

# **Ancon**<sup>°</sup> Low Thermal Conductivity Wall Ties

Helping to deliver sustainable, energy-efficient buildings





Imagine. Model. Make.



We imagine, model and make engineered products and innovative construction solutions that help turn architectural visions into reality and enable our construction partners to build better, safer, stronger and faster.

# Leviat is a world leader in connecting, fixing, lifting and anchoring technology.

From the build of new schools, hospitals, homes and infrastructure, to the repair and maintenance of heritage structures, our engineering skills are making a difference around the world. We provide technical design assistance at every stage of a project, from initial planning to installation and beyond.

Our technical support services range from simple product selection through to the development of a fully customised project-specific design solution. Every promise we make locally, has the commitment and dedication of our global team behind it. We employ almost 3,000 people at 60 locations across North America, Europe and Asia-Pacific, providing an agile and responsive service worldwide.

Leviat, a CRH company, is part of the world's leading building materials business.









#### **Façade Support & Restraint**

Systems for the safe and thermallyefficient fixing of the external building envelope, including brick and natural stone, insulated sandwich panels, curtain walling and suspended concrete façades, and also the repair and strengthening of existing masonry installations.

- Masonry Support Systems
- Windposts
- Lintels
- Brick Slip SystemsWall Ties & Restraints
- Masonry Reinforcement
- Natural Stone Façade Systems
- Cavity Trays
- Sandwich Panel anchor
- Suspended concrete façade
- Masonry Repair

#### Other areas of expertise:



#### Structural Connections

Systems to form robust, efficient connections, and continuity of concrete reinforcement as necessary, between walls, slabs, columns, beams and balconies, providing structural integrity as well as enhanced thermal and acoustic performance.



#### Lifting & Bracing

Systems for the safe and efficient transportation, lifting and temporary bracing of cast concrete elements and tiltup panels before permanent structural connections are made.



#### Anchoring & Fixing

Systems for fixing secondary fixtures to concrete, including anchor channels, bolts and inserts; also tension rod systems for roofs and canopies.



#### Formwork & Site Accessories

Non-structural accessories that complement our engineered solutions and help keep your construction environment operating safely and efficiently, including moulds for casting standard and special concrete elements and construction essentials such as reinforcing bar spacers.



#### Industrial Technology

Mounting channels, pipe clamps and other versatile framing systems that provide safe fixing in a wide range of industrial applications.

### Leviat product ranges:

Ancon I Aschwanden I Connolly I Halfen I Helifix I Isedio I Meadow Burke I Modersohn I Moment I Plaka I Scaldex I Thermomass

## Contents

Ancon Teplo Basalt Fibre	
Cavity Wall Ties	6
Ancon Stainless Steel	
Cavity Wall Ties	6
Ancon Teplo-BFL Basalt	
Fibre Frame Cramps	7
U-value Calculations for	
Cavity Ties & Frame Cramps	8
Ancon Teplo-Channel	
Basalt Fibre Wall Ties	9
U-value Calculations for	
Teplo-Channel Ties 1	C

### Helping to deliver sustainable, energy-efficient buildings

Wall ties are an essential element in the strength and stability of a cavity wall, but by crossing the insulated cavity they act as a thermal bridge, providing a path for heat to escape from the building. Generally speaking, the wider the cavity, the more substantial the wall tie needs to be and the greater the effect the tie will then have on the thermal efficiency (U-value) of the wall.

The challenge for the wall tie industry was to reduce the thermal conductivity of its products whilst continuing to meet the structural performance requirements of wide cavity construction.

Leviat has met this challenge with it's innovative range of Ancon Low Thermal Conductivity Wall Ties.

Ancon Low Thermal Conductivity Wall Ties suit cavities up to 450mm and minimise heat loss through thermal bridging, improving the energy efficiency of a masonry cavity wall. Ideal for today's super-insulated building envelopes, they are suitable for both newbuild and retrofit.





#### Ancon Teplo Basalt Fibre Cavity Wall Ties

Ancon Teplo Wall Ties comprise pultruded basalt fibres set in a resin matrix which offers a thermal conductivity of just 0.7W/mK. The thermal efficiency of this innovative material means these ties are excluded from U-value calculations to BS EN ISO 6946, minimising insulation thickness and wall footprint. The unique ribbed shank of these ties provides an effective moisture drip.

Plain-ended Ancon Teplo-R ties, inspired by the original basalt fibre wall tie, are ideal for resin-fixed remedial/ retrofit projects.

The Ancon Teplo-BF new-build wall tie, with its moulded safety ends, offers improved buildability and mortar bond strength, making it more user-friendly and suitable even in slow drying lime mortars.

The Ancon Teplo-BFR features a plain end for resin anchoring into an existing structure and a moulded safety end for building into a new bed joint.

The range has been independently tested and is BBA approved; a British Board of Agrément certificate is available to download online.

#### Ancon Stainless Steel Cavity Wall Ties

Ancon Stainless Steel Wall Ties are value-engineered to provide high performance at a competitive price. The effect that the slender high tensile wire wall ties have on heat transfer is negligible and so, like the Teplo range, they are generally excluded from U-value calculations to BS EN ISO 6946. For cavities from 50mm to 450mm

Ancon Teplo-BF1 (Type 1) Lengths available: 200, 225, 250, 275mm

Ancon Teplo-R

Ancon Teplo-BF2 (Type 2) Lengths available: 200, 225, 250, 275, 300, 325, 350, 375, 400, 425mm

Ancon Teplo-BF3 (Type 3) Lengths available: 450, 500, 525mm Ancon Teplo-BF4 (Type 4)

Lengths available: 200, 225, 250, 550, 575mm

Ancon Teplo-BFR (Tie type dependent on resin-end/ substrate) Lengths available: 210 - 585mm

**Ancon Teplo-R** (Tie type dependent on resin-end) Lengths available: 215 - 590mm

#### For cavities from 50mm to 175mm



### Ancon ST1 (Type 1) Lengths available:

200, 225, 250, 275, 300, 325, 350mm Type 1 in M2 mortar

Ancon Staifix RT2 (Type 2) Lengths available: 200, 225, 250, 275mm

### Ancon Staifix HRT4 (Type 4)

Lengths available: 200, 225, 250, 275, 300mm Suitable for use in internal separating walls to Approved Document E

Lambda value (W/mK) and cross-sectional areas are given overleaf to aid U-value calculations.

#### **Product Marking**

Ancon Stainless Steel Wall Ties are UKCA & CE marked to BS EN 845-1 in accordance with the Construction Products Regulation. Basalt fibre Ancon Teplo Wall Ties are outside the scope of UKCA & CE marking.

#### Ancon Teplo-BFL-Basalt Fibre Frame Cramps

The Ancon Teplo-BFL-Tie is ideal where a low thermal conductivity restraint fixing is required between a masonry outer leaf and an in-situ structure. It offers the same thermal benefits as a Teplo-BF cavity wall tie, with an additional stainless steel upstand which is mechanically fixed to one end of the tie to allow for a secondary fixing. The range has been independently tested and is BBA approved; a British Board of Agrément certificate is available to download online. For cavities from 76mm-400mm Chi values (W/K) are given overleaf



#### Suitable Fixings

Masonry: Plug and Screw Concrete: Plug and Screw, Expansion Bolt (M6) Steel: Set screws (M6), Self-Drilling Screws (SDTSS-38-5PT) Timber: Countersunk Wood Screw (5mm x 30mm)

#### **Example Wall Profiles**





#### **Project References**

Ancon's low thermal conductivity wall ties have been used on numerous exemplary low energy construction projects, including certified zero carbon and PassivHaus developments. Visit www.ancon.co.uk or contact us for further information.



#### Information for U-value Calculations

For the accurate calculation of a wall's U-value, it is important to use the correct information for the wall ties, rather than allowing a program to apply a default value as this will over-estimate the effect of an Ancon Wall Tie. BS EN ISO 6946 permits the corrections due to wall ties ( $\Delta U_f$ ) and air gaps between insulation boards etc to be omitted if the corrections amount to less than 3% of the uncorrected U-value of the wall.

#### Ancon Teplo Basalt Fibre Wall Ties

Ancon Teplo-BF, Teplo-BFR and Teplo-R have a thermal conductivity of less than 1.0W/mK and so are excluded from U-value calculations to EN ISO 6946, irrespective of tie diameter.

#### **Ancon Stainless Steel Wall Ties**

The thermal conductivity and cross-sectional areas of Ancon's stainless steel wall ties are shown below for use in U-value calculation programs.

Tie Reference	Тіе Туре	Tie Length (mm)	Cavity Range (mm)	Cross-Sectional Area (mm²)	Thermal Conductivity (W/mK)
HRT4-200	4	200	50 - 75	3.5	17.0
HRT4-225	4	225	76 - 100	4.2	17.0
HRT4-250	4	250	101 - 125	6.2	17.0
HRT4-275	4	275	126 - 150	6.2	17.0
HRT4-300	4	300	151 - 175	7.6	17.0
RT2-200	2	200	50 - 75	7.5	17.0
RT2-225	2	225	76 - 100	7.5	17.0
RT2-250	2	250	101 - 125	8.6	17.0
RT2-275	2	275	126 - 150	10.2	17.0
ST1-200	1	200	50 - 75	19.5	17.0
ST1-225	1	225	76 - 100	19.5	17.0
ST1-250	1	250	101 - 125	19.5	17.0
ST1-275	1	275	126 - 150	23.4	17.0
ST1-300	1	300	151 - 175	23.4	17.0
ST1-325	1	325	176 - 200	23.4	17.0
ST1-350	1	350	201 - 225	23.4	17.0

#### Ancon Teplo-BFL-Tie

The Ancon Teplo-BFL-Tie with a stainless steel upstand has been thermally modelled by a third party expert, allowing us to provide accurate Chi values for each product length. To understand the effect of these wall ties in a square metre, the Chi value (W/K) is multiplied by the number of wall ties. The exceptional thermal efficiency of the Ancon Teplo range is such that it is unlikely ever to be taken into account in U-value calculations as a thermal bridge.

Tie Reference	Tie Type	Tie Length (mm)	Cavity Range (mm)	Chi value (W/K)	∆U <sub>f</sub> 2.5 ties/m² (W/m²K)	∆U <sub>f</sub> 4.4 ties/m² (W/m²K)
Teplo-BFL-5-155	3&6	155	76 - 100	0.000370	0.00093	0.00163
Teplo-BFL-5-180	3&6	180	101 - 125	0.000300	0.00075	0.00132
Teplo-BFL-5-205	3&6	205	126 - 150	0.000250	0.00063	0.00110
Teplo-BFL-5-230	3&6	230	151 - 175	0.000200	0.00050	0.00088
Teplo-BFL-5-255	3&6	255	176 - 200	0.000165	0.00041	0.00073
Teplo-BFL-7-155	2	155	76 - 100	0.000570	0.00143	N/A not Type 6
Teplo-BFL-7-180	2	180	101 - 125	0.000450	0.00112	N/A not Type 6
Teplo-BFL-7-205	2	205	126 - 150	0.000360	0.00090	N/A not Type 6
Teplo-BFL-7-230	2	230	151 - 175	0.000290	0.00073	N/A not Type 6
Teplo-BFL-7-255	2	255	176 - 200	0.000250	0.00062	N/A not Type 6
Teplo-BFL-7-280	2&6	280	201 - 225	0.000225	0.00056	0.00099
Teplo-BFL-7-305	2&6	305	226 - 250	0.000200	0.00050	0.00088
Teplo-BFL-7-330	2&6	330	251 - 275	0.000175	0.00044	0.00077
Teplo-BFL-7-355	2&6	355	276 - 300	0.000160	0.00040	0.00070
Teplo-BFL-7-380	3&6	380	301 - 325	0.000145	0.00036	0.00064
Teplo-BFL-7-405	3&6	405	326 - 350	0.000135	0.00034	0.00059
Teplo-BFL-7-430	3&6	430	351 - 375	0.000120	0.00030	0.00053
Teplo-BFL-7-455	3&6	455	376 - 400	0.000110	0.00027	0.00048

Note: Based on thermal modelling using design tie embedment and mineral wool in a full fill cavity.

#### Wall Tie Types

Wall ties are classified by the Types given in PD6697 (Types 1 to 4) and, specifically for timber frame construction, BS5268-6.1:1996 (Types 5 to 7). These documents should be consulted for complete information on wall tie use, such as altitude and wind speed restrictions, however, generally speaking, Type 1 ties are suitable for buildings of any height, Type 2 and Type 3 ties are suitable for buildings up to 15 metres, Type 4 ties are suitable for houses up to 10 metres and Type 6 ties are suitable for timber frame developments up to 15 metres.

#### Wall Tie Spacing

Wall Tie Types 1 to 4 should be installed at a standard spacing of 2.5 per square metre (900mm horizontal x 450mm vertical centres). Decreasing the centres can increase the performance e.g. Type 3 to Type 2. Contact Leviat for details. Type 6 timber-to-masonry wall ties should be installed at a minimum of 4.4 per square metre.

## Ancon Teplo-Channel Basalt Fibre Wall Ties

The Ancon Teplo-Channel Tie range uses the same innovative combination of basalt fibres set in a resin matrix to provide a low thermal conductivity wall tie for use with our popular Ancon Omega 21/18, 25/14 and 28/15 channel profiles. These channel ties have a profiled stainless steel head at one end, shaped to suit each individual channel and mechanically fixed in place. A moulded safety end is provided for building the tie into the outer leaf bed joint.

Ancon Teplo-Channel Ties provide unlimited adjustment along the length of the channel and are ideal for use with SFS and concrete frames. The range has been independently tested and is BBA approved; a British Board of Agrément certificate is available to download online. For cavities from 70mm to 344mm

Chi values (W/K) are given overleaf





Ancon Teplo BF-CT-21 Wall Tie with 21/18 Cast-in Channel



Ancon Teplo BF-CT-28 Wall Tie with 28/15 Cast-in Channel

### Information for U-value Calculations

For the accurate calculation of a wall's U-value, it is important to use the correct information for the wall ties, rather than allowing a program to apply a default value as this will over-estimate the effect of an Ancon Wall Tie. BS EN ISO 6946 permits the corrections due to wall ties ( $\Delta U_f$ ) and air gaps between insulation boards etc to be omitted if the corrections amount to less than 3% of the uncorrected U-value of the wall.

#### Ancon Teplo-Channel Basalt Fibre Wall Ties

The range of basalt fibre channel ties have been thermally modelled by a third party expert to provide accurate Chi values for each tie length and channel end type. To understand the effect of these wall ties in a square metre, the Chi value (W/K) is multiplied by the number of wall ties. The exceptional thermal efficiency of the Ancon Teplo range is such that it is unlikely ever to be taken into account in U-value calculations as a thermal bridge.

Tie Reference	Тіе Туре	Tie Length (mm)	Cavity (mm)	Chi Value (W/K)	∆U <sub>r</sub> , 2.5 ties/m² (W/m²K)
Teplo-BF-CT 21 - 150	2	150	70 - 94	0.0009	0.00225
Teplo-BF-CT 21 - 175	2	175	95 - 119	0.0006	0.00150
Teplo-BF-CT 21 - 200	2	200	120 - 144	0.0004	0.00100
Teplo-BF-CT 21 - 225	2	225	145 - 169	0.0003	0.00075
Teplo-BF-CT 21 - 250	2	250	170 - 194	0.0003	0.00075
Teplo-BF-CT 21 - 275	2	275	195 - 219	0.0002	0.00050
Teplo-BF-CT 21 - 300	2	300	220 - 244	0.0002	0.00050
Teplo-BF-CT 21 - 325	3	325	245 - 269	0.0002	0.00050
Teplo-BF-CT 21 - 350	3	350	270 - 294	0.0001	0.00025
Teplo-BF-CT 21 - 375	3	375	295 - 319	0.0001	0.00025
Teplo-BF-CT 28 - 150	2	150	70 - 94	0.0009	0.00225
Teplo-BF-CT 28 - 175	2	175	95 - 119	0.0006	0.00150
Teplo-BF-CT 28 - 200	2	200	120 - 144	0.0004	0.00100
Teplo-BF-CT 28 - 225	2	225	145 - 169	0.0003	0.00075
Teplo-BF-CT 28 - 250	2	250	170 - 194	0.0003	0.00075
Teplo-BF-CT 28 - 275	2	275	195 - 219	0.0002	0.00050
Teplo-BF-CT 28 - 300	2	300	220 - 244	0.0002	0.00050
Teplo-BF-CT 28 - 325	3	325	245 - 269	0.0002	0.00050
Teplo-BF-CT 28 - 350	3	350	270 - 294	0.0001	0.00025
Teplo-BF-CT 28 - 375	3	375	295 - 319	0.0001	0.00025
Teplo-BF-CT 28 - 400	3	400	320 - 344	0.0001	0.00025

Data based on thermal modelling using mineral wool in a full fill cavity with channel cast into concrete and Teplo-BF-CT ties bridging the insulation zone. Cavity range values refer to cast-in channels. For surface-fixed 28/15 applications, cavity range values should be increased by 15mm. Note: Thermal values will vary for other wall build-ups. For more information please contact Leviat.

Tie Reference	Tie Type	Tie Length (mm)	Cavity (mm)	Chi Value (W/K)	∆U <sub>f</sub> , 3.7 ties/m² (W/m²K)
Teplo-BF-CT 25 - 150	2	150	85 - 109	0.0008	0.00289
Teplo-BF-CT 25 - 175	2	175	110 - 134	0.0007	0.00250
Teplo-BF-CT 25 - 200	2	200	135 - 159	0.0006	0.00216
Teplo-BF-CT 25 - 225	2	225	160 - 184	0.0005	0.00191
Teplo-BF-CT 25 - 250	2	250	185 - 209	0.0005	0.00167
Teplo-BF-CT 25 - 275	2	275	210 - 234	0.0004	0.00150
Teplo-BF-CT 25 - 300	3	300	235 - 259	0.0004	0.00133
Teplo-BF-CT 25 - 325	3	325	260 - 284	0.0003	0.00122
Teplo-BF-CT 25 - 350	3	350	285 - 309	0.0003	0.00109
Teplo-BF-CT 25 - 375	3	375	310 - 334	0.0003	0.00100

Data based on thermal modelling using 100mm thick mineral wool in a partial fill cavity with channel fixed to front of insulation and Ancon Teplo-BF-CT ties bridging the clear cavity.

Note: Thermal values will vary for other wall build-ups. For more information please contact Leviat.





# Leviat® A CRH COMPANY

Innovative engineered products and construction solutions that allow the industry to build safer, stronger and faster.

81





# **Contact Leviat locally**

For more information on the products featured here, please contact Leviat:

**United Kingdom** 

Sheffield

President Way, President Park, Sheffield S4 7UR Tel: +44 - 114 275 5224 Email: info.uk@leviat.com

## **Contact Leviat worldwide**

#### Australia

98 Kurrajong Avenue, Mount Druitt, Sydney, NSW 2770 Tel: +61 - 2 8808 3100 Email: info.au@leviat.com

#### Austria

Leonard-Bernstein-Str. 10 Saturn Tower, 1220 Wien Tel: +43 - 1 - 259 6770 Email: info.at@leviat.com

#### Belgium

Industrielaan 2 1740 Ternat Tel: +32 - 2 - 582 29 45 Email: info.be@leviat.com

#### China

Room 601 Tower D, Vantone Centre No. A6 Chao Yang Men Wai Street Chaoyang District Beijing P.R. China 100020 **Tel: +86 - 10 5907 3200 Email: info.cn@leviat.com** 

#### Czech Republic

Business Čenter Šafránkova Šafránkova 1238/1 155 00 Praha 5 Tel: +420 - 311 - 690 060 Email: info.cz@leviat.com

#### Finland

Vädursgatan 5 412 50 Göteborg / Sweden Tel: +358 (0)10 6338781 Email: info.fi@leviat.com

#### France

6, Rue de Cabanis FR 31240 L'Union Toulouse Tel: +33 - 5 - 34 25 54 82 Email: info.fr@leviat.com

#### Germany

Liebigstrasse 14 40764 Langenfeld Tel: +49 - 2173 - 970 - 0 Email: info.de@leviat.com

#### India

309, 3rd Floor Orion Business Park Ghodbunder Road Kapurbawdi, Thane West, Thane, Maharashtra 400607 Tel: +91 - 22 2589 2032 Email: info.in@leviat.com

#### Italy

Via F.Ili Bronzetti 28 24124 Bergamo Tel: +39 - 035 - 0760711 Email: info.it@leviat.com

#### Malaysia

28 Jalan Anggerik Mokara 31/59 Kota Kemuning, 40460 Shah Alam Selangor Tel: +603 - 5122 4182 Email: info.my@leviat.com

#### Netherlands

Oostermaat 3 7623 CS Borne Tel: +31 - 74 - 267 14 49 Email: info.nl@leviat.com

#### **New Zealand**

2/19 Nuttall Drive, Hillsborough, Christchurch 8022 Tel: +64 - 3 376 5205 Email: info.nz@leviat.com

#### Norway

Vestre Svanholmen 5 4313 Sandnes Tel: +47 - 51 82 34 00 Email: info.no@leviat.com

#### Philippines

2933 Regus, Joy Nostalg, ADB Avenue, Ortigas Center Pasig City Tel: +63 - 2 7957 6381 Email: info.ph@leviat.com

#### Poland

Ul. Obornicka 287 60-691 Poznań Tel: +48 - 61 - 622 14 14 Email: info.pl@leviat.com

#### Singapore

14 Benoi Crescent Singapore 629977 Tel: +65 - 6266 6802 Email: info.sg@leviat.com

#### Spain

Polígono Industrial Santa Ana c/ Ignacio Zuloaga, 20 28522 Rivas-Vaciamadrid Tel: +34 - 91 632 18 40 Email: info.es@leviat.com

#### Sweden

Vädursgatan 5 412 50 Göteborg Tel: +46 - 31 - 98 58 00 Email: info.se@leviat.com

#### Switzerland

Grenzstrasse 24 3250 Lyss Tel: +41 (0)800 22 66 00 Email: info.ch@leviat.com

### United Arab Emirates

RA08 TB02, PO Box 17225 JAFZA, Jebel Ali, Dubai Tel: +971 (0)4 883 4346 Email: info.ae@leviat.com

#### **United Kingdom**

President Way, President Park, Sheffield S4 7UR Tel: +44 - 114 275 5224 Email: info.uk@leviat.com

#### USA / Canada

6467 S Falkenburg Road Riverview, FL 33578 Tel: (800) 423-9140 Email: info.us@leviat.us

For countries not listed **Email: info@leviat.com** 

#### Notes regarding this document

© Protected by copyright. The information in this publication is based on state-ofthe-art technology at the time of publication. In every case, project working details should be entrusted to appropriately qualified and experienced persons. Leviat shall not accept liability for the accuracy of the information in this document or for any printing errors. We reserve the right to make technical and design changes at any time. With a policy of continuous product development, Leviat reserves the right to modify product design and specification at any time.



Imagine. Model. Make.

Leviat.com