{ where } \# = \frac{a - b}{a + b}$$

Ellipse



FORMULAE

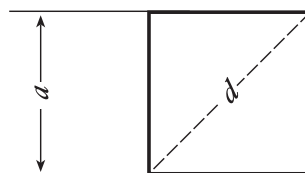
(Square, Rectangle, Parallelogram, Trapezium, Triangle)

Square

$$A = a^2$$

$$c = \sqrt{A}$$

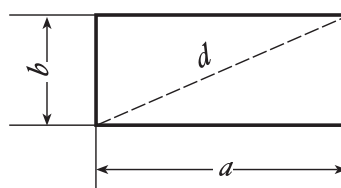
$$d = a\sqrt{2}$$



Rectangle

$$A = a b$$

$$d = \sqrt{a^2 + b^2}$$

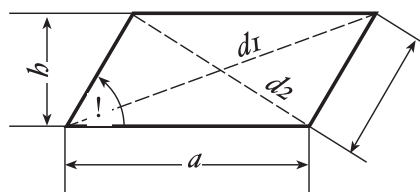


Parallelogram

$$A = a b \sin \alpha$$

$$d_1 = \sqrt{(a + b \cot \alpha)^2 + b^2}$$

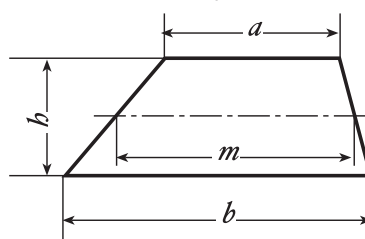
$$d_2 = \sqrt{(a - b \cot \alpha)^2 + b^2}$$



Trapezium

$$A = \frac{a + b}{2} h = m h$$

$$m = \frac{a + b}{2}$$

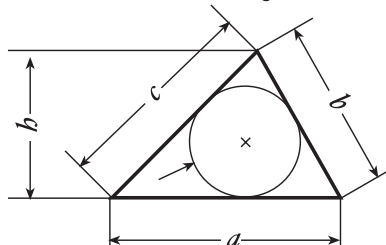


Triangle

$$A = \frac{a b}{2} \sin \gamma = s r$$

$$= \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{a + b + c}{2}$$



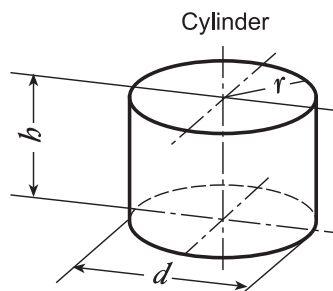
FORMULAE

(Cylinder, Hollow Cylinder, Cone, Frustum of Cone, Sphere)

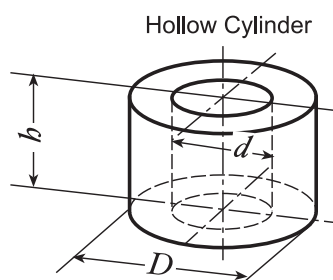
$$V = \frac{\pi}{4} d^2 b$$

$$A_m = 2 \pi r b$$

$$A_0 = 2 \pi r (r + b)$$



$$V = \frac{\pi}{4} b (D^2 - d^2)$$



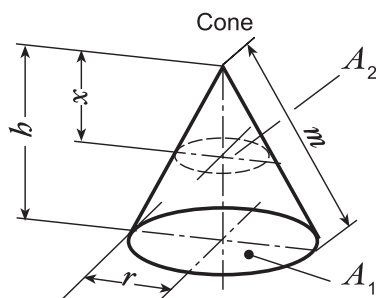
$$V = \frac{\pi}{3} r^2 b$$

$$V_m = \pi r m$$

$$A_0 = \pi r (r + m)$$

$$m = \sqrt{b^2 + r^2}$$

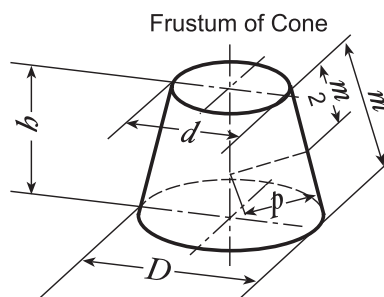
$$A_2 = A_1 = \pi x b^2$$



$$V = \frac{\pi}{12} b (D^2 + Dd + d^2)$$

$$A_m = \frac{\pi}{2} m (D + d) = 2 \pi p b$$

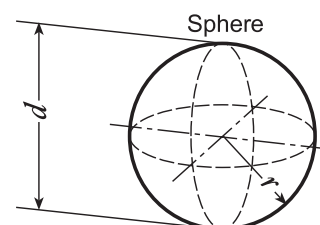
$$m = \sqrt{\left(\frac{D-d}{2}\right)^2 + b^2}$$



$$V = \frac{4}{3} \pi r^3 = \frac{1}{6} \pi d^3$$

$$\approx 4.189 r^3$$

$$A_0 = 4 \pi r^2 = \pi d^2$$



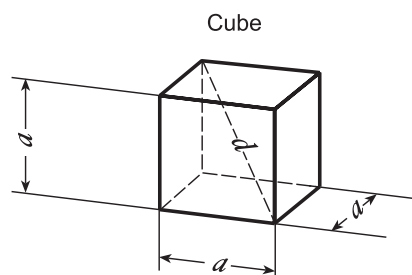
FORMULAE

(Cube, Cuboid, Parallelepiped, Pyramid, Frustum of Pyramid)

$$V = a^2 b$$

$$A_0 = 6 a^2$$

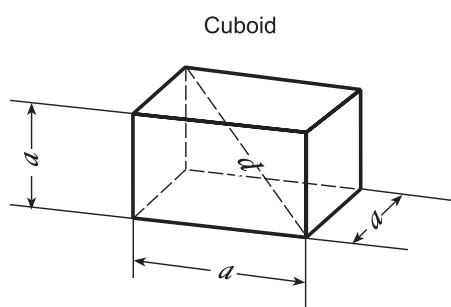
$$d = \sqrt[3]{3} a$$



$$V = a b c$$

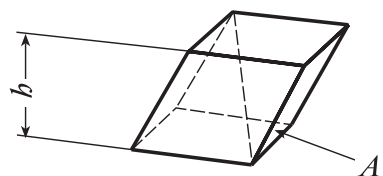
$$A_0 = (a b + a c + b c)$$

$$d = \sqrt{a^2 + b^2 + c^2}$$

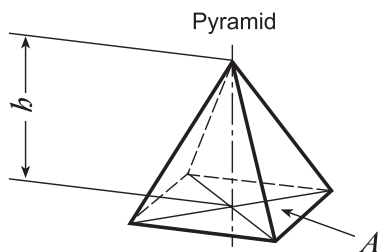


$$V = A_1 b$$

(Cavalieri principle)

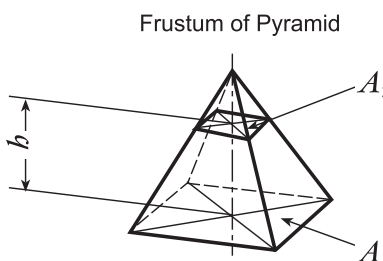


$$V = \frac{A_1 b}{3}$$



$$V = \frac{b}{3} (A_1^2 + A_2^2 + \sqrt{A_1 A_2})$$

$$\approx b \frac{A_1 + A_2}{2}$$



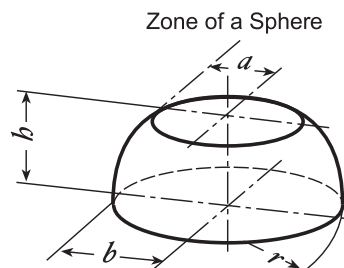
FORMULAE

(Zone of Sphere, Segment of Sphere, Sector of Sphere, Sphere with Cylindrical Bore, Sphere with Conical Bore)

$$V = \frac{\pi}{6} h (3a^2 + 3b^2 + b^2)$$

$$A_m = 2 \pi r b$$

$$A_0 = \pi (2rb + a^2 + b^2)$$

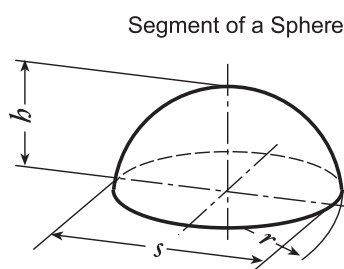


$$V = \frac{\pi}{6} h \left(\frac{3}{4} s^2 + b^2 \right)$$

$$= \pi b \left(r - \frac{b}{3} \right)$$

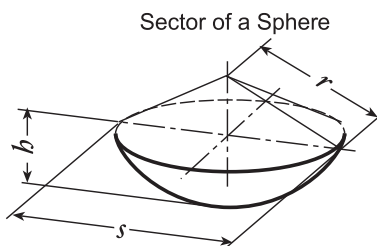
$$A_m = 2 \pi r b$$

$$= \frac{\pi}{4} (s^2 + 4b^2)$$



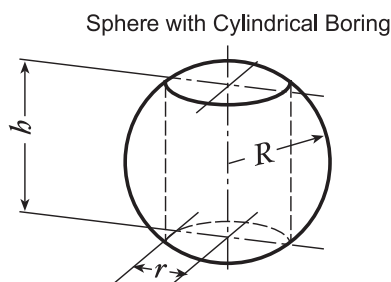
$$V = \frac{2}{3} \pi r^2 b$$

$$A_0 = \frac{\pi}{2} r (4b + s)$$



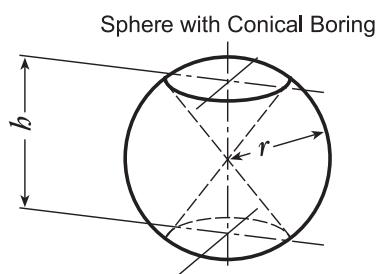
$$V = \frac{\pi}{6} b^3$$

$$A_0 = 2 \pi b (R + r)$$



$$V = \frac{2}{3} \pi r^3 b$$

$$A_0 = 2 \pi b \left(b + \sqrt{r^2 - \frac{b^2}{4}} \right)$$



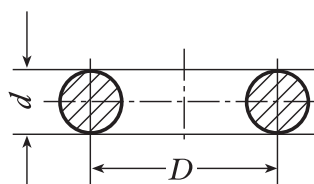
FORMULAE

(Torus, Sliced Cylinder, Ungula, Barrel, Prismoid)

$$V = \frac{\pi^2}{4} D d^2$$

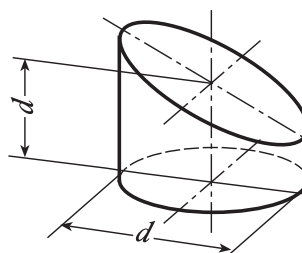
$$A_0 = \pi^2 D d$$

Torus



$$V = \frac{\pi}{4} d^2 b$$

Sliced Cylinder

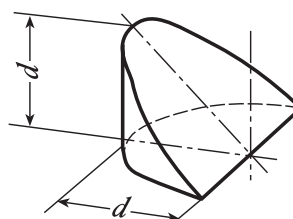


$$V = \frac{2}{3} r^2 b$$

$$A_m = 2 r b$$

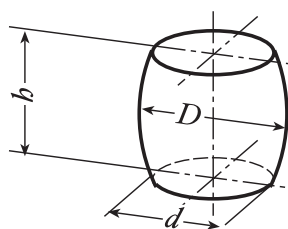
$$A_0 = A_0 + \frac{\pi}{2} r^2 + \frac{\pi}{2} r \sqrt{r^2 + b^2}$$

Ungula



$$V = \frac{\pi}{12} b (2 D^2 + d^2)$$

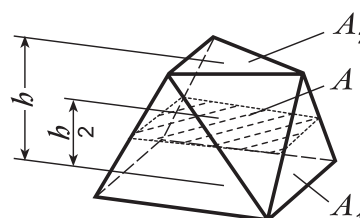
Barrel



$$V = \frac{b}{6} (A_1 + A_2 + 4 A)$$

This formula may be used for calculations involving solids shown on formulae cube and thus spheres and parts of spheres.

Prismoid



CONVERSION TABLES

From		Equals
1 m ³	1000	1000 litres
Litres	area (m ²) x depth (m) x 1000	litres
Yield Per Pack (litres)	area (m ²) x depth (m) x 100 divided by Yield Per Pack x number of applications	litres required
Theoretical coverage rate	10 x % solids content by volume/dry film thickness in mm	m ² /litre
Theoretical coverage rate	10 x % solids content by volume/dry film thickness in mm x S.G	m ² /kg
Atmosphere		101.325 kPa
1 N/mm ²		1 Mpa
Atmosphere (tech = 1 kgf/cm ²)		98,0665 kPa (10m H ₂ O @ 4 °C)
Bar		100 kPa
Centimetre of mercury (0 °C)		1,333224 kPa
Centimetre of water (4 °C)		98,0638 Pa
Centipoise		1 mPa.s
°C	(°C x 1,8) + 32	°F
°F	(°F - 32)/1,8	°C
Gallon (UK)		4,546 l
Gallon (USA)		3,785 l
Inch of mercury (°C)		3,3864 kPa
Inch of water (4°C)		249,082 kPa
kilogram-force		9,8067 N
kilogram-force-metre		9,8067 Nm
kilogram-force per cm ²		98,067 kPa
Mil (milli-inch) (thou)		25,4 µm
Millibar		100 Pa
Millimetre of mercury (0 °C)		133,322 Pa
Millimetre of water (4 °C)		9,8064 Pa
Poise		100 m Pa.s

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