MÉTODO DE EJECUCIÓN

Sika AnchorFix®

FEBRERO 2021 / V1 / SIKA SAU / DEP. TÉCNICO

BUILDING TRUST

INDICE

1 DESCRIPCIÓN DEL SISTEMA

Los productos Sika AnchorFix® se utilizan para la fijación de anclajes no expansivos en:

TRABAJOS ESTRUCTURALES:

- Anclaje de barras / armaduras de acero en obras nuevas y de rehabilitación.
- Varillas roscadas.
- Pernos y sistemas especiales de fijación / sujeción.

CARPINTERÍA METÁLICA, CARPINTERÍA:

- Fijación de barandillas, balaustradas y soportes.
- Fijación de railes.
- Fijación de marcos de ventanas y puertas.

EN LOS SIGUIENTES SOPORTES:

- Hormigón (fisurado y no fisurado).
- Piedra dura natural y reconstituida.
- Roca maciza.
- Mampostería hueca y maciza.
- Madera.

1.1 REFERENCIAS

Para asegurar la correcta aplicación de Sika AnchorFix®, consulte también los siguientes documentos:

- Sika PDS (hojas de datos de los productos de anclajes y sus accesorios).
- Sika MSDS (hojas de datos de los materiales y de seguridad).
- Documentación Técnica de Sika AnchorFix.
- Comentarios y normas de todas las ETA y ACI.
- Todas las partes y anexos de la ETAG 001.
- EOTA TR029 para anclajes de barras y varillas roscadas.
- EOTA TR023 para anclajes de barras instaladas a posteriori.
- ACI 318-08 / ACI 318-11 / ACI 318-14.

1.2 LIMITACIONES

Según la ficha técnica de cada producto, se tendrán en cuenta ciertas limitaciones:

- - Espesor de la capa (mínimo y máximo).
- - Temperatura del soporte.
- - Temperatura ambiente.
- - Temperatura del material.
- - Material utilizado (barras de acero, etc.).
- - Contenido de humedad del soporte.
- - Condiciones del punto de rocío.

Consulte la hoja de datos del producto (PDS) para confirmar los detalles de estos requisitos de cada producto

2 PRODUCTOS

Este método de ejecución es válido para los siguientes productos:

- Sika AnchorFix®-1
- - Sika AnchorFix®-2+
- - Sika AnchorFix®-3030

3 EQUIPOS NECESARIOS

3.1 PROTECCIÓN INDIVIDUAL

Los siguientes símbolos son los típicos del etiquetado exigido internacionalmente para los productos de anclaje químico. De acuerdo con ellos, los productos deben almacenarse y aplicarse de acuerdo con la normativa local correspondiente. Respete también cualquier otra normativa local pertinente (consulte las fichas de datos de seguridad locales).

Irritación de la piel, inflamable, peligroso para el medio ambiente, corrosivo, riesgos a largo plazo

El siguiente equipo de protección es esencial para cualquier persona que trabaje con productos de anclaje químico y estas instrucciones deben ser estrictamente respetadas:

Además de la ropa de protección, también se recomienda utilizar una crema de barrera en la piel. El uso de una crema barrera es más útil y eficaz de lo que a menudo se dice, son baratas, cómodas y protegen bien si no se enjuagan frecuentemente con disolventes. Sin embargo, las cremas de barrera son sólo un complemento y no un sustituto de los guantes de protección, por lo que hay que llevar siempre guantes. Asegúrese siempre de que no hay contaminación en el interior de los guantes antes de reutilizarlos.

Asegurar una ventilación suficiente durante la aplicación en espacios cerrados o confinados.

Si algún componente químico de anclaje cae en la ropa, quítese la prenda de inmediato. La fricción del tejido saturado de resina sobre la piel puede provocar graves quemaduras químicas. Lávese la piel expuesta de vez en cuando durante la jornada de trabajo y de inmediato si algún componente químico cae en ella. Evite el uso de disolventes ya que pueden ayudar a que el material químico penetre en la piel y los propios disolventes son agresivos y perjudiciales para la piel. Si el agua no está disponible en algún momento, entonces limpie la zona con arena en su lugar. Algunos limpiadores de manos también funcionan sin efectos nocivos. Los limpiadores cítricos para la piel, por ejemplo, son eficaces y suaves. El agua y el jabón llevan tiempo, pero también acaban funcionando para zonas pequeñas.

Evitar el contacto con la piel manteniendo limpias las herramientas y el equipo es una de las mejores formas de protegerse.

A pesar de las precauciones de seguridad, en caso de contacto con la piel, aclare inmediatamente con agua limpia y utilice agua caliente y jabón para limpiar a fondo la piel.

Un ejemplo de buen limpiador de la piel es el siguiente:

Nunca se debe proceder a ninguna aplicación de anclaje químico sin que haya suficiente agua cerca y disponible para el lavado de ojos. Si no se dispone de agua limpia adecuada, el proyecto no debe comenzar, sea cual sea la urgencia. Numerosos trabajadores y observadores han sufrido lesiones debido a la entrada de resina en sus ojos cuando no había agua disponible para limpiarlos. Si no se dispone de un kit de lavado de ojos profesional, como mínimo debe haber un litro de agua limpia. El agua puede estar en un cubo, una jarra de plástico o a través de una manguera, pero siempre debe estar directamente adyacente a la operación con los productos que aquí se citan, es decir, una fuente de agua en el lado opuesto del edificio o de la obra no es suficiente. Las gafas de seguridad u otras protecciones para los ojos ayudan obviamente a los que realizan el trabajo, pero también pueden crear una falsa sensación de seguridad. No corra riesgos con la salud.

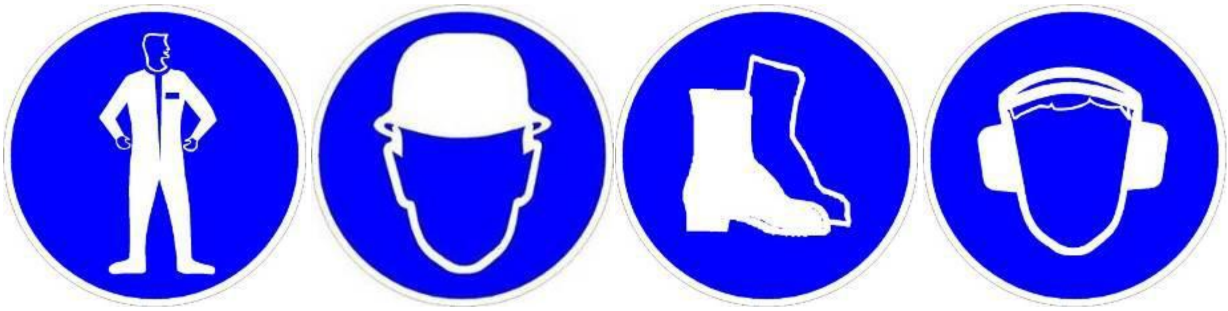
Kit profesional de limpieza de ojos disponible

En caso de derrame o contacto con los ojos, acuda siempre al médico inmediatamente después de enjuagar y limpiar los ojos con agua limpia.

Dependiendo de la normativa local, pueden ser necesarias máscaras respiratorias. Respete todas las normativas locales pertinentes.

Protección respiratoria

El siguiente equipo también se recomienda generalmente en las obras de construcción:



Cepillar y retirar cualquier exceso de material en contenedores adecuados para su eliminación antes de que se haya endurecido.

El producto endurecido puede eliminarse con otros residuos combustibles en una planta de incineración de residuos.

En ningún caso, quemar el producto endurecido en un fuego abierto debido a los gases potencialmente peligrosos que pueden liberar.

El producto no curado debe eliminarse como residuo peligroso. Está prohibido mezclarlo con residuos convencionales.

Elimine siempre los materiales sobrantes o de desecho de acuerdo con la normativa local.

Limpieza de las herramientas:

El material no curado puede eliminarse con el limpiador Sika Colma.

El material curado sólo puede eliminarse mecánicamente.

4 APLICACIÓN

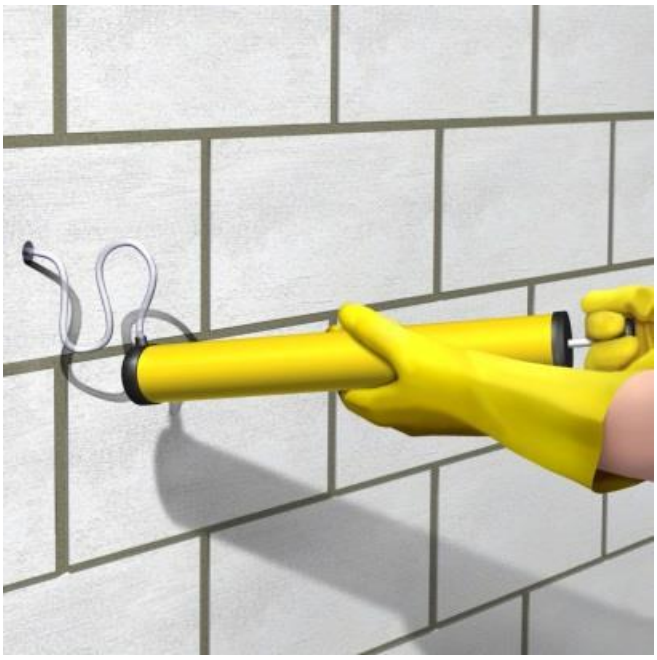
4.1 PREPARACIÓN DE LA SUPERFICIE. REQUERIMIENTOS DEL SOPORTE

- El hormigón débil debe ser eliminado y los defectos de la superficie, reparados adecuadamente.
- El mortero y el hormigón deben tener más de 28 días.
- El contenido máximo de humedad del soporte depende del producto. Consulte la ficha técnica de cada producto para comprobar si el producto es adecuado para el soporte en cuestión.
- Confirme la resistencia del soporte (hormigón, mampostería, piedra natural, etc.). Especialmente la piedra natural y la roca pueden variar mucho en cuanto a resistencia, composición y porosidad. Por lo tanto, para cada aplicación, la idoneidad del producto de anclaje químico debe probarse aplicando primero el Producto sólo en una zona de muestra. Compruebe la resistencia a la tracción en estos soportes.
- El soporte debe estar sano, limpio y libre de contaminantes como suciedad, aceite, grasa, óxido, hielo, tratamientos superficiales existentes y revestimientos, etc.
- Deben eliminarse todas las partículas sueltas.
- Tenga cuidado con las manchas, especialmente en soportes como la piedra natural dura y la roca sólida, Estos soportes pueden variar mucho, en particular en lo que respecta a la composición y la porosidad. Por lo tanto, para cada aplicación se debe probar la idoneidad del producto de anclaje químico aplicando primero el producto en una zona de muestra. Compruebe en particular las manchas y la decoloración de la superficie.

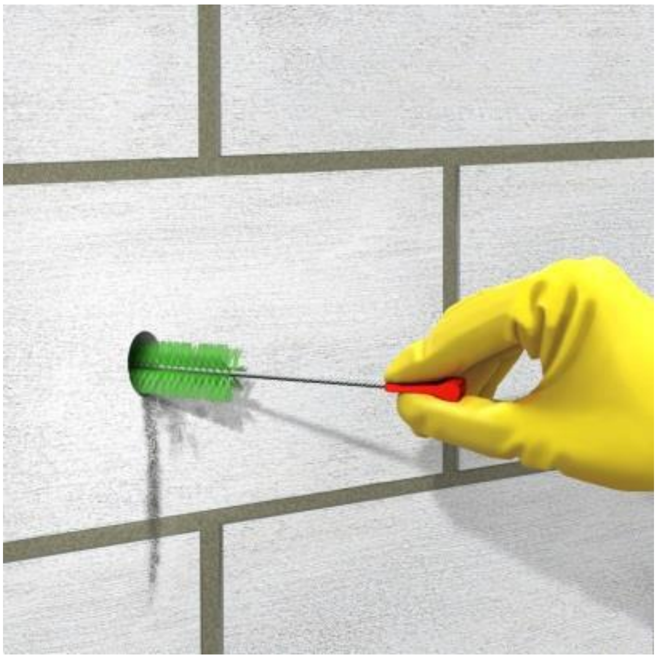
En caso de duda, haga una prueba primero y confirme con el equipo de pruebas, como se muestra en la imagen superior. Equipo: Enerpac o similar

4.2 APLICACIÓN EN HORMIGÓN Y EN FÁBRICAS MACIZAS

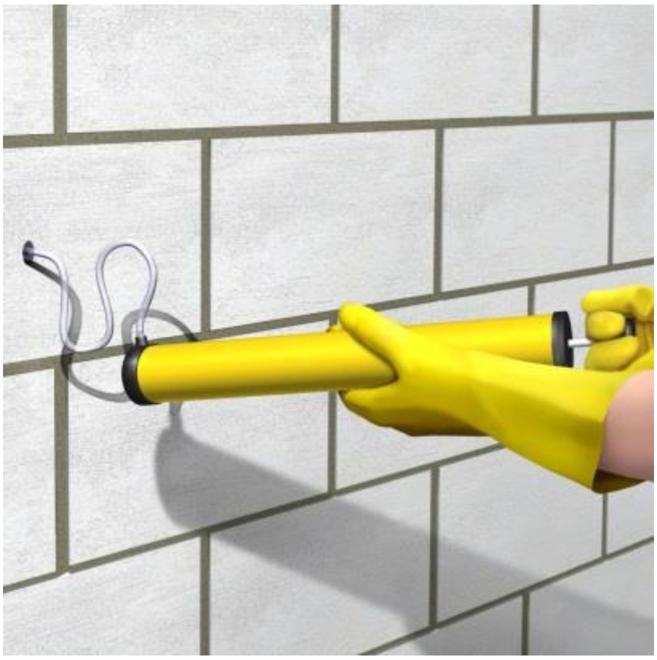
Perforación del orificio con un taladro eléctrico hasta el diámetro y la profundidad requeridos. El diámetro del orificio debe estar en consonancia con el tamaño del anclaje.



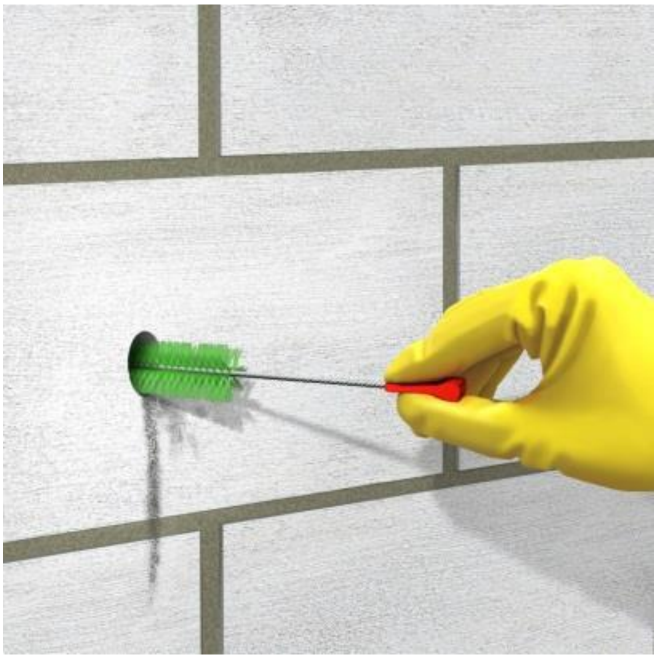
El orificio de perforación debe limpiarse con una bomba de soplado o con aire comprimido, empezando por el fondo del orificio. (al menos 2 veces). Importante: ¡utilizar compresores sin aceite!



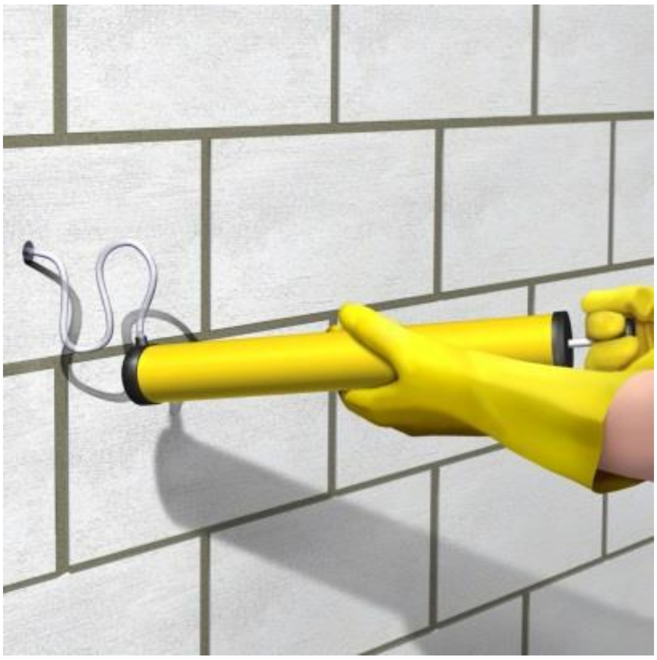
El orificio de perforación debe limpiarse a fondo con el cepillo de acero especial (cepillar al menos 2 veces). El diámetro del cepillo debe ser mayor que el diámetro del orificio de perforación.



El orificio de perforación debe limpiarse con una bomba de soplado o con aire comprimido, empezando por el fondo del orificio. (al menos 2 veces). Importante: ¡utilizar compresores sin aceite!

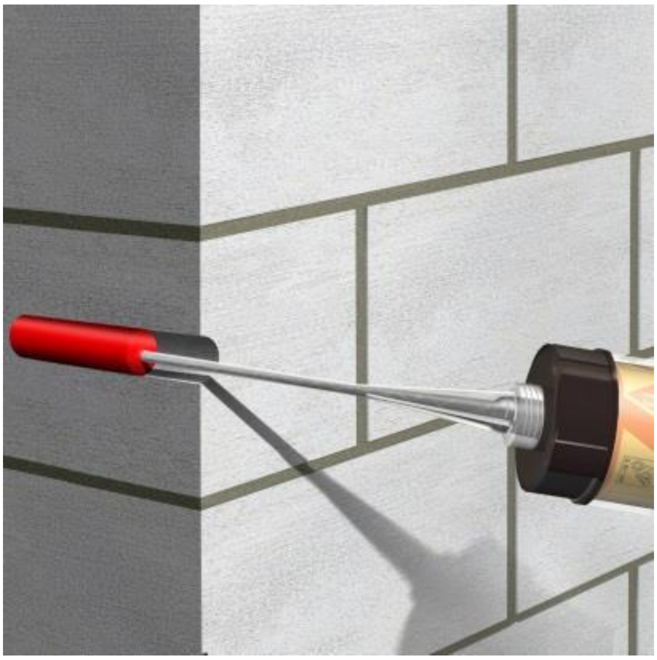


El orificio de perforación debe limpiarse a fondo con el cepillo de acero especial (cepillar al menos 2 veces). El diámetro del cepillo debe ser mayor que el diámetro del orificio de perforación.



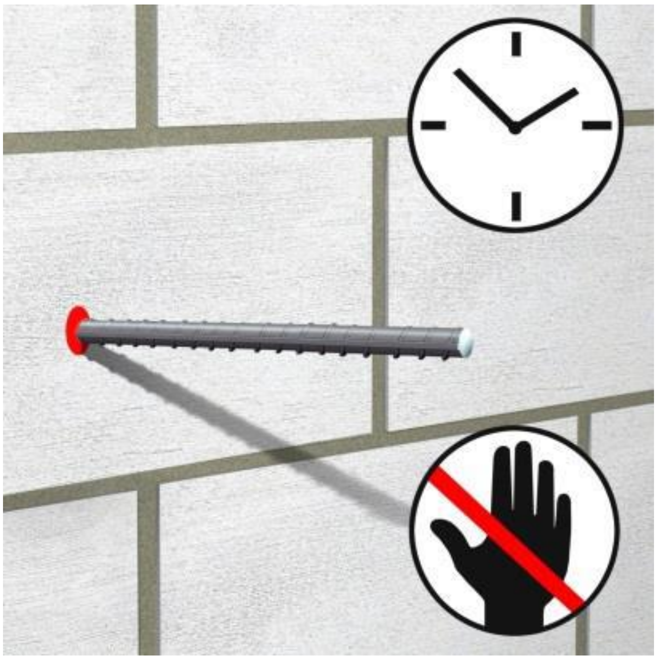
El orificio de perforación debe limpiarse con una bomba de soplado o con aire comprimido, empezando por el fondo del orificio. (al menos 2 veces). Importante: ¡utilizar compresores sin aceite!

Bombear aproximadamente dos veces o hasta que ambas partes salgan uniformemente. No utilice este material. Suelte la presión de la pistola y limpie la abertura del cartucho con un paño.



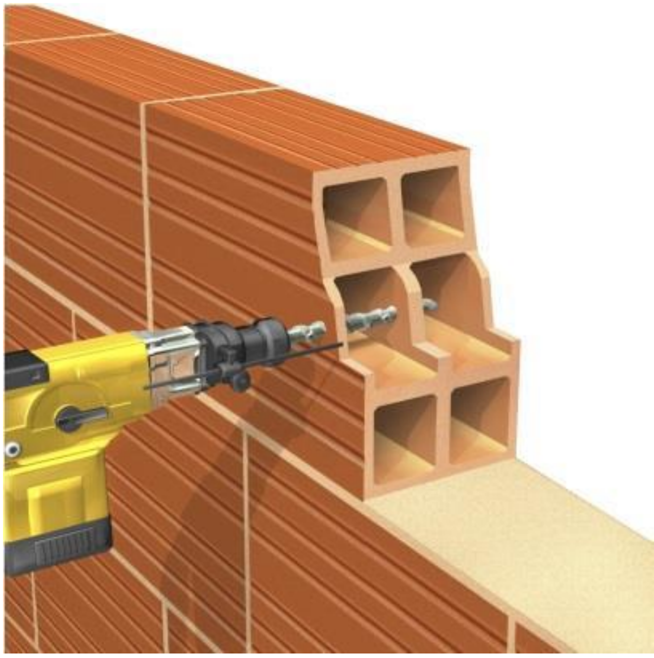
Inyecte el adhesivo en el orificio, empezando por el fondo, mientras retira lentamente el mezclador estático. Para orificios profundos se pueden utilizar tubos de extensión.

Introduzca el anclaje con un movimiento giratorio en el orificio relleno. Debe salir algo de adhesivo del orificio.
Importante: el anclaje debe colocarse dentro del tiempo abierto.

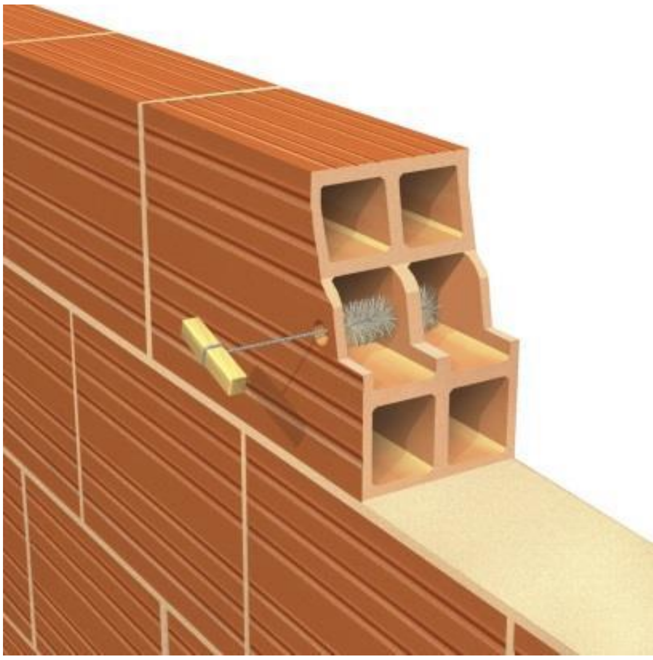


Durante el tiempo de endurecimiento de la resina, el anclaje no debe moverse ni cargarse. Lavar inmediatamente las herramientas con Sika® Colma Cleaner.
Lavar bien las manos y la piel con agua tibia y jabón.

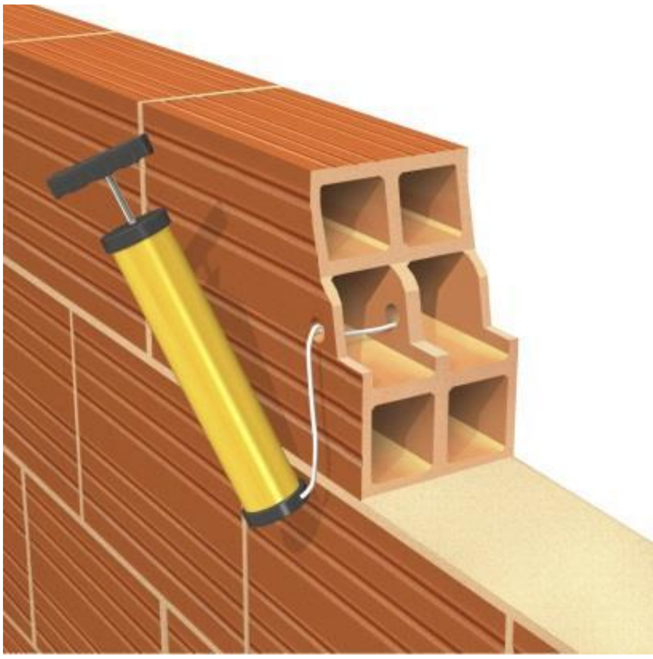
4.3 APLICACIÓN EN FÁBRICA HUECA



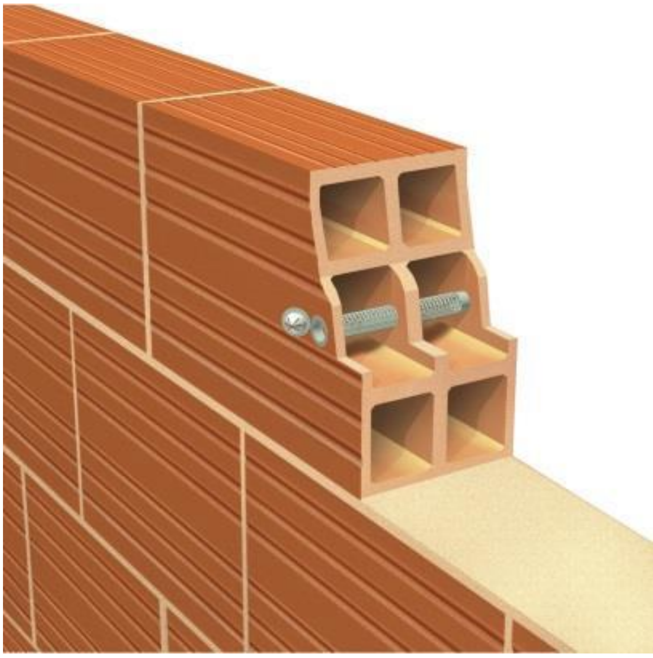
Perforación del orificio con un taladro eléctrico hasta el diámetro y la profundidad requeridos. El diámetro del orificio debe coincidir con el tamaño del anclaje y del manguito perforado. Nota: en el caso de material hueco, no utilizar taladros de percusión.



El orificio de perforación debe limpiarse a fondo con un cepillo redondo (cepillar al menos una vez). El diámetro del cepillo debe ser mayor que el diámetro del orificio de perforación.

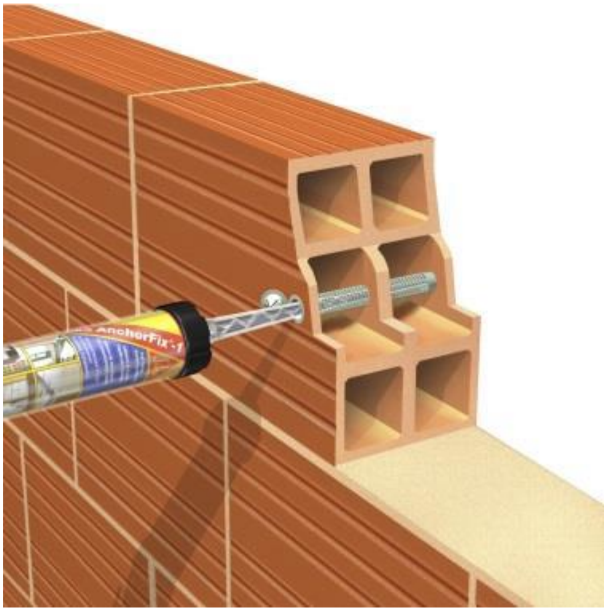


El orificio de perforación debe limpiarse después de cada paso de limpieza con una bomba de soplado o con aire comprimido, empezando por el fondo del orificio (bombear al menos 1 vez). Importante: ¡utilizar compresores sin aceite!

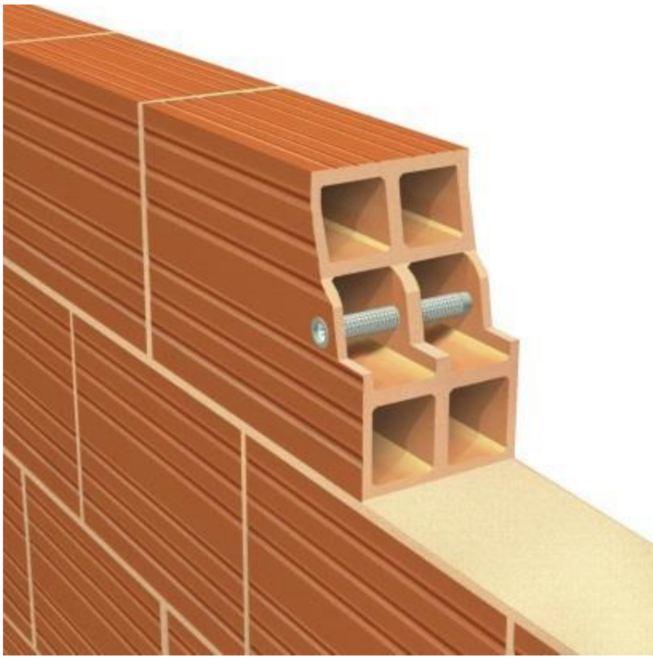


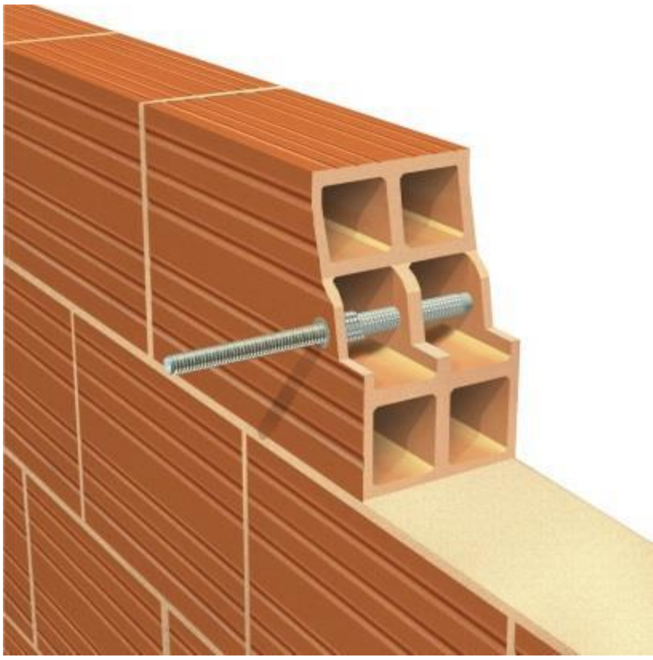
Introduzca el manguito de tamiz perforado completamente en el orificio con la tapa abierta.

Bombear aproximadamente dos veces o hasta que ambas partes salgan uniformemente. No utilice este material. Suelte la presión de la pistola y limpie la abertura del cartucho con un paño.

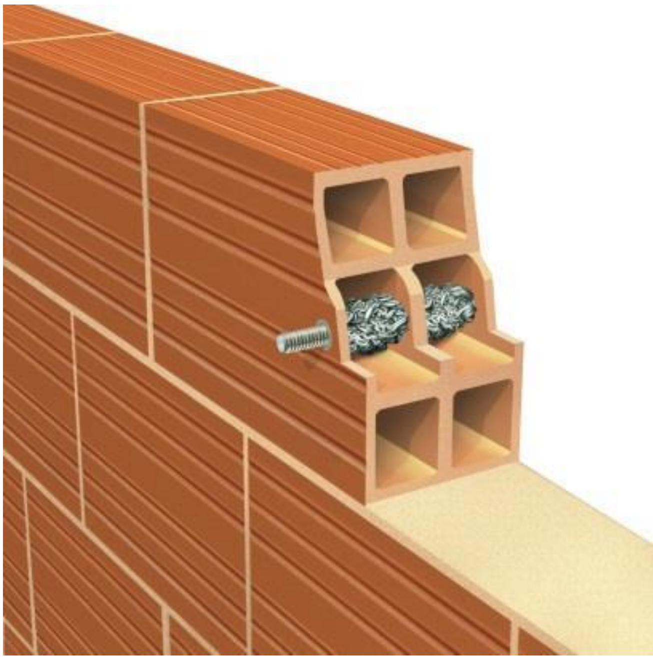


Inyecte el adhesivo en el manguito perforado, empezando por la parte inferior, mientras retira lentamente el mezclador estático. En cualquier caso, evite que quede aire atrapado.

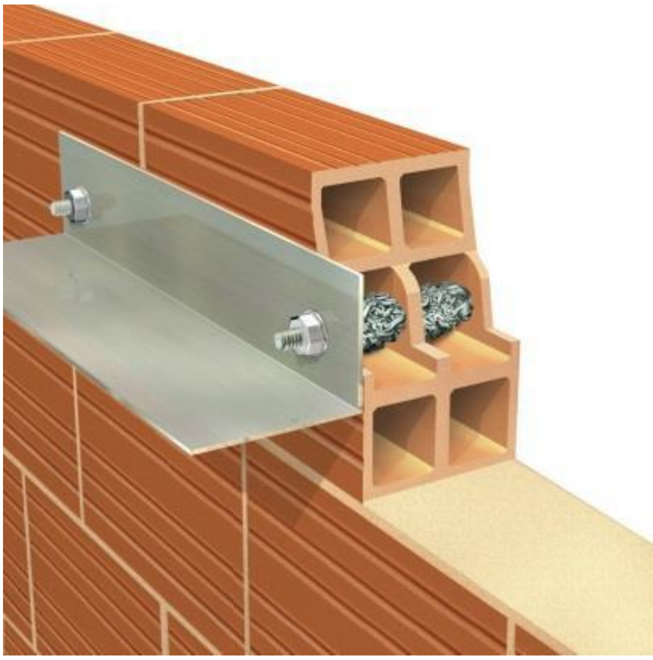

Cierre la tapa del manguito del tamiz perforado para evitar que la resina se escape al entrar en la varilla de acero.



Introduzca el anclaje con un movimiento giratorio en el manguito perforado relleno. Utilice el tamaño de varilla de acero adecuado. Importante: el anclaje debe colocarse dentro del tiempo abierto.



Durante el tiempo de endurecimiento de la resina, el anclaje no debe moverse ni cargarse. Lavar inmediatamente las herramientas con Sika® Colma Cleaner.
Lavar bien las manos y la piel con agua tibia y jabón.



Tras el tiempo de endurecimiento, se puede aplicar la carga.

4.4 APLICACIÓN DE BARRAS APLICADAS A POSTERIORI

Perforación del orificio con un taladro eléctrico hasta el diámetro y la profundidad requeridos. El diámetro del orificio debe estar en consonancia con el tamaño del anclaje.

El orificio de perforación debe limpiarse con aire comprimido, utilizando una lanza de aire, empezando por el fondo del orificio. (al menos dos veces) hasta que la corriente de aire de retorno esté libre de polvo advertido. Se utilizarán compresores sin aceite, con una presión mínima de 6 Bar (90 psi)

El orificio de perforación debe limpiarse a fondo con el cepillo de acero especial (cepillar al menos dos veces). El diámetro del cepillo debe ser mayor que el diámetro del orificio de perforación.

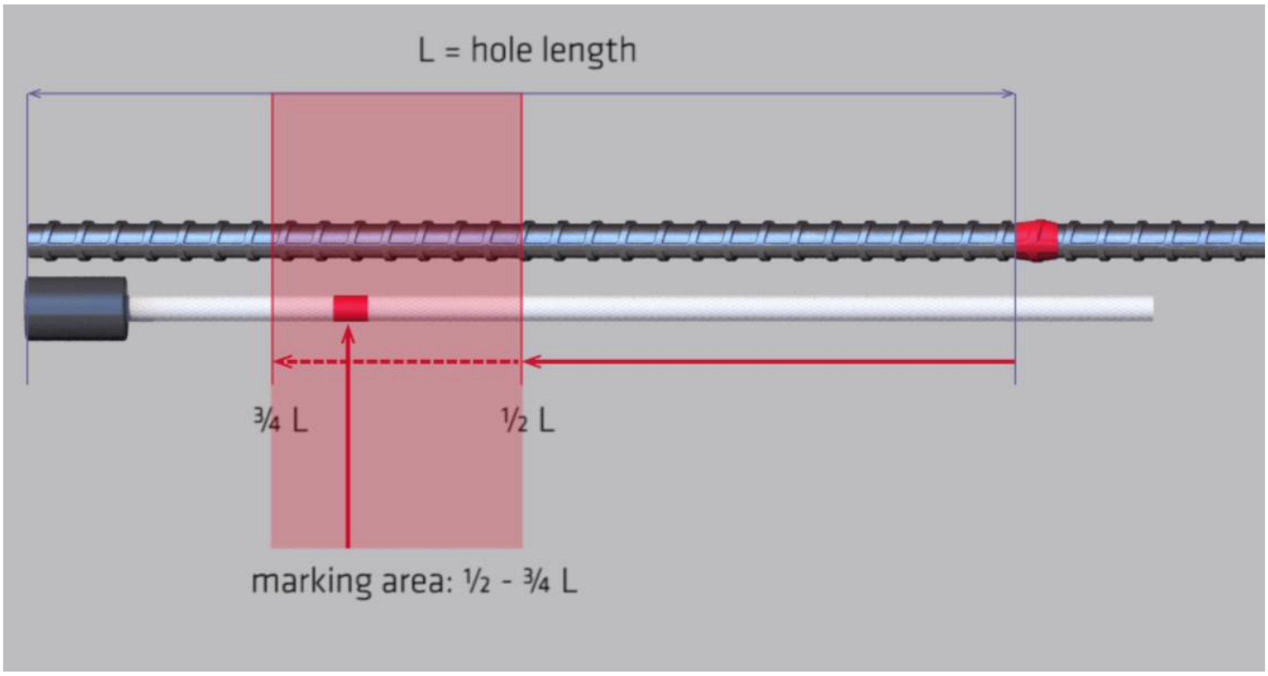
A continuación, el orificio de perforación debe limpiarse de nuevo con aire comprimido, utilizando una lanza de aire, empezando por el fondo del orificio. (al menos dos veces más) hasta que la corriente de aire de retorno esté libre de polvo advertido.
Se utilizarán compresores sin aceite, con una presión mínima de 6 Bar (90 psi)

El orificio de perforación debe limpiarse a fondo con el cepillo de acero especial de nuevo (volver a cepillar al menos dos veces). El diámetro del cepillo debe ser mayor que el diámetro del orificio de perforación.

A continuación, el orificio de perforación debe limpiarse de nuevo con aire comprimido, utilizando una lanza de aire, empezando por el fondo del orificio. (al menos dos veces) hasta que la corriente de aire de retorno esté libre de polvo advertido. Se utilizarán compresores sin aceite, con una presión mínima de 6 Bar (90 psi)

Utilice una cinta aislante, un rotulador o algo similar para ......

Introduzcir la barra de refuerzo en el orificio y marque la profundidad del orificio en la barra de refuerzo con una cinta aislante roja o un marcador……



Marque el tubo de extensión (con el tapón de resina en la parte superior) también con una cinta aislante o un marcador; ½ a ¾ de la profundidad de todo el orificio de perforación

Bombear aproximadamente dos veces o hasta que ambas partes salgan uniformemente. No utilice este material. Suelte la presión de la pistola y limpie la abertura del cartucho con un paño.

Inyecte el adhesivo en el orificio, empezando por el fondo, mientras retira lentamente el mezclador estático. En cualquier caso, evite que quede aire atrapado. Para orificios profundos se pueden utilizar tubos de extensión. Para orificios de mayor diámetro deben utilizarse los tapones de resina para evitar el atrapamiento de aire y los vacíos de aire.

Tire del cartucho con el tubo de extensión y el tapón de resina en la parte superior hacia atrás hasta que la marca sea visible. Esto asegura que el orificio de perforación se llene con una cantidad suficiente de resina.

Introduzca el anclaje con un movimiento giratorio en el orificio relleno. Debe salir algo de adhesivo del orificio. El movimiento giratorio ayuda a distribuir el material.
Importante: el anclaje debe colocarse dentro del tiempo abierto.

Eliminar el exceso de material, por ejemplo, con una espátula o un paño

Durante el tiempo de endurecimiento de la resina, el anclaje no debe moverse ni cargarse. Lavar inmediatamente las herramientas con Sika® Colma Cleaner. Lavar bien las manos y la piel con agua tibia y jabón.

4.5 ELIMINACIÓN DEL MATERIAL CURADO / ENDURECIDO

La abrasión rotatoria con una variedad de discos de lijado y esmerilado es el método de eliminación más común. Cuanto más agresivo sea el método, más rápida será la velocidad de eliminación y más áspera será la superficie final. La abrasión es lenta y genera una gran cantidad de polvo, a menos que se acople un dispositivo de aspiración a la amoladora; estos accesorios están ya disponibles y son lo suficientemente eficaces como para permitir el lijado cuando sea necesario, incluso en el sector de la elaboración de alimentos y otros entornos limpios. Por cierto, los discos abrasivos gruesos parecen generar menos polvo que los discos más finos, que en realidad tienden a pulir la superficie.

Los rascadores flexibles, como los utilizados en los cinceles mecánicos / martillos picadores, también pueden utilizarse para eliminar el exceso de material curado. Siempre funcionan bien, pero lo hacen mejor en superficies lisas de suelos y paredes.

Independientemente del procedimiento que se utilice o del nivel de destreza del operario, es probable que la superficie de hormigón resulte dañada de algún modo tras eliminar el producto curado.

Por lo general, es aconsejable realizar primero una prueba.

5 ACCESORIOS

Una parte esencial de toda la aplicación del anclaje químico son los accesorios. Tienen una gran influencia en toda la aplicación, en términos de calidad y velocidad de aplicación. Por ello, todos los accesorios están referidos y declarados por tipo y tamaño en todas las homologaciones, ya que sin utilizarlos, no se puede garantizar una aplicación suficiente y el anclaje puede fallar.

Utilice siempre los accesorios originales y el tamaño correcto para cada aplicación. Tienen una gran influencia en el rendimiento de cada anclaje.

Todos los valores indicados en las homologaciones sólo pueden alcanzarse utilizando los accesorios correctos.

Para los datos técnicos de todos los accesorios Sika AnchorFix, consulte la ficha técnica de cada artículo. Para los datos de pedido, consulte el folleto "Accesorios Sika AnchorFix".

5.1 MEZCLADORES

Los boquillas mezcladoras Sika AnchorFix® se fijan en cada producto AnchorFix® para lograr la mezcla correcta del adhesivo de anclaje de dos componente y su aplicación en los orificios de anclaje perforados.

Antes de aplicar el adhesivo Sika AnchorFix®, ajustar la boquilla mezcladora estática correcta en cada cartucho Sika Anchor-Fix® después de quitar la tapa del cartucho. Es esencial que se utilice la boquilla mezcladora correcta con los sistemas de anclaje químico Sika AnchorFix® en todo momento. El uso de boquillas de mezcla no aprobadas puede mezclar insuficientemente el producto, variar el consumo y reducir el rendimiento. Cuando los mezcladores / boquillas estáticas Sika AnchorFix® se han fijado en posición, bombear la pistola al menos 2 veces o hasta que ambas partes sean extruidas con un color consistente. No utilizar este material. Liberar la presión de la pistola y limpiar la abertura del mezclador estático con un trapo. Para el procedimiento de instalación del adhesivo de anclaje Sika AnchorFix®, consulte las hojas de datos del producto individuales y cualquier documentación adicional asociada. documentación adicional.

- No utilizar otros tipos de boquillas mezcladoras estáticas, sólo utilizar boquillas mezcladoras estáticas Sika AnchorFix®.
- No cortar ni reducir la longitud de la boquilla mezcladora estática, ya que esto afectará al rendimiento de la mezcla.
- Utilizar únicamente los adhesivos de anclaje Sika AnchorFix® con las boquillas/mezcladores estáticos Sika AnchorFix®.

Mezcladores

5.2 CEPILLOS HIÍBRIDOS

Sika AnchorFix® Hole Cleaning Brushes Hybrid es un cepillo para limpiar orificios de Ø8 mm a Ø40 mm para aplicaciones Sika AnchorFix®.

Para la limpieza de los agujeros se debe utilizar una combinación de cepillo de diámetro correcto y aire comprimido (suministrado por un compresor) o una bomba de mano para limpiar los orificios. El orificio de perforación debe limpiarse a fondo con el cepillo especial original de Sika AnchorFix®. El diámetro del cepillo debe ser mayor que el diámetro del orificio de perforación. Introducir el cepillo hasta el final del orificio de perforación. Sacar el cepillo. Repita este procedimiento. No utilice otros cepillos de limpieza que no sean los originales SikaAnchorFix® originales.

Cepillos híbridos de limpieza del taladro

5.3 CEPILLOS METÁLICOS

Sika AnchorFix® Cepillos para la limpieza de orificios full Steel es un cepillo para limpiar orificios de Ø12mm a Ø55mm para aplicaciones Sika AnchorFix®.

Para la limpieza de orificios se debe utilizar una combinación de cepillo de diámetro correcto y aire comprimido (suministrado por un compresor) o una bomba manual. El orificio de perforación debe limpiarse a fondo con el cepillo especial original de Sika AnchorFix®. El diámetro del cepillo debe ser mayor que el diámetro del orificio de perforación. Introducir el cepillo hasta el final del orificio de perforación. Sacar el cepillo. Repita este procedimiento. No utilice otros cepillos de limpieza que no sean los originales SikaAnchorFix® originales.

Cepillos metálicos de limpieza

5.4 LIMPIADOR DE AIRE

La bomba de limpieza Sika AnchorFix® es una herramienta manual para limpiar orificios de Ø10mm a Ø60mm para aplicaciones Sika Anchor-Fix®.

El orificio de perforación debe ser limpiado, comenzando por la parte inferior del mismo. Extender completamente el pistón de la bomba. Introducir el tubo flexible hasta el fondo del orificio de perforación. Empuje el pistón hacia atrás rápidamente para expulsar el polvo del orificio de perforación. Repita este procedimiento. Una combinación de cepillo de diámetro correcto y aire comprimido (compresor o Sika AnchorFix® Cleaning Pump) debe utilizarse para limpiar los orificios de perforación. No utilizar otros tipos de bombas de limpieza. Sika AnchorFix® Cleaning Pump está diseñada para producir el volumen correcto de aire para los diferentes tamaños de orificios.

Limpiador de aire

5.5 EXTENSOR FLEXIBLE

Sika AnchorFix® Flexible Extensions es un tubo flexible y se utiliza como una extensión de la boquilla / mezclador estático para aplicar AnchorFix® en orificios profundos.

Dependiendo de la profundidad del orificio requerido. Colocar el tubo de extensión sobre el extremo del mezclador estático / boquilla. El tubo de extensión se puede cortar a la longitud requerida.

Extensor flexible

5.6 EXTENSOR RÍGIDO

Sika AnchorFix® Straight Extensions es un tubo recto y se utiliza como una extensión de la boquilla / mezclador estático para aplicar AnchorFix® en orificios profundos.

Dependiendo de la profundidad del orificio requerido, Colocar el tubo de extensión sobre el extremo del mezclador estático / boquilla.

El tubo de extensión se puede cortar a la longitud requerida

Extensor rígido

5.7 STOPPERS DE RESINA

Sika AnchorFix® Resin Stoppers es una herramienta para rellenar orificios profundos y/o de gran diámetro eliminando los vacíos de aire. Se utiliza con un tubo flexible Sika Anchorfix® que se fija en el mezclador estático.

Todos los tapones de resina deben utilizarse junto con un tubo flexible Sika AnchorFix® de 14 mm (9/16") de diámetro exterior (O/D). El tubo debe aplicarse en el mezclador estático original de un producto AnchorFix®.

Introducir el tapón de resina hasta el fondo del orificio. Bombear el material de resina y dejar que el orificio se llene. Introducir siempre el tubo flexible Sika AnchorFix® de manera que quede a ras de la salida del tapón de resina. Después del uso, limpie el tapón de resina con un paño húmedo y vuelva a utilizarlo. Utilizar únicamente el tapón de resina Sika AnchorFix® original.

Stoppers de resina

5.8 TAMICES PERFORADOS

Los tamices perforados se utilizan para llevar a cabo la fijación de anclajes en mampostería hueca y ladrillos huecos.

Después de limpiar el polvo, etc., del orificio de perforación, se coloca el tamiz perforado en el orificio. Empezando por la parte inferior del tamiz perforado, aplicar gradualmente el adhesivo de anclaje Sika AnchorFix® en el tamiz para que la resina salga a través de las perforaciones. Cerrar la tapa del anillo central del tamiz para evitar que la resina se escape antes de la inserción del anclaje. Introducir el anclaje en el tamiz con un movimiento giratorio dentro del tiempo de apertura del adhesivo.

Una parte del adhesivo debe fluir fuera del extremo del tamiz y a través de las perforaciones hacia la cavidad de la mampostería hueca.

Tamiz perforado

6 DISCLAIMER

Este método de ejecución es proporcionado por Sika como una "propuesta estándar" para la aplicación de la gama de anclajes químicos Sika AnchorFix®. Por favor, consulte también las recomendaciones específicas en la hoja de datos del producto correspondiente para cada producto.

Siempre es responsabilidad del ingeniero estructural confirmar la idoneidad del producto y el método correcto para cualquier aplicación.

Cuando se vayan a utilizar métodos o criterios alternativos a los aquí expuestos, éstos deberán ser presentados primero a los Servicios Técnicos de Sika para su aprobación y acuerdo previo por escrito, antes del comienzo de cualquier trabajo. Sika no puede aceptar la responsabilidad debido a cualquier otra variación o condición.

7 NOTAS LEGALES

La información y, en particular, las recomendaciones relativas a la aplicación y el uso final de los productos Sika, han sido dadas de buena fe basándose en los conocimientos y experiencia actuales de Sika cuando se almacenan, manipulan y aplican correctamente en condiciones normales de conformidad con las recomendaciones de Sika. En la práctica, las diferencias en los materiales, los soportes y las condiciones reales del sitio son tales que no se puede inferir ninguna garantía con respecto a la comerciabilidad o aptitud para un propósito particular, ni ninguna responsabilidad derivada de cualquier relación jurídica de esta información, de cualquier recomendación escrita, o de cualquier otro consejo ofrecido. El usuario del producto debe probar la idoneidad de los productos para la aplicación y propósito previstos. Sika se reserva el derecho de cambiar las propiedades de sus productos. Los derechos de propiedad de terceros deben ser tenidos en cuenta. Todas las órdenes son aceptadas sujeto a nuestras condiciones actuales de venta y entrega. Los usuarios siempre deben referirse al número más reciente de la Hoja de Datos de Producto local para el producto en cuestión, copias de las cuales serán suministradas bajo petición.

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Technical Documentation
Sika AnchorFix®-3030
Product Information

Sika Services AG

BUILDING TRUST

TABLE OF CONTENTS

CHEMICAL RESISTANCE

Chemical mortar has undergone extensive chemical resistance testing. The results are summarised in the table below.

Chemical Environment	Concentration	Result
Aqueous Solution Acetic Acid	10%	C
Acetone	100%	✗
Aqueous Solution Aluminium Chloride	Saturated	✓
Aqueous Solution Aluminium Nitrate	10%	✓
Ammonia Solution	5%	✓
Jet Fuel	100%	C
Benzene	100%	C
Benzoic Acid	Saturated	✓
Benzyl Alcohol	100%	✗
Sodium Hypochlorite Solution	5 - 15%	✓
Butyl Alcohol	100%	C
Calcium Sulphate Aqueous Solution	Saturated	✓
Carbon Monoxide	Gas	✓
Carbon Tetrachloride	100%	C
Chlorine Water	Saturated	✗
Chloro Benzene	100%	✗
Citric Acid Aqueous Solution	Saturated	✓
Cyclohexanol	100%	✓
Diesel Fuel	100%	C
Diethylene Glycol	100%	✓
Ethanol	95%	✗
Ethanol Aqueous Solution	20%	C
Heptane	100%	C
Hexane	100%	C
Hydrochloric Acid	10%	✓
	15%	✓
	25%	C
Hydrogen Sulphide Gas	100%	✓
Isoproyl Alcohol	100%	✗
Linseed Oil	100%	✓

Lubricating Oil	100%	✓
Mineral Oil	100%	✓
Paraffin / Kerosene (Domestic)	100%	C
Phenol Aqueous Solution	1%	C
Phosphoric Acid	50%	✓
Potassium Hydroxide	10% / pH13	✓
Sea Water	100%	C
Styrene	100%	C
Sulphur Dioxide Solution	10%	✓
Sulphur Dioxide (40°C)	5%	✓
Sulphuric Acid	10%	✓
	50%	✓
Turpentine	100%	C
White Spirit	100%	✓
Xylene	100%	C

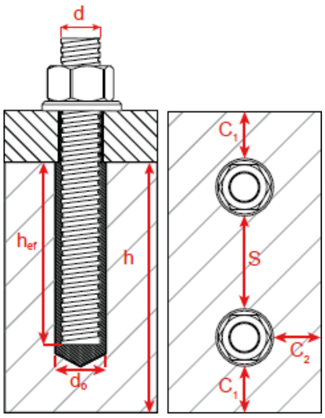
✓ *= Resistant to 75°C with at least 80% of physical properties retained.*

C *= Contact only to a maximum of 25°C.*

✗ *= Not resistant*

INSTALLATION PARAMETERS - THREADED RODS

Property			Anchor Diameter							
			M8	M10	M12	M16	M20	M24	M27	M30
Nominal Drill Hole Diameter	d_0	mm	10	12	14	18	22	26	30	35
Cleaning Brush Diameter	d_b	mm	S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque Moment	T_{inst}	Nm	10	20	40	80	120	160	180	200
Minimum Embedment Depth										
Effective Embedment Depth	h_{ef}	mm	60	60	70	80	90	96	108	120
Minimum Edge Distance	c_{min}	mm	40	40	40	40	50	50	50	50
Minimum Anchor Spacing	s_{min}	mm	40	40	40	40	50	50	50	50
Minimum Member Thickness	h_{min}	mm	h_{ef} + 30 mm ≥ 100 mm			$h_{ef} + 2d_0$				
Maximum Embedment Depth										
Effective Embedment Depth	h_{ef}	mm	160	200	240	320	400	480	540	600
Minimum Edge Distance	c_{min}	mm	80	100	120	160	200	240	270	300
Minimum Anchor Spacing	s_{min}	mm	80	100	120	160	200	240	270	300
Minimum Member Thickness	h_{min}	mm	h_{ef} + 30 mm ≥ 100 mm			$h_{ef} + 2d_0$				



INSTALLATION PARAMETERS - REBARS

Property			**Anchor Diameter**						
			8mm	**10mm**	**12mm**	**16mm**	**20mm**	**25mm**	**32mm**
Nominal Drill Hole Diameter	d_0	mm	12	14	16	20	25	32	40
Cleaning Brush Diameter	d_b	mm	S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF
Torque Moment	T_{inst}	Nm	10	20	40	80	120	180	200
Minimum Embedment Depth									
Effective Embedment Depth	h_{ef}	mm	60	60	70	80	90	100	128
Minimum Edge Distance	c_{min}	mm	40	40	40	40	50	50	50
Minimum Anchor Spacing	s_{min}	mm	40	40	40	40	50	50	50
Minimum Member Thickness	h_{min}	mm	h_{ef} + 30 mm ≥ 100 mm				$h_{ef} + 2d_0$		
Maximum Embedment Depth									
Effective Embedment Depth	h_{ef}	mm	160	200	240	320	400	500	640
Minimum Edge Distance	c_{min}	mm	80	100	120	160	200	250	320
Minimum Anchor Spacing	s_{min}	mm	80	100	120	160	200	250	320
Minimum Member Thickness	h_{min}	mm	h_{ef} + 30 mm ≥ 100 mm				$h_{ef} + 2d_0$		

STEEL FAILURE IN TENSION - THREADED RODS

Characteristic resistance values under tension loading

Steel Grade			Anchor Diameter							
			M8	M10	M12	M16	M20	M24	M27	M30
Steel Grade 4.6	$N_{Rk,s}$	(kN)	15	23	34	63	98	141	184	224
Partial Safety Factor	γ_{Ms}	(-)	2,00							
Steel Grade 5.8	$N_{Rk,s}$	(kN)	18	29	42	79	123	177	230	281
Partial Safety Factor	γ_{Ms}	(-)	1,50							
Steel Grade 8.8	$N_{Rk,s}$	(kN)	29	46	67	126	196	282	367	449
Partial Safety Factor	γ_{Ms}	(-)	1,50							
Steel Grade 10.9*	$N_{Rk,s}$	(kN)	37	58	84	157	245	353	459	561
Partial Safety Factor	γ_{Ms}	(-)	1,33							
Stainless Steel A2-70, A4-70	$N_{Rk,s}$	(kN)	26	41	59	110	172	247	321	393
Partial Safety Factor	γ_{Ms}	(-)	1,87							
Stainless Steel A4-80	$N_{Rk,s}$	(kN)	29	46	67	126	196	282	367	449
Partial Safety Factor	γ_{Ms}	(-)	1,60							
Stainless Steel 1.4529	$N_{Rk,s}$	(kN)	26	41	59	110	172	247	321	393
Partial Safety Factor	γ_{Ms}	(-)	1,50							
Stainless Steel 1.4565	$N_{Rk,s}$	(kN)	26	41	59	110	172	247	321	393
Partial Safety Factor	γ_{Ms}	(-)	1,87							

**Galvanised rod of high strength are sensitive to hydrogen embrittlement*

STEEL FAILURE IN TENSION - REINFORCING BARS

Characteristic resistance values under tension loading

Steel Grade			Anchor Diameter						
			8mm	10mm	12mm	16mm	20mm	25mm	32mm
Rebar BSt 500	$N_{Rk,s}$	(kN)	28	43	62	111	173	270	442
Partial Safety Factor	γ_{Ms}	(-)	1,40						

CHARACTERISTIC RESISTANCE - COMBINED PULLOUT & CONCRETE CONE FAILURE USING THREADED RODS

Dry / Wet Concrete | Temperature Range: -40°C to +70°C

Property				Anchor Diameter							
				M8	M10	M12	M16	M20	M24	M27	M30
Characteristic Bond Strength in Uncracked Concrete		τ_{Rk}	N/mm²	17,0	15,0	15,0	12,0	12,0	12,0	11,0	9,5
Factor for Uncracked Concrete Strength	C25/30	ψ_c	-	1,02							
	C30/37			1,04							
	C35/45			1,06							
	C40/50			1,07							
	C45/55			1,08							
	C50/60			1,09							
Partial Safety Factor		γ_{Mp}	-	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Characteristic Bond Strength in Cracked Concrete		τ_{Rk}	N/mm²	10,0	10,0	10,0	9,5	9,0	9,0	6,0	6,0
Factor for Cracked Concrete Strength	C25/30	ψ_c	-	1,02							
	C30/37			1,04							
	C35/45			1,06							
	C40/50			1,07							
	C45/55			1,08							
	C50/60			1,09							
Partial Safety Factor		γ_{Mp}	-	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5

SPLITTING FAILURE

Property			Anchor Diameter							
			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic Edge Distance	$c_{cr,sp}$	mm	$2h_{ef}$							
Characteristic Anchor Spacing	$s_{cr,sp}$	mm	$2c_{cr,sp}$							
Partial Safety Factor	γ_{Msp}	-	1,8							

RESISTANCE VALUES FOR THREADED RODS IN UNCRACKED CONCRETE

Combined Pullout & Concrete Cone Failure and Concrete Cone Failure | Temperature Range: -40°C to +70°C

Property			Anchor Diameter							
			M8	M10	M12	M16	M20	M24	M27	M30
Effective Embedment Depth = MIN	h_{ef}	mm	60	60	70	80	90	96	108	120
Characteristic Resistance	N_{Rk}	kN	23,47	23,47	29,58	36,13	43,12	47,50	56,68	66,38
Design Resistance	N_{Rd}	kN	15,65	15,65	19,72	24,09	28,75	31,67	37,79	44,26
Controlling Resistance			Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone
Effective Embedment Depth = 8d	h_{ef}	mm	64	80	96	128	160	192	216	240
Characteristic Resistance	N_{Rk}	kN	25,86	36,13	47,50	73,13	102,20	134,35	160,31	187,76
Design Resistance	N_{Rd}	kN	17,24	24,09	31,67	48,75	68,14	89,57	106,88	125,17
Controlling Resistance			Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone
Effective Embedment Depth = STD	h_{ef}	mm	80	90	110	128	170	240	270	300
Characteristic Resistance	N_{Rk}	kN	34,18	42,41	58,26	73,13	111,93	187,76	224,05	262,41
Design Resistance	N_{Rd}	kN	22,79	28,27	38,84	48,75	74,62	125,17	149,36	174,94
Controlling Resistance			Pullout	Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone
Effective Embedment Depth = 12d	h_{ef}	mm	96	120	144	192	240	288	324	360
Characteristic Resistance	N_{Rk}	kN	41,02	56,55	81,43	115,81	180,96	246,82	294,52	322,33
Design Resistance	N_{Rd}	kN	27,34	37,70	54,29	77,21	120,64	164,55	196,34	214,88
Controlling Resistance			Pullout	Pullout	Pullout	Pullout	Pullout	Concrete Cone	Concrete Cone	Pullout
Effective Embedment Depth = 20d	h_{ef}	mm	160	200	240	320	400	480	540	600
Characteristic Resistance	N_{Rk}	kN	68,36	94,25	135,72	193,02	301,59	434,29	503,85	537,21
Design Resistance	N_{Rd}	kN	45,57	62,83	90,48	128,68	201,06	289,53	335,90	358,14
Controlling Resistance			Pullout	Pullout	Pullout	Pullout	Pullout	Pullout	Pullout	Pullout

1. *Resistance values are based on combined pullout & concrete cone failure and concrete cone failure according to EOTA TR029. Resistance for steel failure must also be considered - the lowest value controls.*
2. *Resistance values are for single anchors without close edges or eccentric loading considerations.*
3. *Tabulated values correspond to the above stated temperature range and installation conditions only.*
4. *Long term temperatures are these that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, e.g.: diurnal cycling.*
5. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm^2.*
6. *Tabulated resistance values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

RESISTANCE VALUES FOR THREADED RODS IN CRACKED CONCRETE

Combined Pullout & Concrete Cone Failure and Concrete Cone Failure | Temperature Range: -40°C to +70°C

Property			Anchor Diameter							
			M8	M10	M12	M16	M20	M24	M27	M30
Effective Embedment Depth = MIN	h_{ef}	mm	60	60	70	80	90	96	108	120
Characteristic Resistance	N_{Rk}	kN	15,08	16,73	21,08	25,76	30,74	33,86	40,41	47,32
Design Resistance	N_{Rd}	kN	10,05	11,15	14,06	17,17	20,49	22,57	26,94	31,55
Controlling Resistance			Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone
Effective Embedment Depth = 8d	h_{ef}	mm	64	80	96	128	160	192	216	240
Characteristic Resistance	N_{Rk}	kN	16,08	25,13	33,86	52,13	72,86	95,78	109,93	133,85
Design Resistance	N_{Rd}	kN	10,72	16,76	22,57	34,76	48,57	63,85	73,29	89,23
Controlling Resistance			Pullout	Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Pullout	Concrete Cone
Effective Embedment Depth = STD	h_{ef}	mm	80	90	110	128	170	240	270	300
Characteristic Resistance	N_{Rk}	kN	20,11	28,27	41,47	52,13	79,80	133,85	137,41	169,65
Design Resistance	N_{Rd}	kN	13,40	18,85	27,65	34,76	53,20	89,23	91,61	113,10
Controlling Resistance			Pullout	Pullout	Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Pullout	Pullout
Effective Embedment Depth = 12d	h_{ef}	mm	96	120	144	192	240	288	324	360
Characteristic Resistance	N_{Rk}	kN	24,13	37,70	54,29	91,68	133,85	175,95	164,90	203,58
Design Resistance	N_{Rd}	kN	16,08	25,13	36,19	61,12	89,23	117,30	109,93	135,72
Controlling Resistance			Pullout	Pullout	Pullout	Pullout	Concrete Cone	Concrete Cone	Pullout	Pullout
Effective Embedment Depth = 20d	h_{ef}	mm	160	200	240	320	400	480	540	600
Characteristic Resistance	N_{Rk}	kN	40,21	62,83	90,48	152,81	226,19	325,72	274,83	339,29
Design Resistance	N_{Rd}	kN	26,81	41,89	60,32	101,87	150,80	217,15	183,22	226,19
Controlling Resistance			Pullout	Pullout	Pullout	Pullout	Pullout	Pullout	Pullout	Pullout

1. *Resistance values are based on combined pullout & concrete cone failure and concrete cone failure according to EOTA TR029. Resistance for steel failure must also be considered - the lowest value controls.*
2. *Resistance values are for single anchors without close edges or eccentric loading considerations.*
3. *Tabulated values correspond to the above stated temperature range and installation conditions only.*
4. *Long term temperatures are these that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, e.g.: diurnal cycling.*
5. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm².*
6. *Tabulated resistance values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

Property			Anchor Diameter		
			M12	**M16**	**M20**
Characteristic Bond Strength in Cracked Concrete under Seismic action (Performance Category C1)	τ_{Rk}	N/mm²	5,2	6,6	6,8
Partial Safety Factor	γ_{Mp}	-	1,5	1,5	1,5

RESISTANCE VALUES TO TENSION LOADS FOR THREADED RODS IN CRACKED CONCRETE

Seismic loading category C1

Combined Pullout & Concrete Cone Failure and Concrete Cone Failure | Temperature Range: -40°C to +70°C

Property			Anchor Diameter		
			M12	M16	M20
Effective Embedment Depth = MIN	h_{ef}	mm	70	80	90
Characteristic Resistance	N_{Rk}	kN	13,72	25,76	30,74
Design Resistance	N_{Rd}	kN	9,15	17,17	20,49
Controlling Resistance			Pullout	Concrete Cone	Concrete Cone
Effective Embedment Depth = 8d	h_{ef}	mm	96	128	160
Characteristic Resistance	N_{Rk}	kN	18,82	42,46	68,36
Design Resistance	N_{Rd}	kN	12,55	28,31	45,57
Controlling Resistance			Pullout	Pullout	Pullout
Effective Embedment Depth = STD	h_{ef}	mm	110	128	170
Characteristic Resistance	N_{Rk}	kN	21,56	42,46	72,63
Design Resistance	N_{Rd}	kN	14,38	28,31	48,42
Controlling Resistance			Pullout	Pullout	Pullout
Effective Embedment Depth = 12d	h_{ef}	mm	144	192	240
Characteristic Resistance	N_{Rk}	kN	28,23	63,70	102,54
Design Resistance	N_{Rd}	kN	18,82	42,46	68,36
Controlling Resistance			Pullout	Pullout	Pullout
Effective Embedment Depth = 20d	h_{ef}	mm	240	320	400
Characteristic Resistance	N_{Rk}	kN	47,05	106,16	170,90
Design Resistance	N_{Rd}	kN	31,37	70,77	113,94
Controlling Resistance			Pullout	Pullout	Pullout

1. *Resistance values are based on combined pullout & concrete cone failure and concrete cone failure according to EOTA TR029. Resistance for steel failure must also be considered - the lowest value controls.*
2. *Resistance values are for single anchors without close edges or eccentric loading considerations.*
3. *Tabulated values correspond to the above stated temperature range and installation conditions only.*
4. *Long term temperatures are these that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, e.g.: diurnal cycling.*
5. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm².*
6. *Tabulated resistance values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure*

Property			Anchor Diameter		
			M12	**M16**	**M20**
Characteristic Bond Strength in Cracked Concrete under Seismic action (Performance Category C2)	τ_{Rk}	N/mm²	3,5	4,0	4,5
Partial Safety Factor	γ_{Mp}	-	1,5	1,5	1,5

RESISTANCE VALUES TO TENSION LOADS FOR THREADED RODS IN CRACKED CONCRETE

Seismic loading category C2

Combined Pullout & Concrete Cone Failure and Concrete Cone Failure | Temperature Range: -40°C to +70°C

Property			Anchor Diameter		
			M12	M16	M20
Effective Embedment Depth = MIN	h_{ef}	mm	70	80	90
Characteristic Resistance	N_{Rk}	kN	9,24	16,08	25,45
Design Resistance	N_{Rd}	kN	6,16	10,72	16,96
Controlling Resistance			Pullout	Pullout	Pullout
Effective Embedment Depth = 8d	h_{ef}	mm	96	128	160
Characteristic Resistance	N_{Rk}	kN	12,67	25,74	45,24
Design Resistance	N_{Rd}	kN	8,44	17,16	30,16
Controlling Resistance			Pullout	Pullout	Pullout
Effective Embedment Depth = STD	h_{ef}	mm	110	128	170
Characteristic Resistance	N_{Rk}	kN	14,51	25,74	48,07
Design Resistance	N_{Rd}	kN	9,68	17,16	32,04
Controlling Resistance			Pullout	Pullout	Pullout
Effective Embedment Depth = 12d	h_{ef}	mm	144	192	240
Characteristic Resistance	N_{Rk}	kN	19,00	38,60	67,86
Design Resistance	N_{Rd}	kN	12,67	25,74	45,24
Controlling Resistance			Pullout	Pullout	Pullout
Effective Embedment Depth = 20d	h_{ef}	mm	240	320	400
Characteristic Resistance	N_{Rk}	kN	31,67	64,34	113,10
Design Resistance	N_{Rd}	kN	21,11	42,89	75,40
Controlling Resistance			Pullout	Pullout	Pullout

1. *Resistance values are based on combined pullout & concrete cone failure and concrete cone failure according to EOTA TR029. Resistance for steel failure must also be considered - the lowest value controls.*
2. *Resistance values are for single anchors without close edges or eccentric loading considerations.*
3. *Tabulated values correspond to the above stated temperature range and installation conditions only.*
4. *Long term temperatures are these that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, e.g.: diurnal cycling.*
5. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm².*
6. *Tabulated resistance values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure*

CHARACTERISTIC RESISTANCE - COMBINED PULLOUT & CONCRETE CONE FAILURE USING REINFORCING BARS

Dry / Wet Concrete | Temperature Range:-40°C to +70°C

Property				Anchor Diameter						
				8mm	10mm	12mm	16mm	20mm	25mm	32mm
Characteristic Bond Strength in Uncracked Concrete		τ_{Rk}	N/mm²	13,0	13,0	13,0	12,0	12,0	12,0	8,0
Factor for Uncracked Concrete Strength	C25/30	ψ_C	-	1,02						
	C30/37			1,04						
	C35/45			1,06						
	C40/50			1,07						
	C45/55			1,08						
	C50/60			1,09						
Partial Safety Factor		γ_{Mp}	-	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Characteristic Bond Strength in Cracked Concrete		τ_{Rk}	N/mm²	8,0	11,0	10,0	10,0	10,0	8,5	6,5
Factor for Cracked Concrete Strength	C25/30	ψ_C	-	1,02						
	C30/37			1,04						
	C35/45			1,06						
	C40/50			1,07						
	C45/55			1,08						
	C50/60			1,09						
Partial Safety Factor		γ_{Mp}	-	1,5	1,5	1,5	1,5	1,5	1,5	1,5

SPLITTING FAILURE

Property			Anchor Diameter						
			8mm	10mm	12mm	16mm	20mm	25mm	32mm
Characteristic Edge Distance	$c_{cr,sp}$	mm	$2h_{ef}$						
Characteristic Anchor Spacing	$s_{cr,sp}$	mm	$2c_{cr,sp}$						
Partial Safety Factor	γ_{Msp}	-	1,8						

RESISTANCE VALUES FOR REINFORCING BARS IN UNCRACKED CONCRETE

Combined Pullout & Concrete Cone Failure and Concrete Cone Failure | Temperature Range: -40°C to +70°C

Property			Anchor Diameter						
			8mm	10mm	12mm	16mm	20mm	25mm	32mm
Effective Embedment Depth = MIN	h_{ef}	mm	60	60	70	80	90	100	128
Characteristic Resistance	N_{Rk}	kN	19,60	23,47	29,58	36,13	43,12	50,50	73,13
Design Resistance	N_{Rd}	kN	13,07	15,65	19,72	24,09	28,75	33,67	48,75
Controlling Resistance			Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone
Effective Embedment Depth = 8d	h_{ef}	mm	64	80	96	128	160	200	256
Characteristic Resistance	N_{Rk}	kN	20,91	32,67	47,05	73,13	102,20	142,84	173,72
Design Resistance	N_{Rd}	kN	13,94	21,78	31,37	48,75	68,14	95,22	115,81
Controlling Resistance			Pullout	Pullout	Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Pullout
Effective Embedment Depth = STD	h_{ef}	mm	80	90	110	128	170	250	300
Characteristic Resistance	N_{Rk}	kN	26,14	36,76	53,91	73,13	111,93	199,62	203,58
Design Resistance	N_{Rd}	kN	17,43	24,50	35,94	48,75	74,62	133,08	135,72
Controlling Resistance			Pullout	Pullout	Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Pullout
Effective Embedment Depth = 12d	h_{ef}	mm	96	120	144	192	240	300	384
Characteristic Resistance	N_{Rk}	kN	31,37	49,01	70,57	115,81	180,96	262,41	308,83
Design Resistance	N_{Rd}	kN	20,91	32,67	47,05	77,21	120,64	174,94	205,89
Controlling Resistance			Pullout	Pullout	Pullout	Pullout	Pullout	Concrete Cone	Pullout
Effective Embedment Depth = 20d	h_{ef}	mm	160	200	240	320	400	500	640
Characteristic Resistance	N_{Rk}	kN	52,28	81,68	117,62	193,02	301,59	471,24	514,72
Design Resistance	N_{Rd}	kN	34,85	54,45	78,41	128,68	201,06	314,16	343,15
Controlling Resistance			Pullout	Pullout	Pullout	Pullout	Pullout	Pullout	Pullout

1. *Resistance values are based on combined pullout & concrete cone failure and concrete cone failure according to EOTA TR029. Resistance for steel failure must also be considered - the lowest value controls.*
2. *Resistance values are for single anchors without close edges or eccentric loading considerations.*
3. *Tabulated values correspond to the above stated temperature range and installation conditions only.*
4. *Long term temperatures are these that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, e.g.: diurnal cycling.*
5. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm².*
6. *Tabulated resistance values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.*

RESISTANCE VALUES FOR REINFORCING BARS IN CRACKED CONCRETE

Combined Pullout & Concrete Cone Failure and Concrete Cone Failure | Temperature Range: -40°C to +70°C

Property			Anchor Diameter						
			8mm	10mm	12mm	16mm	20mm	25mm	32mm
Effective Embedment Depth = MIN	h_{ef}	mm	60	60	70	80	90	100	128
Characteristic Resistance	N_{Rk}	kN	12,06	16,73	21,08	25,76	30,74	36,00	52,13
Design Resistance	N_{Rd}	kN	8,04	11,15	14,06	17,17	20,49	24,00	34,76
Controlling Resistance			Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone
Effective Embedment Depth = 8d	h_{ef}	mm	64	80	96	128	160	200	256
Characteristic Resistance	N_{Rk}	kN	12,87	25,76	33,86	52,13	72,86	101,82	141,15
Design Resistance	N_{Rd}	kN	8,58	17,17	22,57	34,76	48,57	67,88	94,10
Controlling Resistance			Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Concrete Cone	Pullout
Effective Embedment Depth = STD	h_{ef}	mm	80	90	110	128	170	250	300
Characteristic Resistance	N_{Rk}	kN	16,08	30,74	41,47	52,13	79,80	142,30	165,40
Design Resistance	N_{Rd}	kN	10,72	20,49	27,65	34,76	53,20	94,87	110,27
Controlling Resistance			Pullout	Concrete Cone	Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Pullout
Effective Embedment Depth = 12d	h_{ef}	mm	96	120	144	192	240	300	384
Characteristic Resistance	N_{Rk}	kN	19,30	41,47	54,29	95,78	133,85	200,28	250,93
Design Resistance	N_{Rd}	kN	12,87	27,65	36,19	63,85	89,23	133,52	167,28
Controlling Resistance			Pullout	Pullout	Pullout	Concrete Cone	Concrete Cone	Concrete Cone	Pullout
Effective Embedment Depth = 20d	h_{ef}	mm	160	200	240	320	400	500	640
Characteristic Resistance	N_{Rk}	kN	32,17	69,12	90,48	160,85	251,33	333,79	418,21
Design Resistance	N_{Rd}	kN	21,45	46,08	60,32	107,23	167,55	222,53	278,81
Controlling Resistance			Pullout	Pullout	Pullout	Pullout	Pullout	Pullout	Pullout

1. *Resistance values are based on combined pullout & concrete cone failure and concrete cone failure according to EOTA TR029. Resistance for steel failure must also be considered - the lowest value controls.*
2. *Resistance values are for single anchors without close edges or eccentric loading considerations.*
3. *Tabulated values correspond to the above stated temperature range and installation conditions only.*
4. *Long term temperatures are those that remain roughly constant over prolonged periods. Short term temperatures occur over brief intervals, e.g.: diurnal cycling.*
5. *The compressive strength of the concrete ($f_{ck,cube}$) is assumed to be 25 N/mm².*
Tabulated resistance values assume that the geometry of the anchor(s) and concrete member is sufficient to avoid splitting failure.

INSTALLATION PARAMETERS FOR POST-INSTALLED REBAR CONNECTIONS

Rebar Diameter[mm]	$f_{y,k}$ [N/mm²]	Drill Hole Diameter [mm]	Cleaning Brush [mm]	Min. Anchorage Length [mm]	Min. Lap/Splice Length [mm]	Max. Embedment Depth [mm]
8	500	12	S12HF S13HF	113	200	400
10	500	14	S14HF S15HF	142	200	500
12	500	16	S18HF	170	200	600
14	500	18	S22HF	198	210	700
16	500	20	S22HF	227	240	800
20	500	25	S27HF	284	300	1000
25	500	32	S35HF	354	375	1000
28	500	35	S38HF	397	420	1000
32	500	40	S43HF	454	480	1000
40	500	55	S58HF	851	900	1000

DESIGN BOND STRENGTH VALUES - HAMMER DRILLED OR COMPRESSED AIR DRILLED HOLES

Design values of the ultimate bond resistance f_{bd} in N/mm² for rotary hammer drilling and compressed air drilling for good bond conditions.

Rebar Ø [mm]	Concrete Class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
8	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
10	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
12	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
14	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
16	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
20	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
25	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
28	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
32	1,6	2,0	2,3	2,7	3,0	3,4	3,7	3,7	3,7
40	1,5	1,8	2,1	2,1	2,1	2,1	2,1	2,1	2,1

Tabulated values are valid for good bond conditions according to EN 1992-1-1. For all other bond conditions multiply the values of f_{bd} by 0.7.

DESIGN BOND STRENGTH VALUES - DIAMOND CORE DRILLED HOLES

Design values of the ultimate bond resistance f_{bd} in N/mm² for diamond core drilling for good bond conditions

Rebar Ø [mm]	Concrete Class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
8	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
10	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
12	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
14	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
16	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
20	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
25	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
28	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,0
32	1,6	2,0	2,3	2,7	3,0	3,4	3,4	3,4	3,4
40	1,5	1,8	2,1	2,1	2,1	2,1	2,1	2,1	2,1

Tabulated values are valid for good bond conditions according to EN 1992-1-1. For all other bond conditions multiply the values of f_{bd} by 0.7

BUILDING TRUST

Sika AnchorFix®-3030

DECLARACIÓN DE PRESTACIONES
No. 84262728

1	**CÓDIGO DE IDENTIFICACIÓN ÚNICO DEL PRODUCTO TIPO:**	84262728
2	**USO PREVISTO**	ETA 17/0694 de 24/11/2019 Anclaje de inyección adherido para uso en hormigón fisurado y no fisurado
3	**FABRICANTE:**	Sika Services AG Tüffenwies 16-22 8064 Zürich
4	**REPRESENTANTE AUTORIZADO:**	
5	**SISTEMA DE AVCP:**	Sistema 1
6b	**CUERPO NOTIFICADO:**	EAD 330499-00-0601
	Evaluacion técnica europea	ETA 17/0694 of 24/11/2019
	Órgano de evaluación técnica	TECHNICKY A ZKUSEBNI USTAV STAVEBNI PRAHA s.p.
	Cuerpo notificado	1020

7 PRESTACIONES DECLARADAS

Reacción al fuego - Los anclajes satisfacen los requerimientos de la Clase A1
Resistencia al fuego – Sin determinar

Anclajes sujetos a:

- Cargas estáticas y quasi estáticas
- Acciones sísmicas categoria C1 (max w = 0,5 mm):
  - Varilla roscada M8, M10, M12, M16, M20, M24, M27, M30
  - Barra Ø10, Ø12, Ø16, Ø20, Ø25, Ø32
- Acciones sísmicas categoría C2 (max w = 0,8 mm): Varilla roscada M12, M16, M20

Material base:

- Hormigón fisurado y sin fisurar
- Hormigón normal armado o en masa, de clase de resistencia C20/25 como mínimo y C50/60 como máximo según la norma EN 206:2013.

Rango de temperatura:

- T3: -40°C to +70°C (máxima temperatura puntual +70°C y +50°C a largo plazo)

Condiciones de uso (Condiciones medioambientales)

- (X1) Estructuras sujetas a condiciones internas secas (acero protegido con zinc, acero inoxidable, acero de alta resistencia a la corrosión).
- (X2) Estructuras sujetas a la exposición atmosférica externa (incluido el entorno industrial y marino) y a condiciones internas de humedad permanente, si no existen condiciones agresivas particulares (acero inoxidable A4, acero de alta resistencia a la corrosión).
- (X3) Estructuras sometidas a una exposición atmosférica externa y a una condición interna de humedad permanente, si existen otras condiciones agresivas particulares (acero de alta resistencia a la corrosión).

Nota: Las condiciones especialmente agresivas son, por ejemplo, la inmersión permanente y alternada en agua de mar o en la zona de salpicaduras del agua de mar, la atmósfera de cloruro de las piscinas cubiertas o la atmósfera con una contaminación química extrema (por ejemplo, en las plantas de desulfuración o en los túneles de carretera donde se utilizan materiales de deshielo).

Condiciones del hormigón:

- I1 - instalación en hormigón seco o húmedo (saturado de agua) o perforación inundada.
- I2 - instalación en orificio saturado de agua (no agua de mar) y uso en servicio en hormigón seco o húmedo.

Diseño:

- Los anclajes se diseñan de acuerdo con la norma EN 1992-4 o el informe técnico TR 055 de la EOTA bajo la responsabilidad de un ingeniero con experiencia en anclajes y trabajos de hormigón.
- Se elaborarán notas de cálculo y planos verificables teniendo en cuenta las cargas a anclar. La posición del anclaje se indicará en los planos de diseño.
- Los anclajes sometidos a acciones sísmicas (hormigón fisurado) deben diseñarse de acuerdo con la norma EN 1992-4.

Instalación:

- Perforación de los agujeros mediante taladro de percusión.
- Instalación de anclajes realizada por personal debidamente cualificado y bajo la supervisión del responsable técnico de la obra.

Dirección de instalación

D3 - instalación hacia abajo y horizontal y hacia arriba (por ejemplo, por encima de la cabeza)

- **Tabla B1**: Parámetros de instalación de varilla roscada

Size			M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	22	26	30	35
Cleaning brush			S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque moment	max T_{fixt}	[Nm]	10	20	40	80	120	160	180	200
Embedment depth for $h_{ef,min}$	h_{ef}	[mm]	60	60	70	80	90	96	108	120
Embedment depth for $h_{ef,max}$	h_{ef}	[mm]	160	200	240	320	400	480	540	600
Depth of drill hole	h_0	[mm]	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5
Minimum edge distance	c_{min}	[mm]	40	40	40	40	50	50	50	60
Minimum spacing	s_{min}	[mm]	40	40	40	40	50	50	50	60
Minimum thickness of member	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + 2d_0				

- **Table B2**: Parámetros de instalación de barras de acero

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Nominal drill hole diameter	$Ød_0$	[mm]	12	14	16	20	25	32	40
Cleaning brush			S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF
Torque moment	max T_{fixt}	[Nm]	10	20	40	80	120	180	200
Min. embedment depth									
Embedment depth for $h_{ef,min}$	h_{ef}	[mm]	60	60	70	80	90	100	128
Embedment depth for $h_{ef,max}$	h_{ef}	[mm]	160	200	240	320	400	500	640
Depth of drill hole	h_0	[mm]	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5
Minimum edge distance	c_{min}	[mm]	40	40	40	40	50	50	70
Minimum spacing	s_{min}	[mm]	40	40	40	40	50	50	70
Minimum thickness of member	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + 2d_0			

- **Table B3**: Tiempo mínimo de curado

Base Material Temperature [°C]	Cartridge Temperature [°C]	T Work [mins]	T Load [hrs]
+5	Minimum +10	300	24
+5°C to +10		150	
+10°C to +15	+10°C to +15	40	18
+15°C to +20	+15°C to +20	25	12
+20°C to +25	+20°C to +25	18	8
+25°C to +30	+25°C to +30	12	6
+30°C to +35	+30°C to +35	8	4
+35°C to +40	+35°C to +40	6	2
Ensure cartridge is ≥ 10°C			

- T Work es el tiempo típico de gelificación a la temperatura más alta del material base en la gama.
- T Load es el tiempo mínimo de fraguado requerido hasta que se puede aplicar la carga a la temperatura más baja de la gama.

Table C1: Método de diseño EN 1992-4

Valores característicos de la resistencia a la carga de tracción de la varilla roscada

Steel failure – Characteristic resistance										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel grade **4.6**	$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	2,00							
Steel grade **5.8**	$N_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **8.8**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **10.9**	$N_{Rk,s}$	[kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **A2-70, A4-70**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Stainless steel grade **A4-80**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,60							
Stainless steel grade **1.4529**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **1.4565**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Combined pullout and concrete cone failure in concrete C20/25										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Characteristic bond resistance in uncracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm²]	17	15	15	12	12	12	11	9,5
Dry, wet concrete, flooded hole										
Partial safety factor	γ_{inst}	[-]	1,0							
Factor for uncracked concrete C25/30	ψ_c	[-]	1,02							
C30/37			1,04							
C35/45			1,06							
C40/50			1,07							
C45/55			1,08							
C50/60			1,09							
Characteristic bond resistance in cracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm²]	10	10	10	9,5	9	9	6	6
Dry, wet concrete, flooded hole										
Partial safety factor	γ_{inst}	[-]	1,0							
Factor for cracked concrete C25/30	ψ_c	[-]	1,02							
C30/37			1,04							
C35/45			1,06							
C40/50			1,07							
C45/55			1,08							
C50/60			1,09							
Concrete cone failure										
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11							
Factor for concrete cone failure for cracked concrete	$k_{cr,N}$	[-]	7,7							
Edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$							
Splitting failure										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Edge distance	$c_{cr,sp}$	[mm]	$2 \cdot h_{ef}$							
Spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$							

Table C2: Método de diseño EN 1992-4

Valores característicos de la resistencia a la carga de tracción de las barras de acero

Steel failure – Characteristic resistance										
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Rebar BSt 500 S	$N_{Rk,s}$	[kN]	28	43	62	111	173	270	442
Partial safety factor	γ_{Ms}	[-]	1,4						

Pullout failure in concrete C20/25									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Characteristic bond resistance in uncracked concrete									
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm²]	13	13	13	12	12	12	8
Dry and wet concrete									
Installation safety factor	$\gamma_2^{1)}=\gamma_{inst}^{2)}$	[-]	1,0						
Flooded hole									
Installation safety factor	$\gamma_2^{1)}=\gamma_{inst}^{2)}$	[-]	1,2						
Factor for uncracked concrete C25/30	ψ_c	[-]	1,02						
C30/37	ψ_c	[-]	1,04						
C35/45	ψ_c	[-]	1,06						
C40/50	ψ_c	[-]	1,07						
C45/55	ψ_c	[-]	1,08						
C50/60	ψ_c	[-]	1,09						
Characteristic bond resistance in cracked concrete									
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm²]	8	11	10	10	9	8,5	6
Dry and wet concrete									
Installation safety factor	$\gamma_2^{1)}=\gamma_{inst}^{2)}$	[-]	1,0						
Flooded hole									
Installation safety factor	$\gamma_2^{1)}=\gamma_{inst}^{2)}$	[-]	1,2						
Factor for cracked concrete C25/30	ψ_c	[-]	1,02						
C30/37	ψ_c	[-]	1,04						
C35/45	ψ_c	[-]	1,06						
C40/50	ψ_c	[-]	1,07						
C45/55	ψ_c	[-]	1,08						
C50/60	ψ_c	[-]	1,09						

Concrete cone failure			
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}^{2)}$	[-]	11
Factor for concrete cone failure for cracked concrete	$k_{cr,N}^{2)}$	[-]	7,7
Edge distance	$c_{cr,N}$	[mm]	$1{,}5h_{ef}$

Splitting failure									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Edge distance	$c_{cr,sp}$	[mm]	$2 \bullet h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$2 \bullet c_{cr,sp}$						

Table C3: Método de diseño EN 1992-4

Valores característicos de la resistencia al cizallamiento de la varilla roscada

Steel failure without lever arm										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel grade **4.6**	$V_{Rk,s}$	[kN]	7	12	17	31	49	71	92	112
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$V_{Rk,s}$	[kN]	9	15	21	39	61	88	115	140
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$V_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,5							
Stainless steel grade **A2-70, A4-70**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,56							
Characteristic resistance of group of fasteners										
Ductility factor	k_7 = 1,0 for steel with rupture elongation A_5 > 8%									

Steel failure with lever arm										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel grade **4.6**	$M^o_{Rk,s}$	[N.m]	15	30	52	133	260	449	666	900
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$M^o_{Rk,s}$	[N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$M^o_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$M^o_{Rk,s}$	[N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **A2-70, A4-70**	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$M^o_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,56							
Concrete pryout failure										
Factor for resistance to pry-out failure	k_8	[-]	2							

Concrete edge failure										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16	20	24	27	30
Effective length of fastener	ℓ_f	[mm]	min (h_{ef}, 8 d_{nom})							

Table C4: Método de diseño EN 1992-4

Valores característicos de la resistencia al cizallamiento de las barras de refuerzo

Steel failure without lever arm										
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Rebar BSt 500 S	$V_{Rk,s}$	[kN]	14	22	31	55	86	135	221
Partial safety factor	γ_{Ms}	[-]	1,5						
Characteristic resistance of group of fasteners									
Ductility factor	k_7 = 1,0 for steel with rupture elongation A_5 > 8%								

Steel failure with lever arm									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Rebar BSt 500 S	$M^{o}_{Rk,s}$	[N.m]	33	65	112	265	518	1013	2122
Partial safety factor	γ_{Ms}	[-]	1,5						
Concrete pryout failure									
Factor for resistance to pry-out failure	k_8	[-]	2						

Concrete edge failure									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16	20	25	32
Effective length of fastener	ℓ_f	[mm]	min (h_{ef}, 8 d_{nom})						

Table C5: Desplazamiento de la varilla roscada bajo carga de Tracción y cizallamiento

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
F	[kN]	11,9	14,3	19,0	23,8	35,7	35,7	45,2	45,2
δ_{N0}	[mm]	0,3	0,3	0,3	0,4	0,4	0,5	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete									
F	[kN]	5,7	9,5	14,3	16,7	23,8	28,6	28,6	28,6
δ_{N0}	[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,6	0,7
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load									
F	[kN]	3,5	5,5	8,0	15,0	23,3	33,6	43,7	53,4
δ_{V0}	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7

Table C6: Desplazamiento de las barras de refuerzo bajo carga de tracción y cizallamiento

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
F	[kN]	7,6	11,9	16,7	28,6	35,7	45,2	66,7
δ_{N0}	[mm]	0,3	0,3	0,4	0,4	0,4	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete								
F	[kN]	5,7	9,5	11,9	19,0	23,8	28,6	35,7
δ_{N0}	[mm]	0,3	0,4	0,4	0,5	0,5	0,5	0,6
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load								
F	[kN]	6,6	10,3	14,8	26,3	41,1	64,3	105,3
δ_{V0}	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7

Table C7: Categoría de comportamiento sísmico C1 de la varilla roscada

Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Tension load										
Steel failure										
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C1}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	2,00							
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C1}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C1}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C1}$	[kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{Ms}	[-]	1,33							
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C1}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C1}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,60							
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C1}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C1}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Characteristic resistance to pull-out										
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm²]	9,4	8,5	10,0	8,7	7,4	7,7	5,7	4,9
Installation safety factor	γ_{inst}	[-]	1,0							

Shear load										
Steel failure without lever arm										
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C1}$	[kN]	5	9	13	20	32	28	37	45
Partial safety factor	γ_{Ms}	[-]	1,67							
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C1}$	[kN]	7	11	16	26	40	35	46	56
Partial safety factor	γ_{Ms}	[-]	1,25							
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C1}$	[kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms}	[-]	1,25							
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C1}$	[kN]	14	22	32	51	80	71	92	112
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance **A2-70, A4-70**	$V_{Rk,s,eq,C1}$	[kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms}	[-]	1,56							
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C1}$	[kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms}	[-]	1,33							
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C1}$	[kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms}	[-]	1,25							
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C1}$	[kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms}	[-]	1,56							
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C7 shall be multiplied by following reduction factor for **hot-dip galvanized** commercial standard rods										
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h-dg,c1}$	[-]	0,47	0,47	0,47	0,54	0,54	0,88	0,88	0,88
Factor for annular gap	α_{gap}	[-]	0,5							

El anclaje se utilizará con un alargamiento de rotura mínimo después de la fractura A5 igual al 19%.

Table C8: Categoría de comportamiento sísmico C1 de las barras de refuerzo

Size			**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Tension load								
Steel failure								
Rebar BSt 500 S	$N_{Rk,s,eq,C1}$	[kN]	43	62	111	173	270	442
Partial safety factor	γ_{Ms}	[-]	1,4					
Characteristic resistance to pull-out								
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm²]	9,4	9,8	9,5	8,8	8,0	5,3
Dry and wet concrete								
Installation safety factor	γ_{inst}	[-]	1,0					
Flooded hole								
Installation safety factor	γ_{inst}	[-]	1,2					

Shear load								
Steel failure without lever arm								
Rebar BSt 500 S	$V_{Rk,s,eq,C1}$	[kN]	16	23	41	69	67	111
Partial safety factor	γ_{Ms}	[-]	1,5					
Factor for annular gap	α_{gap}	[-]	0,5					

Table C9: Categoría de comportamiento sísmico C2

Size			**M12**	**M16**	**M20**
Tension load					
Steel failure					
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C2}$	[kN]	34	63	98
Partial safety factor	γ_{Ms}	[-]	2,00		
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C2}$	[kN]	42	79	123
Partial safety factor	γ_{Ms}	[-]	1,50		
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]	1,50		
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C2}$	[kN]	84	157	245
Partial safety factor	γ_{Ms}	[-]	1,33		
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]	1,87		
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]	1,60		
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]	1,50		
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]	1,87		
Characteristic resistance to pull-out					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$	[N/mm²]	3,5	4,0	4,5
Installation safety factor	$\gamma_2=\gamma_{inst}$	[-]	1,0		

Shear load					
Steel failure without lever arm					
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	γ_{Ms}	[-]	1,67		
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C2}$	[kN]	16	22	35
Partial safety factor	γ_{Ms}	[-]	1,25		
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]	1,25		
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C2}$	[kN]	32	45	70
Partial safety factor	γ_{Ms}	[-]	1,50		
Characteristic resistance **A2-70**, **A4-70**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]	1,56		
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]	1,33		
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]	1,25		
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]	1,56		
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C8 shall be multiplied by following reduction factor for **hot-dip galvanized** commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h-dg,c2}$	[-]	0,46	0,61	0,61
Factor for annular gap	α_{gap}	[-]	0,5		

Table C10: Displacement under tensile and shear load - seismic category C2

Size		M12	M16	M20
$\delta_{N,eq(DLS)}$	[mm]	0,20	0,40	0,77
$\delta_{N,eq(ULS)}$	[mm]	0,76	0,74	1,68
$\delta_{V,eq(DLS)}$	[mm]	5,29	4,12	4,94
$\delta_{V,eq(ULS)}$	[mm]	10,20	9,05	10,99

El anclaje se utilizará con un alargamiento de rotura mínimo después de la fractura A5 igual al 19%.

8 DOCUMENTACIÓN TÉCNICA APROPIADA Y/O - DOCUMENTACIÓN TÉCNICA ESPECÍFICA

La prestación del producto identificado anteriormente está en conformidad con el conjunto de prestaciones declaradas. Esta declaración de prestaciones se emite, de conformidad con el Reglamento (UE) Nº 305/2011, bajo la exclusiva responsabilidad del fabricante identificado anteriormente.

Firmado por y en nombre del fabricante por:

Nombre: Borja Jiménez Salado Función: Product Engineer 20 de Enero de 2020	Gonzalo Causín Sánchez Función: Director General 20 de Enero de 2020

End of information as required by Regulation (EU) No 305/2011

DECLARACIÓN DE PRESTACIONES RELACIONADA

Nombre del Producto	Especificación técnica armonizada	DoP Número
Sika AnchorFix®-3030	ETA 17/0693	10823672

MARCADO CE COMPLETO

CE 17
Sika Services AG, Zurich, Switzerland
84262728
EAD 330499-00-0601
Cuerpo notificador 1020
Anclaje de inyección adherido para uso en hormigón fisurado y no fisurado

Reacción al fuego - Los anclajes satisfacen los requerimientos de la Clase A1
Resistencia al fuego – Sin determinar

Anclajes sujetos a:

- Cargas estáticas y quasi estáticas
- Acciones sísmicas categoria C1 (max w = 0,5 mm):
  - Varilla roscada M8, M10, M12, M16, M20, M24, M27, M30
  - Barra Ø10, Ø12, Ø16, Ø20, Ø25, Ø32
- Acciones sísmicas categoría C2 (max w = 0,8 mm): Varilla roscada M12, M16, M20

Material base:

- Hormigón fisurado y sin fisurar
- Hormigón normal armado o en masa, de clase de resistencia C20/25 como mínimo y C50/60 como máximo según la norma EN 206:2013.

Rango de temperatura:

- T3: -40°C to +70°C (máxima temperatura puntual +70°C y +50°C a largo plazo)

Condiciones de uso (Condiciones medioambientales)

- (X1) Estructuras sujetas a condiciones internas secas (acero protegido con zinc, acero inoxidable, acero de alta resistencia a la corrosión).
- (X2) Estructuras sujetas a la exposición atmosférica externa (incluido el entorno industrial y marino) y a condiciones internas de humedad permanente, si no existen condiciones agresivas particulares (acero inoxidable A4, acero de alta resistencia a la corrosión).
- (X3) Estructuras sometidas a una exposición atmosférica externa y a una condición interna de humedad permanente, si existen otras condiciones agresivas particulares (acero de alta resistencia a la corrosión).

Nota: Las condiciones especialmente agresivas son, por ejemplo, la inmersión permanente y alternada en agua de mar o en la zona de salpicaduras del agua de mar, la atmósfera de cloruro de las piscinas cubiertas o la atmósfera con una contaminación química extrema (por ejemplo, en las plantas de desulfuración o en los túneles de carretera donde se utilizan materiales de deshielo).

Condiciones del hormigón:

- I1 - instalación en hormigón seco o húmedo (saturado de agua) o perforación inundada.
- I2 - instalación en orificio saturado de agua (no agua de mar) y uso en servicio en hormigón seco o húmedo.

Diseño:

- Los anclajes se diseñan de acuerdo con la norma EN 1992-4 o el informe técnico TR 055 de la EOTA bajo la responsabilidad de un ingeniero con experiencia en anclajes y trabajos de hormigón.
- Se elaborarán notas de cálculo y planos verificables teniendo en cuenta las cargas a anclar. La posición del anclaje se indicará en los planos de diseño.
- Los anclajes sometidos a acciones sísmicas (hormigón fisurado) deben diseñarse de acuerdo con la norma EN 1992-4.

Instalación:

- Perforación de los agujeros mediante taladro de percusión.
- Instalación de anclajes realizada por personal debidamente cualificado y bajo la supervisión del responsable técnico de la obra.

Dirección de instalación

D3 - instalación hacia abajo y horizontal y hacia arriba (por ejemplo, por encima de la cabeza)

- **Table B1**: Parámetros de instalación de varilla roscada

Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	22	26	30	35
Cleaning brush			S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque moment	max T_{fixt}	[Nm]	10	20	40	80	120	160	180	200
Embedment depth for $h_{ef,min}$	h_{ef}	[mm]	60	60	70	80	90	96	108	120
Embedment depth for $h_{ef,max}$	h_{ef}	[mm]	160	200	240	320	400	480	540	600
Depth of drill hole	h_0	[mm]	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5
Minimum edge distance	c_{min}	[mm]	40	40	40	40	50	50	50	60
Minimum spacing	s_{min}	[mm]	40	40	40	40	50	50	50	60
Minimum thickness of member	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + 2d_0				

- **Table B2**: Parámetros de instalación de barras de acero

Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Nominal drill hole diameter	$Ød_0$	[mm]	12	14	16	20	25	32	40
Cleaning brush			S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF
Torque moment	max T_{fixt}	[Nm]	10	20	40	80	120	180	200
Min. embedment depth									
Embedment depth for $h_{ef,min}$	h_{ef}	[mm]	60	60	70	80	90	100	128
Embedment depth for $h_{ef,max}$	h_{ef}	[mm]	160	200	240	320	400	500	640
Depth of drill hole	h_0	[mm]	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5
Minimum edge distance	c_{min}	[mm]	40	40	40	40	50	50	70
Minimum spacing	s_{min}	[mm]	40	40	40	40	50	50	70
Minimum thickness of member	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + 2d_0			

- **Table B3**: Tiempo mínimo de curado

Base Material Temperature [°C]	Cartridge Temperature [°C]	T Work [mins]	T Load [hrs]
+5	Minimum +10	300	24
+5°C to +10		150	
+10°C to +15	+10°C to +15	40	18
+15°C to +20	+15°C to +20	25	12
+20°C to +25	+20°C to +25	18	8
+25°C to +30	+25°C to +30	12	6
+30°C to +35	+30°C to +35	8	4
+35°C to +40	+35°C to +40	6	2
Ensure cartridge is ≥ 10°C			

- Work es el tiempo típico de gelificación a la temperatura más alta del material base en la gama.
- T Load es el tiempo mínimo de fraguado requerido hasta que se puede aplicar la carga a la temperatura más baja de la gama.

Table C1: Método de diseño EN 1992-4

Valores característicos de la resistencia a la carga de tracción de la varilla roscada

Steel failure – Characteristic resistance										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel grade **4.6**	$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	2,00							
Steel grade **5.8**	$N_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **8.8**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **10.9**	$N_{Rk,s}$	[kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **A2-70, A4-70**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Stainless steel grade **A4-80**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,60							
Stainless steel grade **1.4529**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **1.4565**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Combined pullout and concrete cone failure in concrete C20/25										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Characteristic bond resistance in uncracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm²]	17	15	15	12	12	12	11	9,5
Dry, wet concrete, flooded hole										
Partial safety factor	γ_{inst}	[-]	1,0							
Factor for uncracked concrete C25/30	ψ_c	[-]	1,02							
Factor for uncracked concrete C30/37	ψ_c	[-]	1,04							
Factor for uncracked concrete C35/45	ψ_c	[-]	1,06							
Factor for uncracked concrete C40/50	ψ_c	[-]	1,07							
Factor for uncracked concrete C45/55	ψ_c	[-]	1,08							
Factor for uncracked concrete C50/60	ψ_c	[-]	1,09							
Characteristic bond resistance in cracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm²]	10	10	10	9,5	9	9	6	6
Dry, wet concrete, flooded hole										
Partial safety factor	γ_{inst}	[-]	1,0							
Factor for cracked concrete C25/30	ψ_c	[-]	1,02							
Factor for cracked concrete C30/37	ψ_c	[-]	1,04							
Factor for cracked concrete C35/45	ψ_c	[-]	1,06							
Factor for cracked concrete C40/50	ψ_c	[-]	1,07							
Factor for cracked concrete C45/55	ψ_c	[-]	1,08							
Factor for cracked concrete C50/60	ψ_c	[-]	1,09							
Concrete cone failure										
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11							
Factor for concrete cone failure for cracked concrete	$k_{cr,N}$	[-]	7,7							
Edge distance	$c_{cr,N}$	[mm]	$1{,}5h_{ef}$							
Splitting failure										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Edge distance	$c_{cr,sp}$	[mm]	$2 \bullet h_{ef}$							
Spacing	$s_{cr,sp}$	[mm]	$2 \bullet c_{cr,sp}$							

Table C2: Método de diseño EN 1992-4

Valores característicos de la resistencia a la carga de tracción de las barras de acero

Steel failure – Characteristic resistance										
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Rebar BSt 500 S	$N_{Rk,s}$	[kN]	28	43	62	111	173	270	442
Partial safety factor	γ_{Ms}	[-]	1,4						

Pullout failure in concrete C20/25										
Size				**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Characteristic bond resistance in uncracked concrete										
Temperature T3: -40°C to +70°C		$\tau_{Rk,ucr}$	[N/mm²]	13	13	13	12	12	12	8
Dry and wet concrete										
Installation safety factor		$\gamma_2^{1)}=\gamma_{inst}^{2)}$	[-]	1,0						
Flooded hole										
Installation safety factor		$\gamma_2^{1)}=\gamma_{inst}^{2)}$	[-]	1,2						
Factor for uncracked concrete	C25/30	ψ_c	[-]	1,02						
	C30/37			1,04						
	C35/45			1,06						
	C40/50			1,07						
	C45/55			1,08						
	C50/60			1,09						
Characteristic bond resistance in cracked concrete										
Temperature T3: -40°C to +70°C		$\tau_{Rk,cr}$	[N/mm²]	8	11	10	10	9	8,5	6
Dry and wet concrete										
Installation safety factor		$\gamma_2^{1)}=\gamma_{inst}^{2)}$	[-]	1,0						
Flooded hole										
Installation safety factor		$\gamma_2^{1)}=\gamma_{inst}^{2)}$	[-]	1,2						
Factor for cracked concrete	C25/30	ψ_c	[-]	1,02						
	C30/37			1,04						
	C35/45			1,06						
	C40/50			1,07						
	C45/55			1,08						
	C50/60			1,09						

Concrete cone failure			
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}^{2)}$	[-]	11
Factor for concrete cone failure for cracked concrete	$k_{cr,N}^{2)}$	[-]	7,7
Edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$

Splitting failure									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Edge distance	$c_{cr,sp}$	[mm]	$2 \bullet h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$2 \bullet c_{cr,sp}$						

Table C3: Método de diseño EN 1992-4

Valores característicos de la resistencia al cizallamiento de la varilla roscada

Steel failure without lever arm										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel grade **4.6**	$V_{Rk,s}$	[kN]	7	12	17	31	49	71	92	112
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$V_{Rk,s}$	[kN]	9	15	21	39	61	88	115	140
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$V_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,5							
Stainless steel grade **A2-70, A4-70**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,56							
Characteristic resistance of group of fasteners										
Ductility factor k_7 = 1,0 for steel with rupture elongation A_5 > 8%										

Steel failure with lever arm										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel grade **4.6**	$M^o_{Rk,s}$	[N.m]	15	30	52	133	260	449	666	900
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$M^o_{Rk,s}$	[N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$M^o_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$M^o_{Rk,s}$	[N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **A2-70, A4-70**	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$M^o_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,56							
Concrete pryout failure										
Factor for resistance to pry-out failure	k_8	[-]	2							

Concrete edge failure										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16	20	24	27	30
Effective length of fastener	ℓ_f	[mm]	min (h_{ef}, 8 d_{nom})							

Table C4: Método de diseño EN 1992-4

Valores característicos de la resistencia al cizallamiento de las barras de refuerzo

Steel failure without lever arm										
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Rebar BSt 500 S	$V_{Rk,s}$	[kN]	14	22	31	55	86	135	221
Partial safety factor	γ_{Ms}	[-]	1,5						
Characteristic resistance of group of fasteners									
Ductility factor	k_7 = 1,0 for steel with rupture elongation A_5 > 8%								

Steel failure with lever arm									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Rebar BSt 500 S	$M^o_{Rk,s}$	[N.m]	33	65	112	265	518	1013	2122
Partial safety factor	γ_{Ms}	[-]	1,5						
Concrete pryout failure									
Factor for resistance to pry-out failure	k_8	[-]	2						

Concrete edge failure									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16	20	25	32
Effective length of fastener	ℓ_f	[mm]	min (h_{ef}, 8 d_{nom})						

Table C5: Desplazamiento de la varilla roscada bajo carga de Tracción y cizallamiento

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
F	[kN]	11,9	14,3	19,0	23,8	35,7	35,7	45,2	45,2
δ_{N0}	[mm]	0,3	0,3	0,3	0,4	0,4	0,5	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete									
F	[kN]	5,7	9,5	14,3	16,7	23,8	28,6	28,6	28,6
δ_{N0}	[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,6	0,7
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load									
F	[kN]	3,5	5,5	8,0	15,0	23,3	33,6	43,7	53,4
δ_{V0}	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7

Table C6: Desplazamiento de las barras de refuerzo bajo carga de tracción y cizallamiento

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
F	[kN]	7,6	11,9	16,7	28,6	35,7	45,2	66,7
δ_{N0}	[mm]	0,3	0,3	0,4	0,4	0,4	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete								
F	[kN]	5,7	9,5	11,9	19,0	23,8	28,6	35,7
δ_{N0}	[mm]	0,3	0,4	0,4	0,5	0,5	0,5	0,6
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load								
F	[kN]	6,6	10,3	14,8	26,3	41,1	64,3	105,3
δ_{V0}	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7

Table C7: Categoría de comportamiento sísmico C1 de la varilla roscada

Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Tension load										
Steel failure										
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C1}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	2,00							
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C1}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C1}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C1}$	[kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{Ms}	[-]	1,33							
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C1}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C1}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,60							
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C1}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C1}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Characteristic resistance to pull-out										
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm²]	9,4	8,5	10,0	8,7	7,4	7,7	5,7	4,9
Installation safety factor	γ_{inst}	[-]	1,0							

Shear load										
Steel failure without lever arm										
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C1}$	[kN]	5	9	13	20	32	28	37	45
Partial safety factor	γ_{Ms}	[-]	1,67							
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C1}$	[kN]	7	11	16	26	40	35	46	56
Partial safety factor	γ_{Ms}	[-]	1,25							
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C1}$	[kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms}	[-]	1,25							
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C1}$	[kN]	14	22	32	51	80	71	92	112
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance **A2-70**, **A4-70**	$V_{Rk,s,eq,C1}$	[kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms}	[-]	1,56							
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C1}$	[kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms}	[-]	1,33							
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C1}$	[kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms}	[-]	1,25							
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C1}$	[kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms}	[-]	1,56							
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C7 shall be multiplied by following reduction factor for **hot-dip galvanized** commercial standard rods										
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h-dg,c1}$	[-]	0,47	0,47	0,47	0,54	0,54	0,88	0,88	0,88
Factor for annular gap	α_{gap}	[-]	0,5							

El anclaje se utilizará con un alargamiento de rotura mínimo después de la fractura A5 igual al 19%.

Table C8: Categoría de comportamiento sísmico C1 de las barras de refuerzo

Size			**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Tension load								
Steel failure								
Rebar BSt 500 S	$N_{Rk,s,eq,C1}$	[kN]	43	62	111	173	270	442
Partial safety factor	γ_{Ms}	[-]	1,4					
Characteristic resistance to pull-out								
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm²]	9,4	9,8	9,5	8,8	8,0	5,3
Dry and wet concrete								
Installation safety factor	γ_{inst}	[-]	1,0					
Flooded hole								
Installation safety factor	γ_{inst}	[-]	1,2					

Shear load								
Steel failure without lever arm								
Rebar BSt 500 S	$V_{Rk,s,eq,C1}$	[kN]	16	23	41	69	67	111
Partial safety factor	γ_{Ms}	[-]	1,5					
Factor for annular gap	α_{gap}	[-]	0,5					

Table C9: Categoría de comportamiento sísmico C2

Size			**M12**	**M16**	**M20**
Tension load					
Steel failure					
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C2}$	[kN]	34	63	98
Partial safety factor	γ_{Ms}	[-]		2,00	
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C2}$	[kN]	42	79	123
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C2}$	[kN]	84	157	245
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,60	
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance to pull-out					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$	[N/mm²]	3,5	4,0	4,5
Installation safety factor	$\gamma_2=\gamma_{inst}$	[-]		1,0	

Shear load					
Steel failure without lever arm					
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	γ_{Ms}	[-]		1,67	
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C2}$	[kN]	16	22	35
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C2}$	[kN]	32	45	70
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **A2-70**, **A4-70**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,56	
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,56	
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C8 shall be multiplied by following reduction factor for **hot-dip galvanized** commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h\text{-}dg,c2}$	[-]	0,46	0,61	0,61
Factor for annular gap	α_{gap}	[-]		0,5	

Table C10: Displacement under tensile and shear load - seismic category C2

Size		M12	M16	M20
$\delta_{N,eq(DLS)}$	[mm]	0,20	0,40	0,77
$\delta_{N,eq(ULS)}$	[mm]	0,76	0,74	1,68
$\delta_{V,eq(DLS)}$	[mm]	5,29	4,12	4,94
$\delta_{V,eq(ULS)}$	[mm]	10,20	9,05	10,99

l anclaje se utilizará con un alargamiento de rotura mínimo después de la fractura A5 igual al 19%.

MARCADO CE PARA LA ETIQUETA

CE 17
Sika Services AG, Zurich, Switzerland
84262728
EAD 330499-00-0601
Cuerpo notificador 1020
Anclaje de inyección adherido para uso en hormigón fisurado y no fisurado
Para más información revise la documentación relacionada
http://dop.sika.com

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Member of EOTA
www.eota.eu

European Technical Assessment

ETA 17/0693
of 07/08/2017

Technical Assessment Body issuing the ETA: Technical and Test Institute for Construction Prague

Trade name of the construction product	Sika AnchorFix®-3030 for rebar connection
Product family to which the construction product belongs	Product area code: 33 Post installed rebar connections with Sika AnchorFix®-3030 injection mortar
Manufacturer	Sika Services AG Tueffenwies 16 CH-8048 Zuerich Switzerland
Manufacturing plant	Sika Plant No. 503 44 08 (1138)
This European Technical Assessment contains	17 pages including 13 Annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	ETAG 001-Part 1 and Part 5, edition 2013, used as European Assessment Document (EAD)

1. Technical description of the product

The Sika AnchorFix®-3030 injection system is used for the connection, by anchoring or overlap joint, of reinforcing bars (rebars) in existing structures made of normal weight concrete. The design of the post-installed rebar connections is done in accordance with the regulations for reinforced concrete constructions.

Reinforcing bars made of steel with a diameter d from 8 to 40 mm and Sika AnchorFix®-3030 chemical mortar are used for rebar connections. The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between embedded element, injection mortar and concrete.

The illustration and the description of the product are given in Annex A.

2. Specification of the intended use in accordance with the applicable EAD

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the products in relation to the expected economically reasonable working life of the works.

3. Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Design values of the ultimate bond resistance	See Annex C 1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Hygiene, health and environment (BWR 3)

Regarding dangerous substances contained in this European Technical Assessment, there may be requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

For basic requirement safety in use the same criteria are valid as for Basic Requirement Mechanical resistance and stability.

3.5 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was determined for this product.

3.6 General aspects relating to fitness for use

Durability and serviceability are only ensured if the specifications of intended use according to Annex B 1 are kept.

4. Assessment and verification of constancy of performance (AVCP) system applied with reference to its legal base

According to the Decision 96/582/EC of the European Commission[1] the system of assessment verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

Product	Intended use	Level or class	System
Metal anchors for use in concrete	For fixing and/or supporting to concrete, structural elements or heavy units such as cladding and suspended ceilings.	-	1

5. Technical details necessary for the implementation of the AVCP system, as provided in the applicable EAD

5.1 Tasks of the manufacturer

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this European Technical Assessment.

The manufacturer may only use raw materials stated in the technical documentation of this European Technical Assessment.

The factory production control shall be in accordance with the control plan which is a part of the technical documentation of this European Technical Assessment. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Technical and Test Institute for Construction Prague.[2] The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

The manufacturer shall, on the basis of a contract, involve a body which is notified for the tasks referred to in section 4 in the field of anchors in order to undertake the actions laid down in section 5.2. For this purpose, the control plan referred to in this section and section 5.2 shall be handed over by the manufacturer to the notified body involved.

The manufacturer shall make a declaration of performance, stating that the construction product is in conformity with the provisions of this European Technical Assessment.

[1] Official Journal of the European Communities L 254 of 08.10.1996

[2] The control plan is a confidential part of the documentation of the European Technical Assessment, but not published together with the ETA and only handed over to the approved body involved in the procedure of AVCP.

5.2 Tasks of the notified bodies

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The notified certification body involved by the manufacturer shall issue a certificate of constancy of performance of the product stating the conformity with the provisions of this European Technical Assessment.

In cases where the provisions of the European Technical Assessment and its control plan are no longer fulfilled the notified body shall withdraw the certificate of constancy of performance and inform Technical and Test Institute for Construction Prague without delay.

Issued in Prague on 07.08.2017

By

Ing. Mária Schaan
Head of the Technical Assessment Body

Figure A1: Overlap joint for rebar connections of slabs and beams

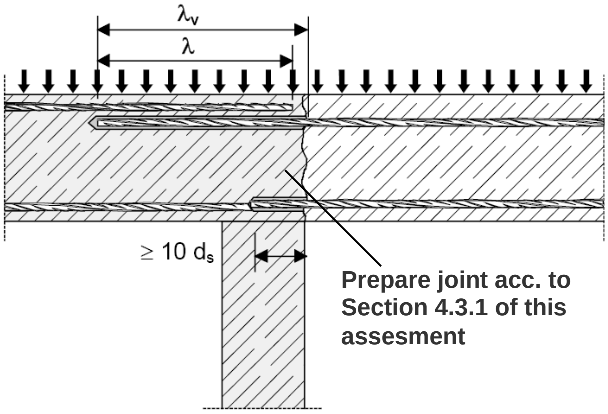


Figure A2: Overlap joint at a foundation of a column or wall where the rebars are stressed in tension

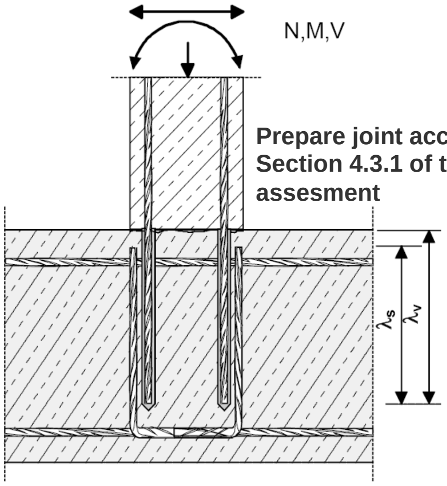


Figure A3: End anchoring of slabs or beams, designed as simply supported

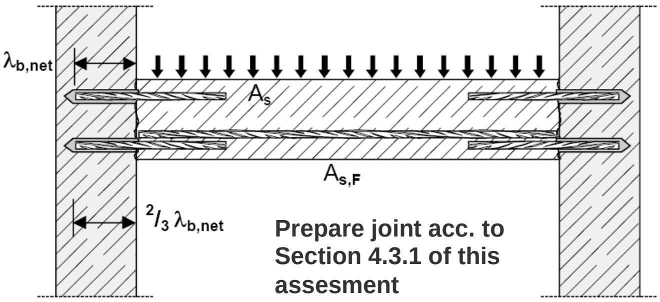


Figure A4: Rebar connection for components stressed primarily in compression.
The rebars are stressed in compression.

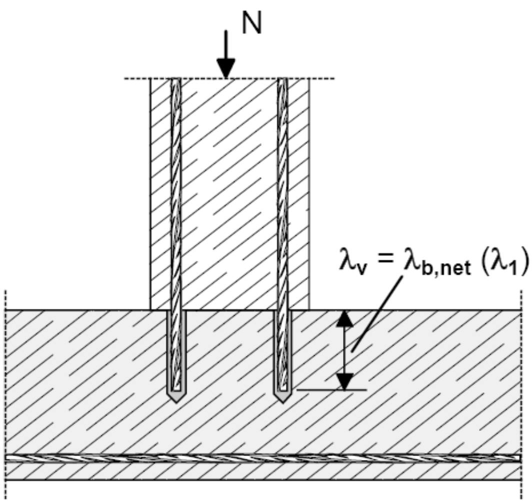
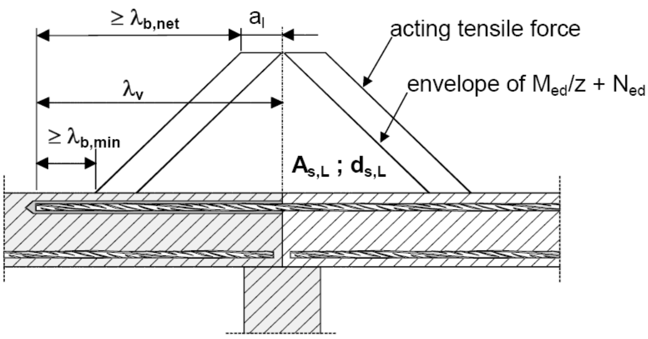


Figure A5: Anchoring of reinforcement to cover the line of acting tensile force



Note to Figure A1 to A5:

In the Figures no transverse reinforcement is plotted, the transverse reinforcement as required by EC 2 shall be present.

The shear transfer between old and new concrete shall be designed according to EC2.

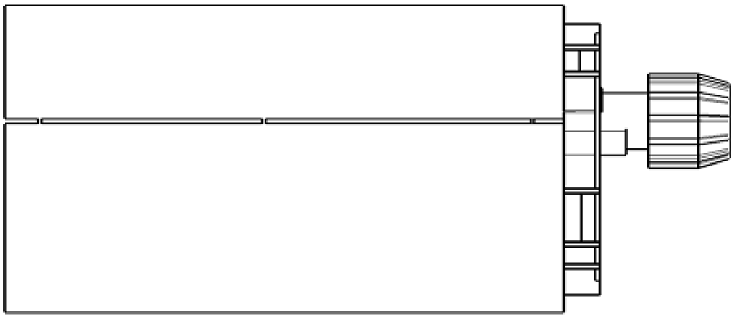
Sika AnchorFix®-3030	**Annex A 1**
Product description Installed condition and examples of use for rebars	

Mortar cartridges

Side by side cartridge

Sika AnchorFix®-3030

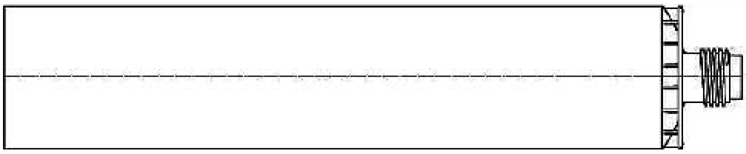
385 ml
585 ml



Two part foil in a single piston component cartridge

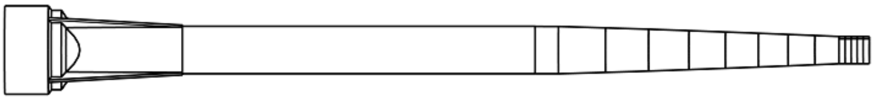
Sika AnchorFix®-3030

300 ml

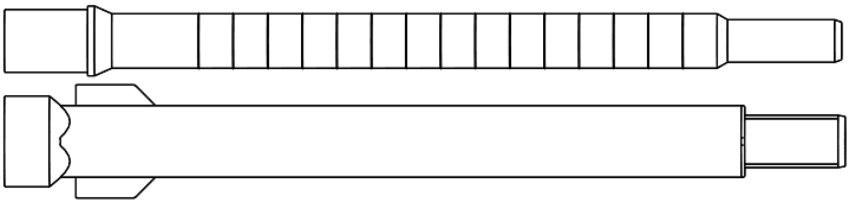


Mixing nozzle

Q



QH



Sika AnchorFix®-3030	**Annex A 2**
Product description Injection system	

Rebar Ø8, Ø10, Ø12, Ø14, Ø16, Ø20, Ø25, Ø28, Ø32, Ø40

Figure A6: Reinforcing bar

Minimum value of related rib area $f_{R,min}$ according to EN 1992-1-1:2004.

- The maximum outer rebar diameter over the ribs shall be:
  Nominal diameter of the rib d + 2 • h (h≤0,07 • d)
  (d: nominal diameter of the bar; h: rib height of the bar)

Table A1: Materials

Product form		**Bars and de-coiled rods**	
Class		B	C
Characteristic yield strength f_{yk} or $f_{0,2k}$ (MPa)		400 to 600	
Minimum value of k = $(f_t / f_y)_k$		≥ 1,08	≥ 1,15 < 1,35
Characteristic strain at maximum force ε_{uk} (%)		≥ 5,0	≥ 7,5
Bendability		Bend / Rebend test	
Maximum deviation from nominal mass (individual bar) (%)	Nominal bar size (mm) ≤ 8 > 8	 ± 6,0 ± 4,5	
Bond: Minimum relative rib area, $f_{R,min}$	Nominal bar size (mm) 8 to 12 > 12	 0,040 0,056	

Sika AnchorFix®-3030	**Annex A 3**
Product description Rebar and materials	

Specifications of intended use

Anchorages subject to:
- Static and quasi-static load.

Base materials
- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000-12
- Strength classes C12/15 to C50/60 according to EN 206-1:2000-12.
- Maximum chloride concrete of 0,40% (CL 0.40) related to the cement content according to EN 206-1:2000-12.
- Non-carbonated concrete.
  Note: In case of a carbonated surface of the existing concrete structure the carbonated layer shall be removed in the area of the post installed rebar connection (with a diameter d_s + 60 mm) prior to the installation of the new rebar. The depth of concrete to be removed shall correspond to at least minimum concrete cover in accordance with EN 1992-1-1:2004.
  The foregoing may be neglected if building components are new and not carbonated.

Temperature range:
- -40°C to +80°C (max. short. term temperature +80°C and max. long term temperature +40°C)

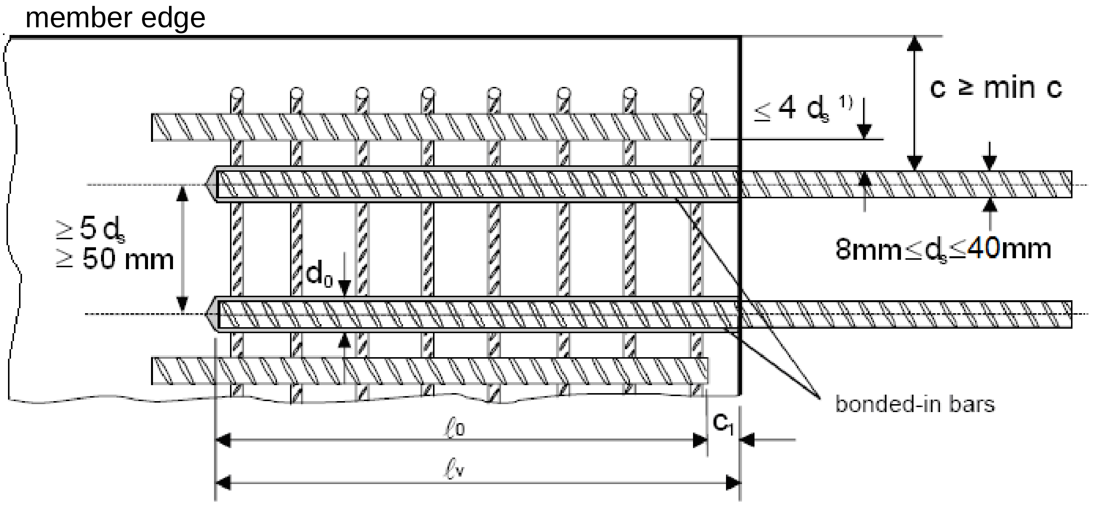
Use conditions (Environmental conditions)
- The rebars may be installed in dry or wet concrete.

Design:
- The anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the forces to be transmitted.
- Design according to EN 1992-1-1:2004
- The position of the reinforcement in the existing structure shall be determined on the basis of the construction documentation and taken into account when designing.

Installation:
- Dry or wet concrete.
- It must not be installed in flooded holes.
- Hole drilling by hammer drill, compressed air drill mode or diamond core drilling.
- The installation of post-installed rebars shall be done only by suitable trained installer and under supervision on site. The conditions under which an installer may be considered as suitable trained and the conditions for supervision on site are up to the Member States in which the installation is done.
- Check the position of the existing rebars

Figure B1: General design rules of construction for bonded-in rebars

- Only tension forces in the axis of the rebar may be transmitted
- The transfer of shear forces between new concrete and existing structure shall be designed additionally according to EN 1992-1-1.
- The joints for concreting must be roughened to at least such an extent that aggregate protrude.



[1)] If the clear distance between lapped bars exceeds $4d_s$ then the lap length shall be increased by the difference between the clear bar distance and $4d_s$

c	concrete cover of bonded-in bar
c_1	concrete cover at end-face of bonded-in bar
min c	minimum concrete cover acc. Table B1 of this assessment
d_s	diameter of bonded-in bar
ℓ_0	lap length acc. to EN 1992-1-1:2004
ℓ_v	effective embedment depth $\geq \ell_0 + c_1$
d_0	nominal drill bit diameter, see Table B3

Sika AnchorFix®-3030

Intended use
General design rules of construction

Annex B 2

Table B1: Minimum concrete cover min c of the bonded-in rebar depending on drilling method

Drilling method	
Hammer drilling	30mm + 0,06 $\ell_v \geq 2\ d_s$
Compressed air drilling	50 mm + 0,08 ℓ_v
Diamond core drilling	50 mm + 0,08 ℓ_v

Table B2: Minimum anchorage length[1)] and lap lengths for C20/25 and maximum installation length l_{max} for good bond conditions.

Rebar		$\ell_{b,min}$	$\ell_{0,min}$	ℓ_{max}
Ød_s [mm]	$f_{y,k}$ [N/mm^2]	[mm]	[mm]	[mm]
8	500	113	200	400
10	500	142	200	500
12	500	170	200	600
14	500	198	210	700
16	500	227	240	800
20	500	284	300	1000
25	500	354	375	1000
28	500	397	420	1000
32	500	454	480	1000
40	500	851	900	1000

[1)] According to EN 1992-1-1: $\ell_{b,min}$ (8.6) and $\ell_{0,min}$ (8.11) for good bond conditions and α_6 = 1,0 with maximum yield stress σ_{sd} = 435 N/mm^2 for rebar B500-B and γ_M = 1,15 and maximum installation length.

Sika AnchorFix®-3030	
Intended use Minimum concrete cover Minimum anchorage length Maximum installation length	**Annex B 3**

Table B3: Drilling diameter and maximum anchorage depth

Rebar diameter d_{nom} [1)]	Nominal drilling diameter d_{cut}	Max permissible embedment depth ℓ_v
[mm]	[mm]	[mm]
8	12	400
10	14	500
12	16	600
14	18	700
16	20	800
20	25	1000
25	32	1000
28	35	1000
32	40	1000
40	55	1000

[1)] The maximum outer rebar diameter over the ribs shall be: nominal diameter of the bar d_{nom} + 0,20 d_{nom}

Table B4: Processing and Cure time

Base Material Temperature °C	Cartridge Temperature °C	T Gel (mins)	T load (hrs)
+5°C	Minimum +10°C	300	24
+5°C to +10°C		150	
+10°C to +15°C	+10°C to +15°C	40	18
+15°C to +20°C	+15°C to +20°C	25	12
+20°C to +25°C	+20°C to +25°C	18	8
+25°C to +30°C	+25°C to +30°C	12	6
+30°C to +35°C	+30°C to +35°C	8	4
+35°C to +40°C	+35°C to +40°C	6	2
Ensure cartridge is > 10°C			

Sika AnchorFix®-3030

Intended use
Maximum anchorage depth
Processing and Load time

Annex B 4

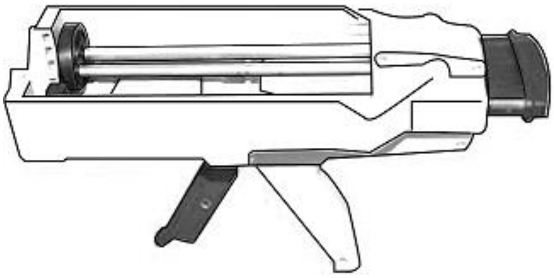
Table B5: Applicator gun

A

B

C

D



E

Applicator gun	A	B	C	D	E
Cartridge	Side by side 385 ml	Side by side 385 ml	Side by side 385 ml	Side by side 585 ml	Foil capsule 300 ml

Table B6: Brush

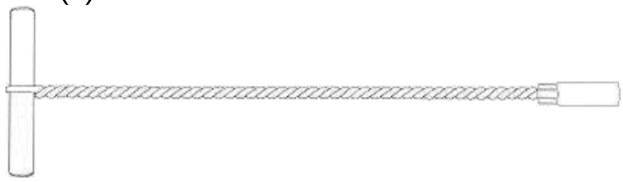
Sizes		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32	Ø40
Drill hole diameter d_0	[mm]	12	14	16	18	20	25	32	35	40	55
Steel brush diameter	[mm]	S12HF S13HF	S14HF S15HF	S18HF	S22HF		S27HF	S35HF	S38HF	S43HF	S58HF
Brushes head length	[mm]	75									

If required use additional accessories and extension for air nozzle and brush to reach back of hole.

Max. hole depth	Brush / extension configuration	Part
375 mm	Brush head unit + handle unit	(a)+(b)
675 mm	Brush head unit + extension piece + handle unit	(a)+(c)+(b)
975 mm	Brush head unit + 2x extension piece + handle unit	(a)+(c)+(c)+(b)

Part (a)

Part (b)

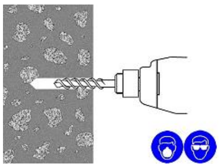


Part (c)

Table B7: Extension hose for deep holes

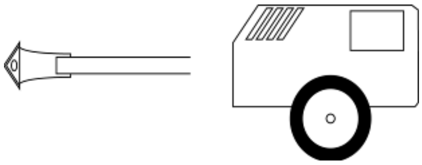
Sizes		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32	Ø40
Hole diameter	[mm]	12	14	16	18	20	25	32	35	40	55
Extension hose	[mm]	6		9							
Resin stopper	[mm]	-	-	-	-	18	22	30		36	50

Drilling the hole



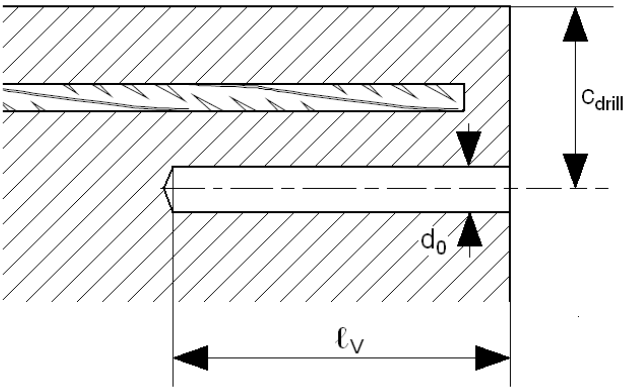
Drill hole to the required embedment depth using a hammer-drill with carbide drill bit set in rotation hammer mode, or a compressed air drill or diamond core drill.

Rotary hammer drilling



Compressed air drill

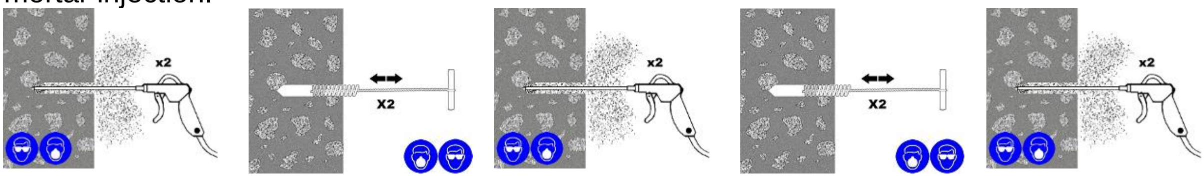
Before drilling remove carbonized concrete.
In case of aborted drill hole the drill hole shall be filled with mortar.



- Observe concrete coverage c, as per setting plan and Table B1
- Drill parallel to the edge and to existing rebar

Cleaning the hole

The borehole must be free of dust, debris, water, ice, oil, grease and other contaminants prior to mortar injection.

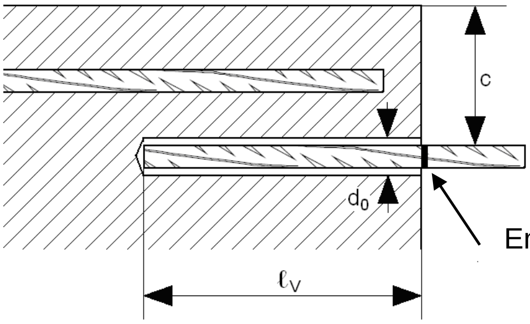


- Blowing 2 time from the back of the hole with oil-free compressed air (min. 6 bar) until return air stream is free of noticed dust.
- Brushing 2 time with the special brush size (brush Ø ≥ borehole Ø) by inserting the brush to the back of the hole in a twisting motion. The brush shall produce natural resistance as it enters the anchor hole. If this is not the case, please use a new brush or a brush with a larger diameter.
- Repeat operation 1 and 2.
- Blowing 1 time again with compressed air until return air stream is free of noticeable dust.

Sika AnchorFix®-3030	**Annex B 7**
Intended use Installation instructions I	

Mortar injection

If the hole collects water after initial cleaning,
this water must be removed before injecting the resin.



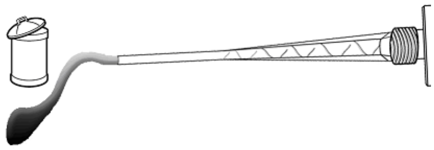
Before use, make sure the rebar is dry and free of oil or other residue.

Mark embedment depth on the rebar (e.g. with tape) ℓ_v

Insert rebar in borehole, to verify hole and setting depth ℓ_v

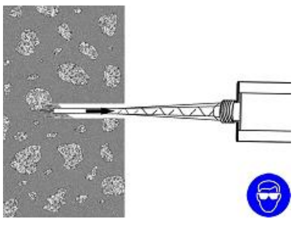
- Check expiration date: See imprint on cartridge. Do not use an expired product
- Foil pack temperature:
  Must be between +10°C and +40°C when in use
- Base material temperature at time of installation:
  Must be between +5°C and +40°C
- Instructions for transport and storage:
  Keep in a cool, dry and dark place at +5°C to +20°C achieve maximum shelf life

Select the appropriate static mixer nozzle for the installation, open the cartridge/foil and screw onto the mouth of the cartridge. Insert the cartridge into the correct applicator gun.



Extrude the first part of the cartridge to waste until an even colour has been achieved without streaking in the resin

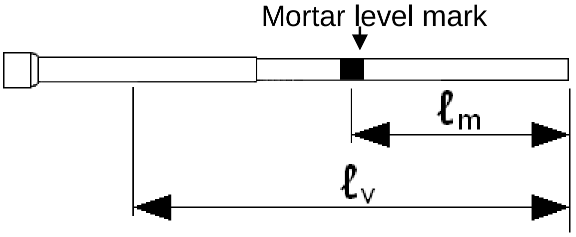
If necessary, cut the extension tube to the depth of the hole and push onto the end of the mixer nozzle, and (for rebars 16 mm dia. or more) fit the correct resin stopper to the other end. Attach extension tubing and resin stopper.



Insert the mixer nozzle (resin stopper / extension tube if applicable) to the bottom of the hole. Begin to extrude the resin and slowly withdraw the mixer nozzle from the hole ensuring that there are no air voids as the mixer nozzle is withdrawn. Fill the hole to approximately ½ to ¾ full and remove the mixer nozzle completely.

Sika AnchorFix®-3030	**Annex B 8**
Intended use Installation instructions II	

Inserting the rebar

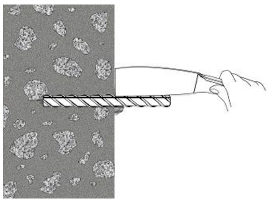


Mark the required mortar level ℓ_m and embedment depth ℓ_v with tape or marker on the injection extension.

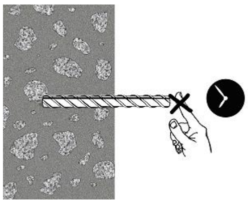
Quick estimation: $\ell_m = 1/2 \cdot \ell_v$

Continue injection until the mortar level mark ℓ_m becomes visible.

Insert the rebar, free from oil or other release agents, to the bottom of the hole using a back and forth twisting motion ensuring all the threads are thoroughly coated. Adjust to the correct position within the stated working time.



Any excess resin should be expelled from the hole evenly around the steel element showing that the hole is full.
This excess resin should be removed from around the mouth of the hole before it sets.



Leave the anchor to cure.

Do not disturb the anchor until the appropriate loading/curing time has elapsed depending on the substrate conditions and ambient temperature.

Table C1: Design values of the ultimate bond resistance f_{bd}[1)] in N/mm² for hammer drilling methods for good bond conditions

<table>
<tr><th rowspan="2">Size
d_s [mm]</th><th colspan="9">Concrete class</th></tr>
<tr><th>C12/15</th><th>C16/20</th><th>C20/25</th><th>C25/30</th><th>C30/37</th><th>C35/45</th><th>C40/50</th><th>C45/55</th><th>C50/60</th></tr>
<tr><td>8</td><td rowspan="9">1,6</td><td rowspan="9">2,0</td><td rowspan="9">2,3</td><td rowspan="9">2,7</td><td rowspan="9">3,0</td><td rowspan="9">3,4</td><td rowspan="9">3,7</td><td rowspan="8">4,0</td><td rowspan="8">4,3</td></tr>
<tr><td>10</td></tr>
<tr><td>12</td></tr>
<tr><td>14</td></tr>
<tr><td>16</td></tr>
<tr><td>20</td></tr>
<tr><td>25</td></tr>
<tr><td>28</td></tr>
<tr><td>32</td><td colspan="2">3,7</td></tr>
<tr><td>40</td><td>1,5</td><td>1,8</td><td colspan="7">2,1</td></tr>
</table>

1) Tabulated values f_{bd} are valid for good bond conditions according to EN 1992-1-1. For all other bond conditions multiply the values for f_{bd} by 0,7.

Table C2: Design values of the ultimate bond resistance f_{bd}[1)] in N/mm² for diamond core drilling methods for good bond conditions

<table>
<tr><th rowspan="2">Size
d_s [mm]</th><th colspan="9">Concrete class</th></tr>
<tr><th>C12/15</th><th>C16/20</th><th>C20/25</th><th>C25/30</th><th>C30/37</th><th>C35/45</th><th>C40/50</th><th>C45/55</th><th>C50/60</th></tr>
<tr><td>8</td><td rowspan="9">1,6</td><td rowspan="9">2,0</td><td rowspan="9">2,3</td><td rowspan="9">2,7</td><td rowspan="9">3,0</td><td rowspan="9">3,4</td><td rowspan="8">3,7</td><td rowspan="8">4,0</td><td rowspan="7">4,3</td></tr>
<tr><td>10</td></tr>
<tr><td>12</td></tr>
<tr><td>14</td></tr>
<tr><td>16</td></tr>
<tr><td>20</td></tr>
<tr><td>25</td></tr>
<tr><td>28</td><td>4,0</td></tr>
<tr><td>32</td><td colspan="3">3,4</td></tr>
<tr><td>40</td><td>1,5</td><td>1,8</td><td colspan="7">2,1</td></tr>
</table>

1) Tabulated values f_{bd} are valid for good bond conditions according to EN 1992-1-1. For all other bond conditions multiply the values for f_{bd} by 0,7.

Sika AnchorFix®-3030	**Annex C 1**
Performances Design values of the ultimate bond resistance	

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Designated according to Article 29 of Regulation (EU) No 305/2011

Member of EOTA
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European Technical Assessment

ETA 17/0694 of 24/11/2019

Technical Assessment Body issuing the ETA: Technical and Test Institute for Construction Prague

Trade name of the construction product	Sika AnchorFix®-3030
Product family to which the construction product belongs	Product area code: 33 Bonded injection type anchor for use in cracked and uncracked concrete
Manufacturer	Sika Services AG Tueffenwies 16 CH-8048 Zuerich Switzerland
Manufacturing plant	Sika Plant No. 503 44 08 (1138)
This European Technical Assessment contains	20 pages including 17 Annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	EAD 330499-01-0601
This version replaces	ETA 17/0694 issued on 11/07/2018

1. Technical description of the product

The Sika AnchorFix®-3030 with steel elements is bonded anchor (injection type).

Steel elements can be galvanized or stainless steel threaded rods or rebars.

Steel element is placed into a drilled hole filled with injection mortar. The steel element is anchored via the bond between metal part, injection mortar and concrete. The anchor is intended to be used with various embedment depth up to 20 diameters.

The illustration and the description of the product are given in Annex A.

2. Specification of the intended use in accordance with the applicable EAD

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the products in relation to the expected economically reasonable working life of the works.

3. Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	**Performance**
Static and quasi-static loading	
Resistance to steel failure (tension)	See Annex C 1, C 2
Resistance to combined pull-out and concrete failure	See Annex C 1, C 2
Resistance to concrete cone failure	See Annex C 1, C 2
Edge distance to prevent splitting under load	See Annex C 1, C 2
Robustness	See Annex C 1, C 2
Maximum setting torque moment	See Annex B 5
Minimum edge distance and spacing	See Annex B 5
Resistance to steel failure (shear)	See Annex C 3, C 4
Resistance to pry-out failure	See Annex C 3, C 4
Resistance to concrete edge failure	See Annex C 3, C 4
Displacements under short term and long term loading	See Annex C 5
Durability of metal parts	See Annex A 3
Seismic performance C1 and C2	
Resistance to steel failure	See Annex C 6, C 7, C 8
Resistance to pull-out	See Annex C 6, C 7, C 8
Factor for annular gap	See Annex C 6, C 7, C 8
Displacement	See Annex C 8

3.2 Hygiene, health and environment (BWR 3)

No performance determined.

3.3 General aspects relating to fitness for use

Durability and serviceability are only ensured if the specifications of intended use according to Annex B 1 are kept.

4. Assessment and verification of constancy of performance (AVCP) system applied with reference to its legal base

According to the Decision 96/582/EC of the European Commission[1] the system of assessment verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

[1] Official Journal of the European Communities L 254 of 08.10.1996

Product	Intended use	Level or class	System
Metal anchors for use in concrete	For fixing and/or supporting to concrete, structural elements (which contributes to the stability of the works) or heavy units	-	1

5. Technical details necessary for the implementation of the AVCP system, as provided in the applicable EAD

5.1 Tasks of the manufacturer

The manufacturer may only use raw materials stated in the technical documentation of this European Technical Assessment.

The factory production control shall be in accordance with the control plan which is a part of the technical documentation of this European Technical Assessment. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Technický a zkušební ústav stavební Praha, s.p.[2] The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

5.2 Tasks of the notified bodies

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The notified certification body involved by the manufacturer shall issue a certificate of constancy of performance of the product stating the conformity with the provisions of this European Technical Assessment.

In cases where the provisions of the European Technical Assessment and its control plan are no longer fulfilled the notified body shall withdraw the certificate of constancy of performance and inform Technický a zkušební ústav stavební Praha, s.p without delay.

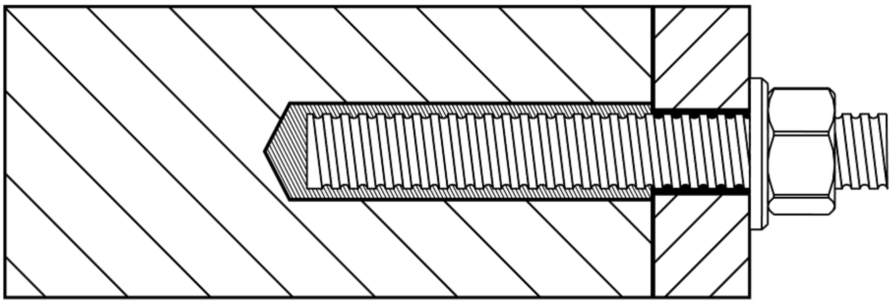
Issued in Prague on 24.11.2019

By

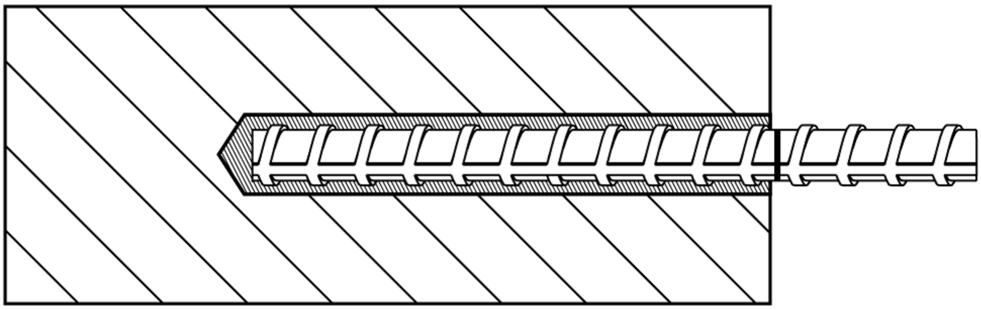
Ing. Mária Schaan
Head of the Technical Assessment Body

[2] The control plan is a confidential part of the documentation of the European Technical Assessment, but not published together with the ETA and only handed over to the approved body involved in the procedure of AVCP.

Threaded rod



Reinforcing bar

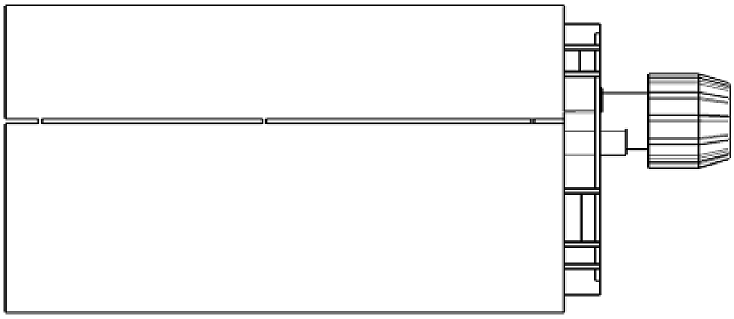


Sika AnchorFix®-3030	**Annex A 1**
Product description Installed conditions	

Mortar cartridges

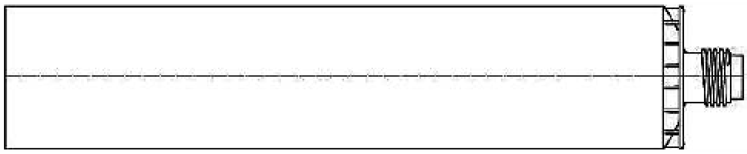
Side by side cartridge

Sika AnchorFix®-3030 — 385 ml, 585 ml



Two part foil in a single piston component cartridge

Sika AnchorFix®-3030 — 300 ml

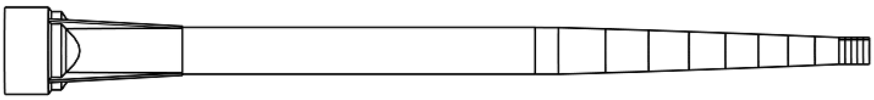


Marking of the mortar cartridges

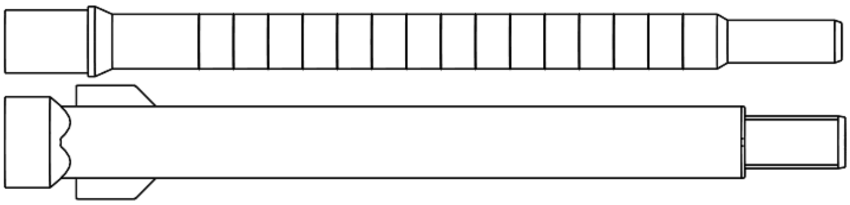
Identifying mark of the producer, Trade name, Charge code number, Storage life, Curing and processing time

Mixing nozzle

Q mixing nozzle



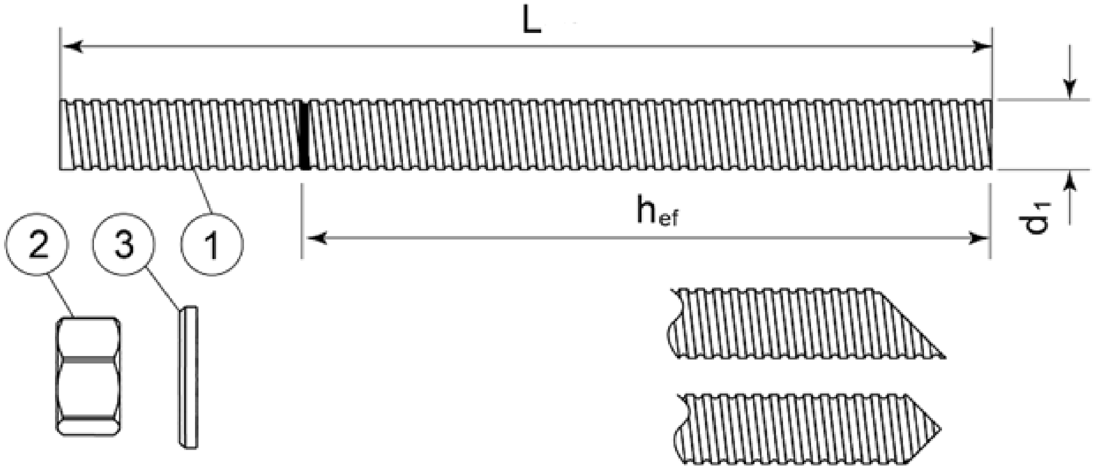
QH mixing nozzle



EZ mixing nozzle

Sika AnchorFix®-3030	**Annex A 2**
Product description Injection system	

Threaded rod M8, M10, M12, M16, M20, M24, M27, M30



Standard commercial threaded rod with marked embedment depth

Part	Designation	Material
Steel, zinc plated ≥ 5 µm acc. to EN ISO 4042 or Steel, Hot-dip galvanized ≥ 40 µm acc. to EN ISO 1461 and EN ISO 10684 or Steel, zinc diffusion coating ≥ 15 µm acc. to EN 13811		
1	Anchor rod	Steel, EN 10087 or EN 10263 Property class 4.6, 5.8, 8.8, 10.9* EN ISO 898-1
2	Hexagon nut EN ISO 4032	According to threaded rod, EN 20898-2
3	Washer EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	According to threaded rod
Stainless steel		
1	Anchor rod	Material: A2-70, A4-70, A4-80, EN ISO 3506
2	Hexagon nut EN ISO 4032	According to threaded rod
3	Washer EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	According to threaded rod
High corrosion resistant steel		
1	Anchor rod	Material: 1.4529, 1.4565, EN 10088-1
2	Hexagon nut EN ISO 4032	According to threaded rod
3	Washer EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	According to threaded rod

*Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

Sika AnchorFix®-3030	**Annex A 3**
Product description Threaded rod and materials	

Rebar Ø8, Ø10, Ø12, Ø16, Ø20, Ø25, Ø32

Standard commercial reinforcing bar with marked embedment depth

Product form		**Bars and de-coiled rods**	
Class		B	C
Characteristic yield strength f_{yk} or $f_{0,2k}$ (MPa)		400 to 600	
Minimum value of $k = (f_t/f_y)_k$		≥ 1,08	≥ 1,15 < 1,35
Characteristic strain at maximum force ε_{uk} (%)		≥ 5,0	≥ 7,5
Bendability		Bend/Rebend test	
Maximum deviation from nominal mass (individual bar) (%)	Nominal bar size (mm) ≤ 8 > 8	 ±6,0 ±4,5	
Bond: Minimum relative rib area, $f_{R,min}$	Nominal bar size (mm) 8 to 12 > 12	 0,040 0,056	

Specifications of intended use

Anchorages subject to:

- Static and quasi-static load
- Seismic actions category C1 (max w = 0,5 mm):
  - threaded rod size M8, M10, M12, M16, M20, M24, M27, M30
  - rebar size Ø10, Ø12, Ø16, Ø20, Ø25, Ø32
- Seismic actions category C2 (max w = 0,8 mm): threaded rod size M12, M16, M20

Base materials

- Cracked and uncracked concrete
- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum and C50/60 at maximum according EN 206:2013.

Temperature range:

- T3: -40°C to +70°C (max. short. term temperature +70°C and max. long term temperature +50°C)

Use conditions (Environmental conditions)

- (X1) Structures subject to dry internal conditions (zinc coated steel, stainless steel, high corrosion resistance steel).
- (X2) Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel A4, high corrosion resistant steel).
- (X3) Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant steel).

Note: *Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).*

Concrete conditions:

- I1 – installation in dry or wet (water saturated) concrete and use in service in dry or wet concrete.
- I2 – installation in water-filled (not sea water) and use in service in dry or wet concrete

Design:

- The anchorages are designed in accordance with the EN 1992-4 under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings.
- Anchorages under seismic actions (cracked concrete) have to be designed in accordance with EN 1992-4.

Installation:

- Hole drilling by hammer drill mode.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

Installation direction:

- D3 – downward and horizontal and upwards (e.g. overhead) installation

Sika AnchorFix®-3030	**Annex B 1**
Intended use Specifications	

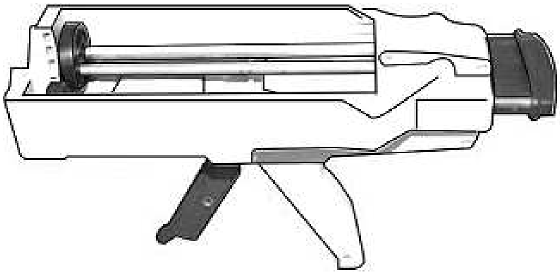
Applicator gun

A

B

C

D

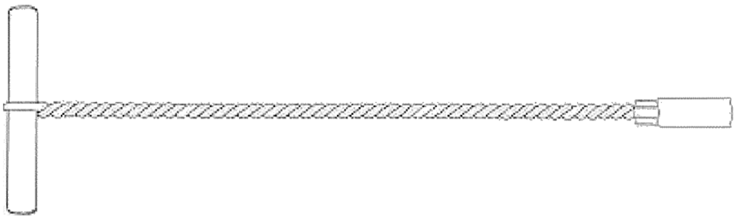


E

Applicator gun	A	B	C	D	E
Cartridge	Side by side 385 ml	Side by side 385 ml	Side by side 385 ml	Side by side 585 ml	Foil capsule 300 ml

Cleaning steel brush

Brush extensions

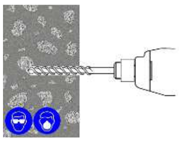


Sika AnchorFix®-3030	**Annex B 2**
Intended use Applicator guns Cleaning brush	

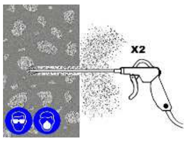
Installation instructions

Before commencing installation ensure the operative is equipped with appropriate personal protection equipment, SDS Hammer Drill, Air, Hole Cleaning Brush, good quality Dispensing Tool – either manual or power operated, Chemical cartridge with mixing nozzle and extension tube, if needed.

1. Using the SDS Hammer Drill in rotary hammer mode for drilling, with a carbide tipped drill bit of the appropriate size, drill the hole to the specified hole diameter and depth.

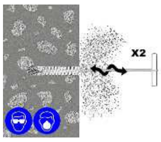


2. *2.* Insert the Air Lance to the bottom of the hole and depress the trigger for 2 seconds. The compressed air must be clean – free from water and oil – and at a minimum pressure of 6bar.



   Perform the blowing operation twice.

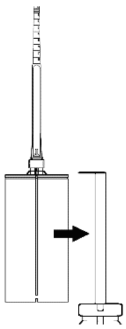
3. Select the correct size Hole Cleaning Brush. Ensure that the brush is in good condition and the correct diameter. Insert the brush to the bottom of the hole, using a brush extension if needed to reach the bottom of the hole and withdraw with a twisting motion. *There should be positive interaction between the steel bristles of the brush and the sides of the drilled hole*.



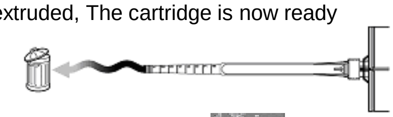
   Perform the brushing operation twice.

4. Repeat 2
5. Repeat 3
6. Repeat 2
7. Select the appropriate static mixer nozzle, checking that the mixing elements are present and correct **(do not modify the mixer)**. Attach mixer nozzle to the cartridge. Check the Dispensing Tool is in good working order. Place the cartridge into the dispensing tool.

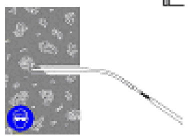
   Note: The QH nozzle is in two sections. One section contains the mixing elements and the other section is an extension piece. Connect the extension piece to the mixing section by pushing the two sections firmly together until a positive engagement is felt.



8. Extrude some resin to waste until an even-colored mixture is extruded, The cartridge is now ready for use

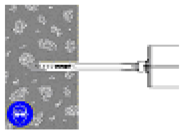


9. Attach an extension tube with resin stopper (if required) to the end of the mixing nozzle with a push fit

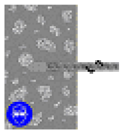


   (The extension tubes may be pushed into the resin stoppers and are held in place with a coarse internal thread).

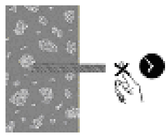
10. Insert the mixing nozzle to the bottom of the hole. Extrude the resin and slowly withdraw the nozzle from the hole. **Ensure no air voids are created** as the nozzle is withdrawn. Inject resin until the hole is approximately ¾ full and remove the nozzle from the hole.



11. Select the steel anchor element ensuring it is free from oil or other contaminants, and mark with the required embedment depth. Insert the steel element into the hole using a back and forth twisting motion to ensure complete cover, until it reaches the bottom of the hole. Excess resin will be expelled from the hole evenly around the steel element and there shall be no gaps between the anchor element and the wall of the drilled hole.

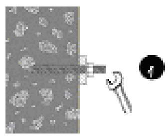


12. Clean any excess resin from around the mouth of the hole.
13. Do not disturb the anchor until at least the minimum cure time has elapsed. Refer to the Working and Load Timetable to determine the appropriate cure time.



14. Position the fixture and tighten the anchor to the appropriate installation torque.

    Do not over-torque the anchor as this could adversely affect its performance.



Sika AnchorFix®-3030

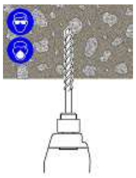
Intended use
Installation procedure

Annex B 3

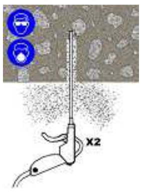
Installation instructions

Overhead Substrate Installation Method

1. Using the SDS Hammer Drill in rotary hammer mode for drilling, with a carbide tipped drill bit of the appropriate size, drill the hole to the specified hole diameter and depth.

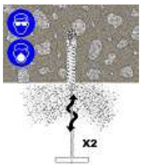


2. Select the correct Air Lance, insert to the bottom of the hole and depress the trigger for 2 seconds. The compressed air must be clean – free from water and oil – and at a minimum pressure of 90psi (6bar).



   Perform the blowing operation twice.

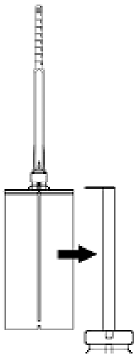
3. Select the correct size Hole Cleaning Brush. Ensure that the brush is in good condition and the correct diameter. Insert the brush to the bottom of the hole, using a brush extension if needed to reach the bottom of the hole, and withdraw with a twisting motion. *There should be positive interaction between the steel bristles of the brush and the sides of the drilled hole*.



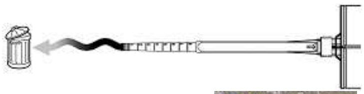
   Perform the brushing operation twice.

4. Repeat 2
5. Repeat 3
6. Repeat 2
7. Select the appropriate static mixer nozzle checking that the mixing elements are present and correct **(do not modify the mixer)**. Attach mixer nozzle to the cartridge. Check the Dispensing Tool is in good working order. Place the cartridge into the dispensing tool.

   Note: The QH nozzle is in two sections. One section contains the mixing elements and the other section is an extension piece. Connect the extension piece to the mixing section by pushing the two sections firmly together until a positive engagement is felt.



8. Extrude some resin to waste until an even-colored mixture is extruded, The cartridge is now ready for use.



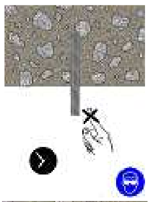
9. Attach an extension tube with resin stopper (if required) to the end of the mixing nozzle with a push fit. (The extension tubes may be pushed into the resin stoppers and are held in place with a coarse internal thread).

10. Insert the mixing nozzle to the bottom of the hole. Extrude the resin and slowly withdraw the nozzle from the hole. **Ensure no air voids are created** as the nozzle is withdrawn. Inject resin until the hole is approximately ¾ full and remove the nozzle from the hole.

11. Select the steel anchor element ensuring it is free from oil or other contaminants, and mark with the required embedment depth. Insert the steel element into the hole using a back and forth twisting motion to ensure complete cover, until it reaches the bottom of the hole.

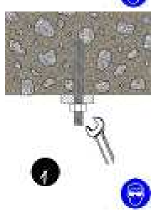
    Excess resin will be expelled from the hole evenly around the steel element and there shall be no gaps between the anchor element and the wall of the drilled hole.

12. Clean any excess resin from around the mouth of the hole.
13. Do not disturb the anchor until at least the minimum cure time has elapsed. Refer to the Working and Load Timetable to determine the appropriate cure time.



14. Position the fixture and tighten the anchor to the appropriate installation torque.

    Do not over-torque the anchor as this could adversely affect its performance.



Sika AnchorFix®-3030

Intended use
Installation procedure

Annex B 4

Table B1: Installation parameters of threaded rod

Size			M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	22	26	30	35
Cleaning brush			S11HF	S14HF	S14/15HF	S22HF	S24HF	S31HF	S31HF	S38HF
Torque moment	max T_{fix}	[Nm]	10	20	40	80	120	160	180	200
Embedment depth for $h_{ef,min}$	h_{ef}	[mm]	60	60	70	80	90	96	108	120
Embedment depth for $h_{ef,max}$	h_{ef}	[mm]	160	200	240	320	400	480	540	600
Depth of drill hole	h_0	[mm]	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5
Minimum edge distance	c_{min}	[mm]	40	40	40	40	50	50	50	60
Minimum spacing	s_{min}	[mm]	40	40	40	40	50	50	50	60
Minimum thickness of member	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + $2d_0$				

Table B2: Installation parameters of rebar

Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Nominal drill hole diameter	$Ød_0$	[mm]	12	14	16	20	25	32	40
Cleaning brush			S12/13HF	S14/15HF	S18HF	S22HF	S27HF	S35HF	S43HF
Torque moment	max T_{fix}	[Nm]	10	20	40	80	120	180	200
Embedment depth for $h_{ef,min}$	h_{ef}	[mm]	60	60	70	80	90	100	128
Embedment depth for $h_{ef,max}$	h_{ef}	[mm]	160	200	240	320	400	500	640
Depth of drill hole	h_0	[mm]	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5	h_{ef}+5
Minimum edge distance	c_{min}	[mm]	40	40	40	40	50	50	70
Minimum spacing	s_{min}	[mm]	40	40	40	40	50	50	70
Minimum thickness of member	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + $2d_0$			

Table B3: Minimum curing time

Base Material Temperature [°C]	Cartridge Temperature [°C]	T Work [mins]	T Load [hrs]
+5	Minimum +10	300	24
+5°C to +10		150	
+10°C to +15	+10°C to +15	40	18
+15°C to +20	+15°C to +20	25	12
+20°C to +25	+20°C to +25	18	8
+25°C to +30	+25°C to +30	12	6
+30°C to +35	+30°C to +35	8	4
+35°C to +40	+35°C to +40	6	2
Ensure cartridge is ≥ 10°C			

T Work is typical gel time at highest base material temperature in the range.
T Load is minimum set time required until load can be applied at the lowest temperature in the range.

Sika AnchorFix®-3030

Intended use
Installation parameters
Curing time

Annex B 5

Table C1: Design method EN 1992-4
Characteristic values of resistance to tension load of threaded rod

Steel failure – Characteristic resistance										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel grade **4.6**	$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	2,00							
Steel grade **5.8**	$N_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **8.8**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,50							
Steel grade **10.9**	$N_{Rk,s}$	[kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **A2-70, A4-70**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Stainless steel grade **A4-80**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,60							
Stainless steel grade **1.4529**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **1.4565**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Combined pullout and concrete cone failure in concrete C20/25										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Characteristic bond resistance in uncracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm²]	17	15	15	12	12	12	11	9,5
Dry, wet concrete, flooded hole										
Partial safety factor	γ_{inst}	[-]	1,0							
Factor for uncracked concrete C25/30	ψ_c	[-]	1,02							
Factor for uncracked concrete C30/37	ψ_c	[-]	1,04							
Factor for uncracked concrete C35/45	ψ_c	[-]	1,06							
Factor for uncracked concrete C40/50	ψ_c	[-]	1,07							
Factor for uncracked concrete C45/55	ψ_c	[-]	1,08							
Factor for uncracked concrete C50/60	ψ_c	[-]	1,09							
Characteristic bond resistance in cracked concrete										
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm²]	10	10	10	9,5	9	9	6	6
Dry, wet concrete, flooded hole										
Partial safety factor	γ_{inst}	[-]	1,0							
Factor for cracked concrete C25/30	ψ_c	[-]	1,02							
Factor for cracked concrete C30/37	ψ_c	[-]	1,04							
Factor for cracked concrete C35/45	ψ_c	[-]	1,06							
Factor for cracked concrete C40/50	ψ_c	[-]	1,07							
Factor for cracked concrete C45/55	ψ_c	[-]	1,08							
Factor for cracked concrete C50/60	ψ_c	[-]	1,09							
Concrete cone failure										
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11							
Factor for concrete cone failure for cracked concrete	$k_{cr,N}$	[-]	7,7							
Edge distance	$c_{cr,N}$	[mm]	$1{,}5h_{ef}$							
Splitting failure										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Edge distance	$c_{cr,sp}$	[mm]	$2 \bullet h_{ef}$							
Spacing	$s_{cr,sp}$	[mm]	$2 \bullet c_{cr,sp}$							

Sika AnchorFix®-3030

Performances
Design according to EN 1992-4
Characteristic resistance for tension loads - threaded rod

Annex C 1

Table C2: Design method EN 1992-4
Characteristic values of resistance to tension load of rebar

Steel failure – Characteristic resistance										
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Rebar BSt 500 S	$N_{Rk,s}$	[kN]	28	43	62	111	173	270	442
Partial safety factor	γ_{Ms}	[-]	1,4						

Pullout failure in concrete C20/25									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Characteristic bond resistance in uncracked concrete									
Temperature T3: -40°C to +70°C	$\tau_{Rk,ucr}$	[N/mm^2]	13	13	13	12	12	12	8
Dry and wet concrete									
Installation safety factor	γ_{inst}	[-]	1,0						
Flooded hole									
Installation safety factor	γ_{inst}	[-]	1,2						
Factor for uncracked concrete C25/30 C30/37 C35/45 C40/50 C45/55 C50/60	ψ_c	[-]	1,02 1,04 1,06 1,07 1,08 1,09						
Characteristic bond resistance in cracked concrete									
Temperature T3: -40°C to +70°C	$\tau_{Rk,cr}$	[N/mm^2]	8	11	10	10	9	8,5	6,5
Dry and wet concrete									
Installation safety factor	γ_{inst}	[-]	1,0						
Flooded hole									
Installation safety factor	γ_{inst}	[-]	1,2						
Factor for cracked concrete C25/30 C30/37 C35/45 C40/50 C45/55 C50/60	ψ_c	[-]	1,02 1,04 1,06 1,07 1,08 1,09						

Concrete cone failure			
Factor for concrete cone failure for uncracked concrete	$k_{ucr,N}$	[-]	11
Factor for concrete cone failure for cracked concrete	$k_{cr,N}$	[-]	7,7
Edge distance	$c_{cr,N}$	[mm]	$1,5h_{ef}$

Splitting failure									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Edge distance	$c_{cr,sp}$	[mm]	$2 \cdot h_{ef}$						
Spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$						

Sika AnchorFix®-3030

Performances
Design according to EN 1992-4
Characteristic resistance for tension loads - rebar

Annex C 2

Table C3: Design method EN 1992-4
Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel grade **4.6**	$V_{Rk,s}$	[kN]	7	12	17	31	49	71	92	112
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$V_{Rk,s}$	[kN]	9	15	21	39	61	88	115	140
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$V_{Rk,s}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,5							
Stainless steel grade **A2-70, A4-70**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	161	196
Partial safety factor	γ_{Ms}	[-]	1,56							
Characteristic resistance of group of fasteners										
Ductility factor k_7 = 1,0 for steel with rupture elongation A_5 > 8%										

Steel failure with lever arm										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel grade **4.6**	$M^o_{Rk,s}$	[N.m]	15	30	52	133	260	449	666	900
Partial safety factor	γ_{Ms}	[-]	1,67							
Steel grade **5.8**	$M^o_{Rk,s}$	[N.m]	19	37	66	166	325	561	832	1125
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **8.8**	$M^o_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel grade **10.9**	$M^o_{Rk,s}$	[N.m]	37	75	131	333	649	1123	1664	2249
Partial safety factor	γ_{Ms}	[-]	1,50							
Stainless steel grade **A2-70, A4-70**	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,56							
Stainless steel grade **A4-80**	$M^o_{Rk,s}$	[N.m]	30	60	105	266	519	898	1332	1799
Partial safety factor	γ_{Ms}	[-]	1,33							
Stainless steel grade **1.4529**	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,25							
Stainless steel grade **1.4565**	$M^o_{Rk,s}$	[N.m]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ_{Ms}	[-]	1,56							
Concrete pryout failure										
Factor for resistance to pry-out failure	k_8	[-]	2							

Concrete edge failure										
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16	20	24	27	30
Effective length of fastener	ℓ_f	[mm]	min (h_{ef}, 8 d_{nom})							

Sika AnchorFix®-3030

Performances
Design according to EN 1992-4
Characteristic resistance for shear loads - threaded rod

Annex C 3

Table C4: Design method EN 1992-4
Characteristic values of resistance to shear load of rebar

Steel failure without lever arm										
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Rebar BSt 500 S	$V_{Rk,s}$	[kN]	14	22	31	55	86	135	221
Partial safety factor	γ_{Ms}	[-]	1,5						
Characteristic resistance of group of fasteners									
Ductility factor	k_7 = 1,0 for steel with rupture elongation $A_5 > 8\%$								

Steel failure with lever arm									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Rebar BSt 500 S	$M^o_{Rk,s}$	[N.m]	33	65	112	265	518	1013	2122
Partial safety factor	γ_{Ms}	[-]	1,5						
Concrete pryout failure									
Factor for resistance to pry-out failure	k_8	[-]	2						

Concrete edge failure									
Size			**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16	20	25	32
Effective length of fastener	ℓ_f	[mm]	min (h_{ef}, 8 d_{nom})						

Table C5: Displacement of threaded rod under tension and shear load

Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension load									
Uncracked concrete									
F	[kN]	11,9	14,3	19,0	23,8	35,7	35,7	45,2	45,2
δ_{N0}	[mm]	0,3	0,3	0,3	0,4	0,4	0,5	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete									
F	[kN]	5,7	9,5	14,3	16,7	23,8	28,6	28,6	28,6
δ_{N0}	[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,6	0,7
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load									
F	[kN]	3,5	5,5	8,0	15,0	23,3	33,6	43,7	53,4
δ_{V0}	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7

Table C6: Displacement of rebar under tension and shear load

Size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Uncracked concrete								
F	[kN]	7,6	11,9	16,7	28,6	35,7	45,2	66,7
δ_{N0}	[mm]	0,3	0,3	0,4	0,4	0,4	0,5	0,5
$\delta_{N\infty}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Cracked concrete								
F	[kN]	5,7	9,5	11,9	19,0	23,8	28,6	35,7
δ_{N0}	[mm]	0,3	0,4	0,4	0,5	0,5	0,5	0,6
$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Shear load								
F	[kN]	6,6	10,3	14,8	26,3	41,1	64,3	105,3
δ_{V0}	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{V\infty}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7

Table C7: Seismic performance category C1 of threaded rod

Size			M8	M10	M12	M16	M20	M24	M27	M30
Tension load										
Steel failure										
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C1}$	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ_{Ms}	[-]	2,00							
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C1}$	[kN]	18	29	42	79	123	177	230	281
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C1}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C1}$	[kN]	37	58	84	157	245	353	459	561
Partial safety factor	γ_{Ms}	[-]	1,33							
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C1}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C1}$	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ_{Ms}	[-]	1,60							
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C1}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C1}$	[kN]	26	41	59	110	172	247	321	393
Partial safety factor	γ_{Ms}	[-]	1,87							
Characteristic resistance to pull-out										
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm²]	9,4	8,5	10,0	8,7	7,4	7,7	5,7	4,9
Installation safety factor	γ_{inst}	[-]	1,0							
Shear load										
Steel failure without lever arm										
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C1}$	[kN]	5	9	13	20	32	28	37	45
Partial safety factor	γ_{Ms}	[-]	1,67							
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C1}$	[kN]	7	11	16	26	40	35	46	56
Partial safety factor	γ_{Ms}	[-]	1,25							
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C1}$	[kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms}	[-]	1,25							
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C1}$	[kN]	14	22	32	51	80	71	92	112
Partial safety factor	γ_{Ms}	[-]	1,50							
Characteristic resistance **A2-70**, **A4-70**	$V_{Rk,s,eq,C1}$	[kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms}	[-]	1,56							
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C1}$	[kN]	11	17	25	41	64	56	73	90
Partial safety factor	γ_{Ms}	[-]	1,33							
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C1}$	[kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms}	[-]	1,25							
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C1}$	[kN]	10	15	22	36	56	49	64	79
Partial safety factor	γ_{Ms}	[-]	1,56							
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C7 shall be multiplied by following reduction factor for **hot-dip galvanized** commercial standard rods										
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h\text{-}dg,c1}$	[-]	0,47	0,47	0,47	0,54	0,54	0,88	0,88	0,88
Factor for annular gap	α_{gap}	[-]	0,5							

The anchor shall be used with minimum rupture elongation after fracture A_5 equal to 19%.

Sika AnchorFix®-3030

Performances
Seismic performance category C1 of threaded rod

Annex C 6

Table C8: Seismic performance category C1 of rebar

Size			Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Tension load								
Steel failure								
Rebar BSt 500 S	$N_{Rk,s,eq,C1}$	[kN]	43	62	111	173	270	442
Partial safety factor	γ_{Ms}	[-]	1,4					
Characteristic resistance to pull-out								
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C1}$	[N/mm²]	9,4	9,8	9,5	8,8	8,0	5,3
Dry and wet concrete								
Installation safety factor	γ_{inst}	[-]	1,0					
Flooded hole								
Installation safety factor	γ_{inst}	[-]	1,2					

Shear load								
Steel failure without lever arm								
Rebar BSt 500 S	$V_{Rk,s,eq,C1}$	[kN]	16	23	41	69	67	111
Partial safety factor	γ_{Ms}	[-]	1,5					
Factor for annular gap	α_{gap}	[-]	0,5					

Table C9: Seismic performance category C2 of threaded rod

Size			**M12**	**M16**	**M20**
Tension load					
Steel failure					
Characteristic resistance grade **4.6**	$N_{Rk,s,eq,C2}$	[kN]	34	63	98
Partial safety factor	γ_{Ms}	[-]		2,00	
Characteristic resistance grade **5.8**	$N_{Rk,s,eq,C2}$	[kN]	42	79	123
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **8.8**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance grade **10.9**	$N_{Rk,s,eq,C2}$	[kN]	84	157	245
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **A2-70, A4-70**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance **A4-80**	$N_{Rk,s,eq,C2}$	[kN]	67	126	196
Partial safety factor	γ_{Ms}	[-]		1,60	
Characteristic resistance **1.4529**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **1.4565**	$N_{Rk,s,eq,C2}$	[kN]	59	110	172
Partial safety factor	γ_{Ms}	[-]		1,87	
Characteristic resistance to pull-out					
Temperature T3: -40°C to +70°C	$\tau_{Rk,p,eq,C2}$	[N/mm²]	3,5	4,0	4,5
Installation safety factor	$\gamma_2=\gamma_{inst}$	[-]		1,0	

Shear load					
Steel failure without lever arm					
Characteristic resistance grade **4.6**	$V_{Rk,s,eq,C2}$	[kN]	13	18	28
Partial safety factor	γ_{Ms}	[-]		1,67	
Characteristic resistance grade **5.8**	$V_{Rk,s,eq,C2}$	[kN]	16	22	35
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **8.8**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance grade **10.9**	$V_{Rk,s,eq,C2}$	[kN]	32	45	70
Partial safety factor	γ_{Ms}	[-]		1,50	
Characteristic resistance **A2-70**, **A4-70**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,56	
Characteristic resistance **A4-80**	$V_{Rk,s,eq,C2}$	[kN]	25	36	56
Partial safety factor	γ_{Ms}	[-]		1,33	
Characteristic resistance **1.4529**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,25	
Characteristic resistance **1.4565**	$V_{Rk,s,eq,C2}$	[kN]	22	31	49
Partial safety factor	γ_{Ms}	[-]		1,56	
Characteristic shear load resistance $V_{Rk,s,eq}$ in the Table C9 shall be multiplied by following reduction factor for **hot-dip galvanized** commercial standard rods					
Reduction factor for hot-dip galvanized rods	$\alpha_{v,h\text{-}dg,c2}$	[-]	0,46	0,61	0,61
Factor for annular gap	α_{gap}	[-]		0,5	

Table C10: Displacement under tensile and shear load - seismic category C2 of threaded rod

Size		M12	M16	M20
$\delta_{N,eq(DLS)}$	[mm]	0,20	0,40	0,77
$\delta_{N,eq(ULS)}$	[mm]	0,76	0,74	1,68
$\delta_{V,eq(DLS)}$	[mm]	5,29	4,12	4,94
$\delta_{V,eq(ULS)}$	[mm]	10,20	9,05	10,99

The anchor shall be used with minimum rupture elongation after fracture A_5 equal to 19%.

Sika AnchorFix®-3030

Performances
Seismic performance category C2 of threaded rod

Annex C 8