Schluter® Systems

PROFILE OF INNOVATION

UNCOUPLING MEMBRANES

INNOVATIVE SOLUTIONS FOR CERAMIC AND STONE TILE

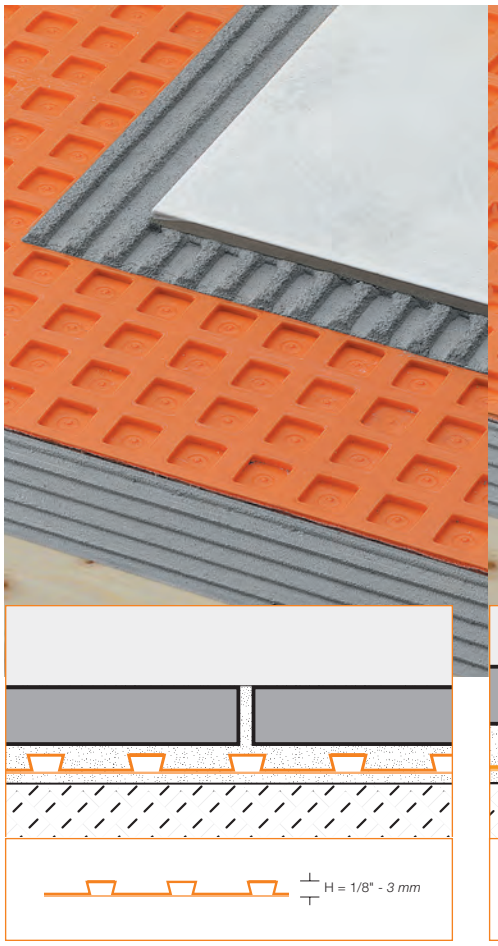
UNCOUPLING, WATERPROOFING, VAPOR MANAGEMENT, AND SUPPORT/LOAD DISTRIBUTION

Ceramic and stone tiles are durable, easy to maintain, and hygienic, representing the ideal surface coverings. However, today's lightweight construction methods can make the installation of hard surface coverings particularly challenging. In order to protect the integrity of the tile assembly, an underlayment that performs multiple functions is required.

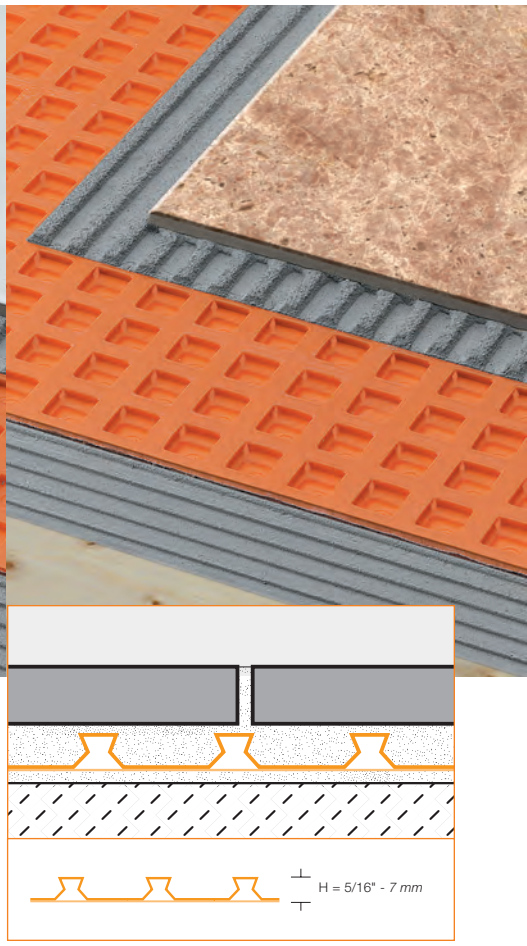
Application and Function

6.1 Schluter®-DITRA and **6.4 Schluter®-DITRA-XL** are polyethylene membranes with a grid structure of square cavities, each cut back in a dovetail configuration, and an anchoring fleece laminated to the underside. The anchoring fleece is embedded in thin-set mortar to provide a mechanical bond to the substrate. Tile is installed over Schluter®-DITRA and Schluter®-DITRA-XL using the thin-bed method in such a way that the mortar becomes mechanically anchored in the square, cutback cavities of the matting.

Designed specifically for ceramic tile and dimension stone installations, Schluter®-DITRA and Schluter®-DITRA-XL serve as an uncoupling layer, waterproofing membrane, and vapor management layer that accommodates moisture from beneath the tile covering. Further, DITRA and DITRA-XL perform all these functions while still providing adequate support/load distribution for the tile covering. The combination of these four essential functions allows for the successful installation of tile over a wide range of substrates, including plywood/OSB, concrete, gypsum, heated floors, etc. Schluter®-DITRA is 1/8" *(3 mm)* thick, which minimizes tile assembly thickness and reduces transitions to lower surface coverings (e.g., carpet, engineered wood, and vinyl). DITRA allows for ceramic tile application over single-layer plywood or OSB subfloors on joists spaced up to 19.2" *(488 mm)* o.c. Schluter®-DITRA-XL is 5/16" *(7 mm)* thick, which permits even transitions between tile and 3/4" -thick hardwood flooring. DITRA-XL allows for ceramic tile application over single-layer plywood or OSB subfloors on joists spaced up to 24" *(610 mm)* o.c.



6.1 Schluter®-DITRA



6.4 Schluter®-DITRA-XL

Uncoupling

Tile has been successfully installed for thousands of years by incorporating an uncoupling layer, or forgiving shear interface, within the tile assembly. Schluter®-DITRA/DITRA-XL provides uncoupling

through its open rib structure, which allows for in-plane movement that effectively neutralizes the differential movement stresses between the substrate and the tile, thus eliminating the major cause of cracking and delaminating of the tiled surface.

Waterproofing

Schluter®-DITRA/DITRA-XL provides reliable waterproofing in interior and exterior applications. Its polyethylene composition protects the substrate from moisture penetration, which is particularly important in today's building environment where most substrates are moisture-sensitive.

Vapor management

The distinguishing feature of Schluter®-DITRA/DITRA-XL is the existence of free space created by the configured channels on the underside of the matting. The free space provides a route for excess moisture and vapor to escape from the substrate that could otherwise cause damage to the tile layer above. Thus, DITRA/DITRA-XL effectively manages moisture beneath the tile covering.

Support/load distribution

When placed on a solid foundation, columns or pillars can support tremendous loads. The same physical principle applies to Schluter®-DITRA/DITRA-XL installations. Column-like mortar structures are formed in the cutback cavities of the matting. Loads are transferred from the tile covering through these column-like mortar structures to the substrate. Since the matting is virtually incompressible within the tile assembly, the advantages of uncoupling are achieved without sacrificing point load distribution capabilities. The ability of DITRA/DITRA-XL installations to support and distribute heavy loads while preserving the integrity of the tiled surface has been verified through extensive laboratory and field testing, including applications exposed to vehicular traffic.

Material Properties and Areas of Application

Schluter®-DITRA and Schluter®-DITRA-XL are manufactured using high-density polyethylene (HDPE), which does not rot and is inert, non-toxic, and physiologically safe. The material is highly resistant to solutions containing salts, acids, and alkalis, as well as many organic solvents, alcohols, and oils. Resistance to specific stresses can be provided if concentration, temperature, and exposure time are known. Schluter®-DITRA and Schluter®-DITRA-XL are waterproof and minimize the transmission of vapor (water vapor permeance of DITRA is 0.006 perms per ASTM E96).

Schluter®-DITRA meets the American National Standard for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations (ANSI A118.10), is listed by cUPC®, and is evaluated by ICC-ES (see Report No. ESR-2467). For copies of the above listing or report, please contact Schluter®-Systems at (800) 472-4588 (USA) or (800) 667-8746 (CAN) or by e-mail at info@schluter.com. Links to the listing and report can also be accessed at www.schluter.com.

Suitable Substrates

For complete installation guidelines and warranty criteria for Schluter®-DITRA and Schluter®-DITRA-XL over the following substrates, please contact Schluter®-Systems for a copy of the Schluter®-DITRA Installation Handbook (USA: 800-472-4588; Canada: 800-667-8746), or download it from our website at www.schluter.com. All substrates must be clean, even, and load bearing. Bond-inhibiting surfaces must be removed prior to the application of Schluter®-DITRA and Schluter®-DITRA-XL.

Note: Type, thickness, and format of the tile or stone surface covering must be suitable for the intended application. Minimum tile format is 2" x 2" *(5 cm x 5 cm)*.

Wood

All wood materials, including OSB, plywood, and framing members, are subject to expansion, contraction, bending, and deflection as a result of changes in moisture content and loading. Further, these deformations fluctuate over the life of the building structure.

Schluter®-DITRA/DITRA-XL's uncoupling function protects the ceramic or stone tile covering from the aforementioned deformations by neutralizing the differential movement stresses between the wood structure and the tile, thus eliminating the major cause of cracking and delaminating of the tiled surface. Therefore, DITRA/DITRA-XL can replace a second layer of plywood in most applications. Since the uncoupling function of the matting is based on its geometric configuration, the increased thickness of DITRA-XL results in increased uncoupling capacity. Thus, DITRA-XL is optimized for tile installation over bending and deflecting substrates such as plywood and OSB, including applications over single-layer plywood/OSB subfloors on joists spaced at 24" *(610 mm)* o.c.

Wood continually absorbs and releases moisture. The free space beneath Schluter®-DITRA/DITRA-XL allows the wood to breathe and provides a route for any residual moisture in the wood substrate to escape.

Since Schluter®-DITRA/DITRA-XL is virtually incompressible within the tile assembly, the advantages of uncoupling are achieved without sacrificing point load distribution capabilities.

Industry standard guidelines referencing uncoupling membranes over wood substrates include methods F147 and F148 in the TCA Handbook for Ceramic Tile Installation and method 313F (Detail D) in the Terrazzo, Tile and Marble Association of Canada (TTMAC) Specification Guide 09 30 00 Tile Installation Manual.

Note: Schluter®-DITRA and Schluter®-DITRA-XL may be installed over existing vinyl floors (no cushioned or perimeter bonded vinyl). However, various steps must be taken to ensure a successful installation. Please refer to the DITRA Installation Handbook for details.

Concrete

There are various challenges associated with the installation of hard surface coverings on concrete substrates. To begin, the coefficient of thermal expansion of concrete is close to twice that of ceramic tile. Additionally, tile contractors are often expected to install tile over young concrete (concrete cured less than 28 days). However, rigid surface coverings installed over young concrete are susceptible to damage as a result of shrinkage during curing. Pre-stressed/post-tensioned concrete slabs are also commonplace in today's construction environment. Although

pre-stressing is used to help control deflections in concrete structures, these slabs are still subject to deformations caused by changes in moisture, temperature, and loading. Many concrete slabs on or below grade are subject to moisture migration, which can be problematic. Furthermore, these structures experience the same deformations as stated above.

Schluter®-DITRA/DITRA-XL's uncoupling function protects the ceramic or stone tile covering by neutralizing the differential movement stresses between the concrete substrate and the tile, thus eliminating the major cause of cracking and delaminating of the tiled surface.

Schluter®-DITRA/DITRA-XL's waterproofing ability not only protects the substrate from moisture and harmful substances, it also slows the drying of fresh concrete, thus reducing the chances of cracking and curling.

The free space beneath the Schluter® -DITRA/DITRA-XL matting provides a route for any residual moisture in the concrete slab to escape. This allows the installation of DITRA/DITRA-XL and the tile covering as soon as the slab can be walked upon. Vapor management is also essential for slabs subject to moisture migration.

Since Schluter®-DITRA/DITRA-XL is virtually incompressible within the tile assembly, the advantages of uncoupling are achieved without sacrificing point load distribution capabilities. This allows DITRA/DITRA-XL to be installed in commercial and industrial applications exposed to heavy vehicular traffic, provided the type, format, and thickness of the tile are appropriate for the application.

Industry standard guidelines referencing uncoupling membranes over concrete substrates include method F128 in the TCA Handbook for Ceramic Tile Installation and method 311F (Details A, C and D) in the Terrazzo, Tile and Marble Association of Canada (TTMAC) Specification Guide 09 30 00 Tile Installation Manual.

Gypsum

Bonding ceramic or stone tiles directly to gypsum concrete substrates is generally considered questionable or not recommended. The challenges associated with gypsum-based underlayments include the requirement of an extended drying period before installing tile and continued sensitivity to the reintroduction of moisture throughout the life of the installation. In addition, since the coefficient of thermal expansion of gypsum concrete is substantially greater than that of ceramic tile, shear stresses caused by temperature fluctuations can result in delamination or cracking of the tile covering. This is particularly important when gypsum concrete is used as a thermal mass for radiant heated floors. With the increasing popularity of radiant heated floors, which typically utilize gypsum concrete, tile installers need a reliable installation system to address these issues.

Schluter®-DITRA/DITRA-XL's uncoupling function protects the ceramic or stone tile covering by neutralizing the differential movement stresses between the gypsum concrete substrate and the tile, thus eliminating the major cause of cracking and delaminating of the tiled surface.

Schluter®-DITRA/DITRA-XL's waterproofing function prevents the reintroduction of moisture to gypsum concrete underlayments, which, if not prevented, could significantly compromise performance of the underlayment and lead to damage of the tiled surface. The residual moisture in gypsum concrete is allowed to escape through the air channels on the underside of the matting. This is particularly important since gypsum concrete must dry in order to gain strength.

Since Schluter®-DITRA/DITRA-XL is virtually incompressible within the tile assembly, the advantages of uncoupling are achieved without sacrificing point load distribution capabilities.

Industry standard guidelines referencing uncoupling membranes over gypsum substrates include methods F180 and F200 in the TCA Handbook for Ceramic Tile Installation and method 314F (Details B and F) in the Terrazzo, Tile and Marble Association of Canada (TTMAC) Specification Guide 09 30 00 Tile Installation Manual.

Heated Floors

Radiant heating is one of the fastest growing market segments in the construction industry. Unlike other surface coverings, the low thermal resistivity of ceramic and stone tiles allows them to be used in radiant heat applications without sacrificing the energy efficiency of the system. However, there are inherent challenges in combining rigid surface coverings with radiant panel heating systems. A viable installation system must address the magnified fluctuations in temperature that contribute to increased shear stresses between the heated assembly and the tile covering. The system must also limit thermal striping by promoting even heat distribution and protect the assembly from moisture, which is particularly important when gypsum concrete is used as the thermal mass. Differential movement stresses are magnified in radiant-heated floor applications because of significant temperature gradients.

Schluter®-DITRA/DITRA-XL's uncoupling function protects the ceramic or stone tile covering by neutralizing the differential movement stresses between the heated assembly and the tile, thus eliminating the major cause of cracking and delaminating of the tiled surface.

Schluter®-DITRA/DITRA-XL's waterproofing function provides simple, effective, and permanent protection for moisture-sensitive substrates, such as gypsum concrete and wood, used in heated floor applications.

The open rib structure of the Schluter® -DITRA/DITRA-XL matting allows the residual moisture in the substrate to escape. This is particularly important for gypsum concrete since it must dry in order to gain strength. In addition, the free space beneath the matting limits thermal striping by promoting even heat distribution throughout the assembly.

Industry standard guidelines referencing uncoupling membranes over heated floors include methods RH111, RH112, RH122 and RH123 in the TCA Handbook for Ceramic Tile Installation and method 314F (Details A, B, C, D, E and F) in the Terrazzo, Tile and Marble Association of Canada (TTMAC) Specification Guide 09 30 00 Tile Installation Manual.

Exterior Applications

Ceramic and stone tiles are ideal surface coverings for the exterior and have been used successfully for thousands of years. Exterior balconies and terraces are ideal opportunities for the installation of tiled surfaces. However, these installations have typically presented significant challenges to tile setters. Since hard surface coverings are rigid by nature and have different physi-

cal properties compared to virtually every substrate, they cannot be bonded directly to the substrate, particularly in exterior applications where they are exposed to potentially severe climatic changes and the recurring introduction of moisture.

Schluter®-DITRA/DITRA-XL's uncoupling function protects the ceramic or stone tile covering by neutralizing the differential movement stresses between the substrate and the tile, thus eliminating the major cause of cracking and delaminating of the tiled surface. This is particularly important since these stresses are magnified by the significant temperature gradients common in exterior applications.

Schluter®-DITRA/DITRA-XL provides effective waterproofing that will protect the tile assembly from the recurring introduction of water which is common in exterior applications.

The free space beneath the Schluter®-DITRA/DITRA-XL matting provides a route for any residual moisture in the substrate to escape. This is especially important when installing tile over a young slab, a concrete slab subject to moisture migration, or a fresh mortar bed.

Since Schluter®-DITRA/DITRA-XL is virtually incompressible within the tile assembly, the advantages of uncoupling are achieved without sacrificing point load distribution capabilities.

Installation

For complete installation guidelines and warranty criteria, please contact Schluter®-Systems (USA: 800-472-4588; Canada: 800-667-8746) to receive a copy of the Schluter®-DITRA Installation Handbook and a step-by-step installation video. To download a PDF version of the Handbook or to view the installation video online, please visit www.schluter.com.

Thin-set facts

Question: Can ceramic tile, including porcelain tile, be set on Schluter®-DITRA/DITRA-XL with unmodified thin-set mortar?

Answer: YES. In fact, we recommend it.

Here's why: Portland cement-based unmodified thin-set mortars are dependent upon the presence of moisture for hydration in order to gain strength. Since Schluter®-DITRA/DITRA-XL is impervious, it does not deprive the mortar of its moisture. This allows the cement to properly hydrate, resulting in a strong, dense bond coat. In fact, after the mortar has reached final set (usually within 24 hours), unmodified thin-set mortars achieve higher strengths when cured in continually moist conditions.

Question: Can ceramic tile, including porcelain tile, be set on Schluter®-DITRA/DITRA-XL with latex-modified thin-set mortar?

Answer: We DON'T recommend it.

Here's why: Latex-modified mortars must air dry for the polymers to coalesce and form a hard film in order to gain strength. When sandwiched between two impervious materials such as Schluter®-DITRA/DITRA-XL and ceramic tile, including porcelain tile, drying takes place very slowly through the open joints in the tile covering. [According to the TCA Handbook for Ceramic Tile Installation, this drying period can fluctuate from 14 days to over 60 days, depending on the geographic location, the climatic conditions, and whether the installation is interior or exterior]. Therefore, extended cure times would be required before grouting if using modified thin-set mortars between DITRA/DITRA-XL and ceramic tile, including porcelain tile. If extended cure times were not observed, the results could be unpredictable. This is even more important to consider in exterior applications that are exposed to rain, as there is the additional concern of latex leaching.

Additional Notes:

15 years of field experience and testing by the Tile Council of North America (TCNA) support the efficacy of using unmodified thin-set mortars to bond ceramic tile, including porcelain tile, to Schluter®-DITRA/DITRA-XL in both interior and exterior applications. Remember, the type of mortar used to apply Schluter®-DITRA/DITRA-XL depends on the type of substrate. The mortar must bond to the substrate and mechanically anchor the fleece on the underside of the matting. For example, bonding DITRA/DITRA-XL to wood requires latex-modified thin-set mortar. Additionally, all mortars (modified and unmodified) have an acceptable temperature range that must be observed during application and curing.

Movement joints

Schluter®-DITRA and Schluter®-DITRA-XL do not eliminate the need for movement joints, including perimeter joints, within the tiled surface. Please refer to the Schluter®-DITRA Installation Handbook for movement joint placement guidelines.

Wood underlayment

In some applications, adding a layer of plywood or OSB before installing Schluter®-DITRA or Schluter®-DITRA-XL and the ceramic or stone tile covering is required to reduce deflection and curvature of the sheathing between the joists. Please refer to the Schluter®-DITRA Installation Handbook for plywood/OSB underlayment installation guidelines.

Exterior installations

It is recommended that DITRA and DITRA-XL be allowed to adapt to ambient air temperature before installing. Further, if low temperatures are expected during installation, proper care to ensure sufficient strength gain of the thin-set mortar must be taken.

Connection to Schluter®-KERDI-DRAIN

Schluter®-KERDI-DRAIN is a floor drain featuring an integrated bonding flange that is designed to allow connections to a bonded waterproof membrane at the top of the assembly. At connections to Schluter®-KERDI-DRAIN, Schluter®-DITRA and Schluter®-DITRA-XL must be held back to the outer edge of the bonding flange. Adhere a 20" x 20" *(50 cm x 50 cm)* cut section of Schluter®-KERDI to the top of the DITRA/DITRA-XL membrane and bonding flange using an unmodified thin-set mortar. When using the stainless steel KERDI-DRAIN bonding flange, use Schluter®-KERDI-FIX to bond the KERDI to the drain. The Schluter®-KERDI must overlap the DITRA/DITRA-XL membrane a minimum of 2" *(50 mm)*. With the flat side of the trowel, firmly press Schluter®-KERDI into the thin-

set to ensure 100% coverage and a water-tight seal.
Industry standard guidelines referencing floor drains with integrated bonding flanges include method B422 in the TCA Handbook for Ceramic Tile Installation, and method 326DR in the Terrazzo, Tile and Marble Association of Canada (TTMAC) Specification Guide 09 30 00 Tile Installation Manual.

Notes:

1) When Schluter®-KERDI-DRAIN is used in shower applications, walls must be waterproofed up to the height of the showerhead. Please refer to the Schluter®-Shower System Installation Handbook for complete details.
2) Various configurations of the Schluter®-KERDI-DRAIN are listed by UPC® (IGC 195), CSA (B79), and NSF (as a special engineered product meeting applicable requirements of ASME A112.6.3).
3) Schluter®-DITRA and Schluter®-KERDI meet the American National Standard for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations (ANSI A118.10), are listed by cUPC®, and are evaluated by ICC-ES (see Report No. ESR 2467).

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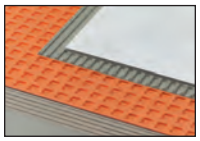
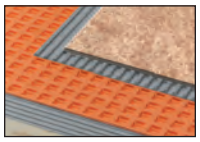
Product Item Numbers



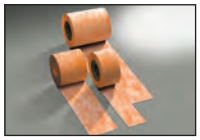
6.1 Schluter®-DITRA

Item No.	Width	Length	Area	Thickness
DITRA 5M	3' 3" – *1 m*	16' 5" – *5 m*	54 ft² – *5 m²*	1/8" – *3 mm*
DITRA 150	3' 3" – *1 m*	45' 9" – *14 m*	150 ft² – *14 m²*	1/8" – *3 mm*
DITRA 30	3' 3" – *1 m*	98' 5" – *30 m*	323 ft² – *30 m²*	1/8" – *3 mm*



6.4 Schluter®-DITRA-XL

Item No.	Width	Length	Area	Thickness
DITRA-XL/175	3' 3" – *1 m*	53' 3" – *16.25 m*	175 ft² – *16.25 m²*	5/16" – *7 mm*

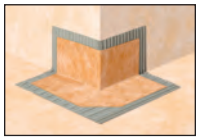


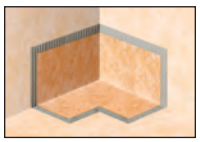
8.1 Schluter®-KERDI-BAND (waterproofing strips)

Item No.	Width	Length	Thickness
KEBA 100/125/5M	5" – *12.5 cm*	16' 5" - *5 m*	4 mil
KEBA 100/125/10M	5" – *12.5 cm*	33' - *10 m*	4 mil
KEBA 100/185/5M	7-1/4" – *18.5 cm*	16' 5" - *5 m*	4 mil
KEBA 100/250/5M	10" – *25 cm*	16' 5" - *5 m*	4 mil
KEBA 100/125	5" – *12.5 cm*	98' 5" - *30 m*	4 mil
KEBA 100/185	7-1/4" – *18.5 cm*	98' 5" - *30 m*	4 mil
KEBA 100/250	10" – *25 cm*	98' 5" - *30 m*	4 mil

8.1 Schluter®-KERDI-FLEX (waterproofing strips for use above movement joints)

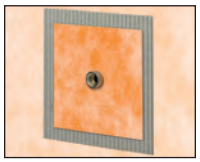
Item No.	Width	Length	Thickness
FLEX 125/5M	5" – *12.5 cm*	16' 5" – *5 m*	12 mil
FLEX 250/5M	10" – *25 cm*	16' 5" – *5 m*	12 mil
FLEX 125/30	5" – *12.5 cm*	98' 5" – *30 m*	12 mil
FLEX 250/30	10" – *25 cm*	98' 5" – *30 m*	12 mil





8.1 Schluter®-KERDI-KERECK-F (pre-formed corners)

Item No.	Thickness	Packaging
KERECK / FI 2	4 mil	2 Inside corners
KERECK / FI 10	4 mil	10 Inside corners
KERECK / FA 2	4 mil	2 Outside corners
KERECK / FA 10	4 mil	10 Outside corners



8.1 Schluter®-KERDI-KM (pipe collar)

Item No.	Dimensions	Thickness	Packaging
KM 5117/22	7" x 7" - *17 cm x 17 cm*	4 mil	5 units

Hole diameter, ø = 7/8" - *22 mm*

Schluter®-KERDI-FIX (sealant)

Item No.	Cartridge Volume
KERDIFIX / ***color****	9.81 oz *(290 ml)*

*Color Codes

BW Bright white

G Grey

To complete the item number, add the ***color*** code (e.g., KERDIFIX / **BW**).

Schluter®-DITRA-TROWEL

Item No.	Notch Size	Packaging
TRL-DIT/6	11/64" x 11/64" *(4.5 mm x 4.5 mm)*	6 units

Schluter®-KERDI-TROWEL

Item No.	Notch Size	Packaging
TRL-KER/6	1/8" x 1/8" *(3 mm x 3 mm)*	6 units

The **Schluter®-DITRA** and **Schluter®-DITRA-XL** uncoupling membranes allow independent movement and effectively neutralizes differential movement stresses between the substrate and the tile, thus eliminating the major cause of cracking and delaminating of the tiled surface.

Schluter®-DITRA and **Schluter®-DITRA-XL** are uniquely engineered to provide uncoupling, vapor management, and waterproofing to provide reliable installation systems for ceramic and stone tile surface coverings in both interior and exterior applications.

PROFILE OF INNOVATION

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Item number: CSUNCOUPMEM Date: 02/2009 Printed in CANADA