## Foreword

2	General Requirements	5	
2.1	Introduction	5	
2.2	Effects on windows and external pedestrian doors in the external wall	7	
2.3	Plane model and principles of a wall connection	13	
2.4	Special features in existing buildings	17	
2.5	Conclusion	20	
3	Tasks for Planning	21	
3.1	Execution Planning	21	
	<ul><li>3.1.1 Interface to the wall connection</li><li>3.1.2 Minimum specifications for planning</li><li>3.1.3 Sample floor connection and sill formation</li><li>3.1.4 Example of 2-step window installation with pre-assembly frames</li></ul>	21 26 34 44	
3.2	Factory and installation planning by the contracting agency	47	
	3.2.1 Basic Principles 3.2.2 Impacts/codes of practice from neighbouring construction tasks/companies (trades) 3.2.3 Planning services by the contracting agency – Case of window replacement 3.2.4 Examples of connection	47 51 51 52	
4	Fundamentals of Building Physics	53	
4.1	Thermal insulation and protection against moisture	53	
	4.1.1 Surface temperatures and isothermal line 4.1.2 Moisture/Humidity 4.1.3 Thermal bridges 4.1.4 Air tightness 4.1.5 Minimum thermal insulation, thermal bridges 4.1.6 Preventing the formation of condensation or moulds 4.1.7 Avoiding thermal losses via thermal bridges 4.1.8 Examples for the linear thermal transmittance □ and temperature factor fRsi 4.1.9 Protection against driving rain (water tightness) 4.1.10 Suitable installation planes for thermal and moisture-proof insulation	53 54 56 57 59 60 64 68 83 83	
4.2	Sound insulation	85	
	<ul><li>4.2.1 Requirements</li><li>4.2.2 Planning for the sound insulation of outdoor building components</li><li>4.2.3 Resulting sound insulation taking the joints into consideration</li></ul>	85 85 87	
4.3 I	4.3 Fire safety		
4.4	4.4 Summary		



5	Fastening and load transfer	95
5.1	Fastening of windows and external pedestrian doors	96
	<ul> <li>5.1.1 Acting forces</li> <li>5.1.2 Determination of fixing points (standard case 2)</li> <li>5.1.3 Fastening with top elements, roller shutter boxes and profile extensions</li> <li>5.1.4 Installation levels and types of loading on fasteners</li> <li>5.1.5 Wall systems</li> <li>5.1.6 Fastening systems, fasteners</li> </ul>	103 108 128 132 134 136
5.2	Corrosion protection of fasteners	140
5.3	Fastening building components with special characteristics	142
	<ul><li>5.3.1 Building components with burglary-resistant characteristics</li><li>5.3.2 Building components with safety barrier characteristics</li><li>5.3.3 Doors in escape routes and emergency exits</li><li>5.3.4 Fire safety elements</li></ul>	142 144 146 146
6	Sealing	147
6.1	Constructive requirements	148
6.2	Sealing planes	148
6.3	Types of joints	150
	6.3.1 Special case: Structural joints 6.3.2 Building component connecting joints, compensation for deformation as the	152
	determining factor 6.3.3 Scale of the movements	154 156
6.4	Sealing systems	158
	6.4.1 Gunnable joint sealants 6.4.2 Impregnated joint-sealing tapes made of cellular plastics 6.4.3 Multifunctional sealing tapes 6.4.4 Joint-sealing films 6.4.5 Sealing films 6.4.6 Plaster stop bead	159 164 169 172 175 176
6.5	Water vapour diffusion performance of the sealing systems	178
6.6	Recommendations for sealing	178
6.7	Joint insulation	180
7	Practical execution	183
7.1	Duties of the person responsible for the installation	183
	7.1.1 Preparatory actions, workshop and installation planning 7.1.2 Survey of installation situation 7.1.3 Tolerances and tolerance standards 7.1.4 Design documents 7.1.5 Accommodating building physics requirements in the construction 7.1.6 Detailed design of fastening and load transfer 7.1.7 Detailed design of sealing system 7.1.8 Measures to be carried out before execution	183 186 191 195 197 203 205 209

7.2	Notes for the installer	210
	<ul><li>7.2.1 Fastening the elements for adequate load transfer</li><li>7.2.2 Work sequence for joint insulation</li><li>7.2.3 Correct use of insulation and sealing systems</li></ul>	210 212 213
7.3	Special care at transitions	224
7.4	Design of the exterior window sill (weatherboard)	231
7.5	Threshold design	240
8	Examples for execution	245
8.1	General remarks	245
8.2	Examples for new buildings	248
	<ul> <li>8.2.1 Monolithic external wall</li> <li>8.2.2 Externally insulated external wall</li> <li>8.2.3 Rear-ventilated external sandwich wall with heavyweight facing</li> <li>8.2.4 Rear-ventilated external sandwich wall with low weight facing</li> <li>8.2.5 Unventilated external sandwich wall</li> </ul>	248 252 254 256 258
8.3	Examples for replacement/refurbishment	264
	<ul><li>8.3.1 Monolithic external wall</li><li>8.3.2 Uninsulated external wall with air layer and heavyweight facing</li><li>8.3.3 Unventilated external sandwich wall</li><li>8.3.4 Timber framework</li></ul>	264 266 268 270
8.4	More examples	272
	8.4.1 uPVC windows in slab construction 8.4.2 Timber-aluminium window in multi-skin wall system 8.4.3 Timber window in frame (subframe)	272 274 276
9	Bibliography	279
9.1	Standards	279
9.2	Further literature	284