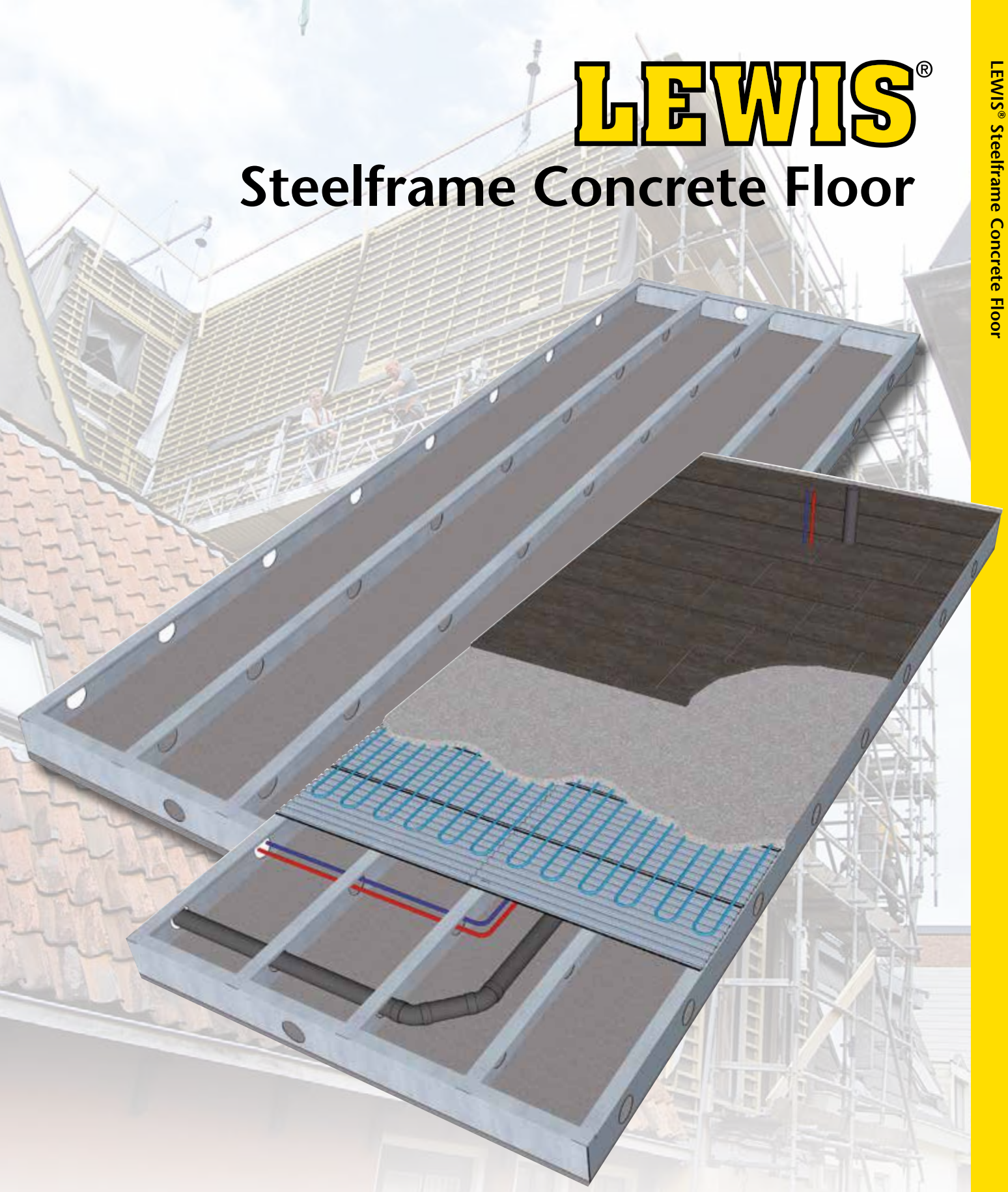
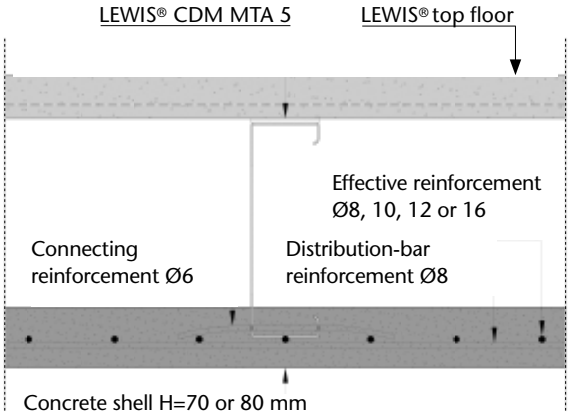
LEWIS®
Steelframe Concrete Floor



LEWIS® STEELFRAME CONCRETE FLOOR

Lightweight steel frame concrete floor for residential, industrial and commercial construction

The LEWIS® Steelframe Concrete Floor (SCF) is a patented self-supporting floor system. The floor system consists of prefabricated elements consisting of a closed steel frame of cold formed C-sections that have been cast into a reinforced concrete shell. This concrete shell is also the ceiling slab of the floor system.



The steel frame is provided with round openings so that pipes and services can easily be incorporated into the floor.
A LEWIS® top floor is applied to the steel frame. Depending on the desired flexibility of the floor system, the top floor can be fitted with removable floor zones.

The LEWIS® Steelframe Concrete Floor can achieve free spans up to approx.15 meters. In addition to being used as an intermediate floor, the floor system can also be used as an insulated ground floor.

Building IFD

IFD stands for Industrial, Flexible and Demountable. Building IFD is a way to deliver sustainable buildings. Possible functional changes in buildings are taken into account. The LEWIS® Steelframe Concrete Floor fits perfectly within the IFD way of thinking and makes it possible to design buildings that are future-proof.

Floor construction

- LEWIS® top floor ≥ 50 mm
- rubber flooring strips / acoustic separation
- Steel frame (C-profiles with round openings)
- Concrete shell / ceiling slab ≥ 70 mm

The floor elements have a standard width of 3000 mm.

C-Profile	Construction height
C200	290 mm
C220	310 mm
C250	340 mm
C350	440 mm
C400	490 mm

Large free spans

Depending on the thickness and size of the C-profiles used, various floor spans are possible. Based on a floor application in residential construction, a span of approx. 8000 mm can be achieved with a C300 profile, for example.

When using higher profiles, a span of up to approx. 15000 mm can be achieved.
Based on the desired span and floor load, the optimal floor structure can be calculated per project.

The LEWIS® Steelframe Concrete Floor offers designers optimal design freedom and layout flexibility of the created floor space.

Manageable and efficient construction process

The LEWIS® Steelframe Concrete Floor is characterised by precise dimensional stability. The prefabricated floor elements are delivered to the building site ready to use. Lifting provisions are included in the elements so that the floor can be easily and quickly installed in the steel or concrete supporting structure. The floor system can be

installed unpropped and there is no concrete drying time. After installation, the concrete ceiling slab is immediately safe to walk on as a work floor.

The installer can install his pipes and services at a later stage of construction so that there is no delay in the installation of the elements. After connecting the services, the LEWIS® top floor can be applied.

The ceiling slab of the LEWIS® Steelframe Concrete Floor consists of at least 70 mm reinforced concrete. The concrete cover on the reinforcement is at least 10 mm. This achieves a fire resistance of 60 minutes. In floor designs where a higher fire resistance is required, a thicker concrete ceiling slab can be chosen.

Sound insulation

For the standard floor construction of the LEWIS® Steelframe Concrete Floor the top floor is attached to the C-profiles.

The service void (cavity) in the floor can be filled with mineral wool.

Airborne sound insulation

	Ilu [dB]	DnT,A [dB]
Without cavity filling	+1 / +5	53 - 57
Mineral wool in cavity	+10	62

Impact sound insulation

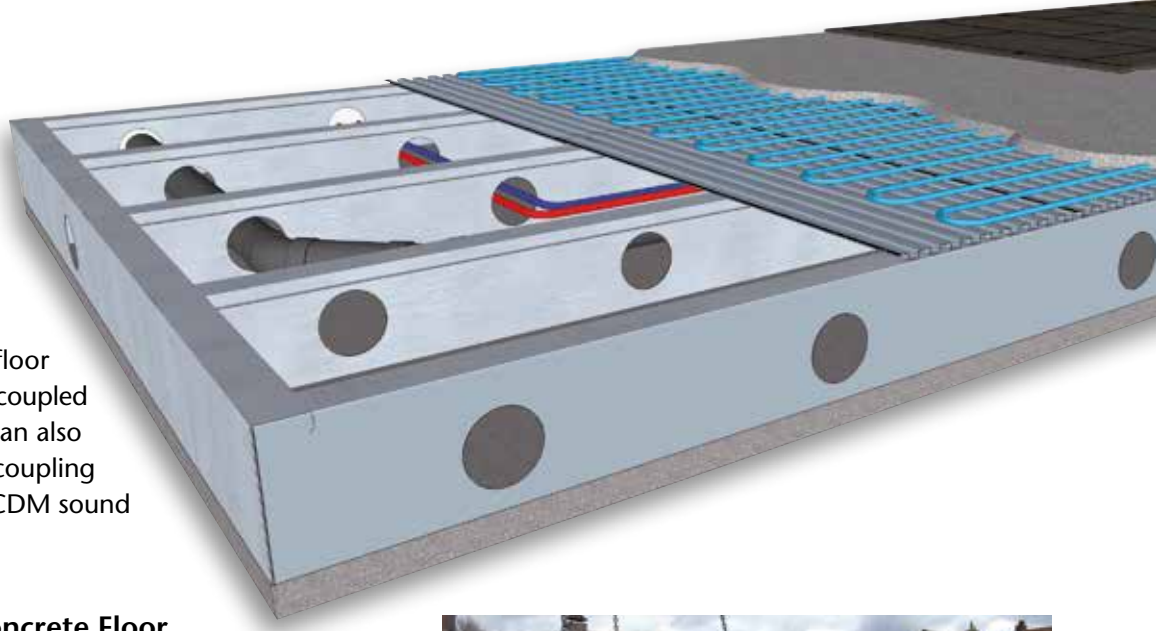
	Ico [dB]	LnT,A [dB]
Without cavity filling	+7 / +9	49 - 51
Mineral wool in cavity	+9 / +11	47 - 49

All mentioned acoustic values are values of the element itself.
Due to other influences such as sound transmission via adjacent walls, sound leaks, etc., up to 5 dB lower sound insulation values can be expected in practice.

The above performances are derived from the notes:

Nieman reference
Nz130090aaA0.gs

Nieman reference
20170171/7554



In the design phase of the floor elements, an acoustically decoupled (floating) LEWIS® top floor can also be chosen. The acoustic decoupling is created by using LEWIS® CDM sound insulation strips.

Insulated Steelframe Concrete Floor

The LEWIS® Steelframe Concrete Floor can also function as a ground floor. In order to meet the desired thermal insulation values, an insulation layer is applied directly under the concrete shell during the production of the floor elements. Expanded polystyrene (EPS) is used as the standard insulation material.
Concrete support lugs are used to allow the positioning of the insulated LEWIS® Steelframe Concrete Floor. Depending on the EPS insulation thickness used, the following Rc values can be achieved.

Thermal resistance U-value (W/mk)	EPS (thick mm)
0,29	132
0,25	152
0,20	192
0,17	212

Services void

Due to the cast C-profiles, the floor element has a services void. Pipes and services can be installed in this space. The C-profiles are provided with round openings through which pipes and services can be fed. By using removable floor zones and floor hatches in the top floor, the pipes and services remain accessible via the floor.

The floor system offers a high degree of freedom to change any layout of services and pipes during the construction phase or during the final assembly.

Top floor

A LEWIS® floor is used as top floor on top of the floor elements. This top floor guarantees a high floor load (also concentrated loads!) and gives the comfort of a solid concrete floor.

The LEWIS® top floor can be applied with a cementitious or gypsum-based screed. For an optimal indoor climate in the building, the LEWIS® top floor can have underfloor heating integrated.

Depending on the intended purpose of a building, a completely dry top floor finish on the floor elements can also be chosen. This top floor can, for example, be made of cementitious board material.
A dry top floor can be a choice if completely dry construction is required. A dry top floor is also the solution when 100% flexibility of the building is required within a short operating period due to a change of function or disassembly.

Lightweight floor construction

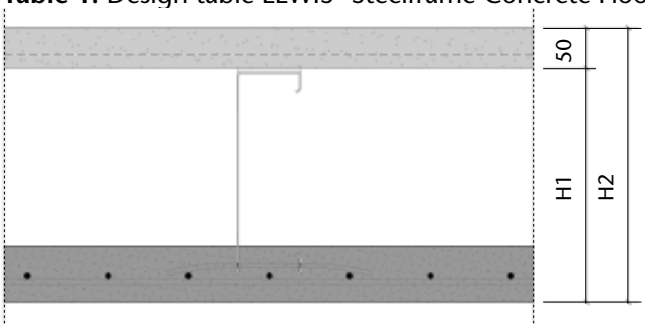
Due to the low weight of the LEWIS® Steelframe Concrete Floor savings are realised on the foundation and supporting structure in new construction projects. The low weight also makes the floor system very suitable for building on existing foundations.

Characteristics

- slim floor construction
- large free spans
- unpropped construction
- low self weight
- flexibility with piping and services
- smooth and level concrete ceiling
- applicable in combination with many building systems

Design information

Table 1: Design table LEWIS® Steelframe Concrete Floor



low weight construction approx. 300 kg/m²

Free span floor (mm)		Floor load (kN/m²)									
		1	2	3	4	5	6	7	8	9	10
2.000	H1	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm
	H2	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm
4.000	H1	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm	240 mm
	H2	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm
6.000	H1	260 mm	260 mm	260 mm	260 mm	260 mm	290 mm	290 mm	290 mm	290 mm	340 mm
	H2	310 mm	310 mm	310 mm	310 mm	310 mm	340 mm	340 mm	340 mm	340 mm	390 mm
8.000	H1	290 mm	290 mm	340 mm	340 mm	340 mm	390 mm	390 mm	390 mm	440 mm	440 mm
	H2	340 mm	340 mm	390 mm	390 mm	390 mm	440 mm	440 mm	440 mm	490 mm	490 mm
10.000	H1	340 mm	340 mm	390 mm	390 mm	390 mm	440 mm	440 mm	440 mm	440 mm	440 mm
	H2	390 mm	390 mm	440 mm	440 mm	440 mm	490 mm	490 mm	490 mm	490 mm	490 mm
12.000	H1	340 mm	340 mm	390 mm	390 mm	440 mm	440 mm	440 mm	440 mm		
	H2	390 mm	390 mm	440 mm	440 mm	490 mm	490 mm	490 mm	490 mm		
14.000	H1	390 mm	440 mm	440 mm	440 mm						
	H2	440 mm	490 mm	490 mm	490 mm						
16.000	H1	440 mm									
	H2	490 mm									

Please contact us

Assumptions
- permanent load 2.95 kN/m² (concrete shell + LEWIS®)
- LEWIS® top floor 50 mm
- LEWIS® SCF 100% collaboration with the LEWIS® top floor
- standard width SCF floor element 3000 mm
- c.t.c. distance C-profile 750 mm
- load factors $\xi\Upsilon_P$ = 1,2 en Υ_Q= 1.5 (consequence class CC2)

Table 2: Permissible uniformly distributed load LEWIS® top floor

Span (mm)	Slab depth (mm)	Permissible load Qk in kN/m² (excl. load factor)
600	50	36,3
900	50	22,8
1200	50	14,8

Assumptions
- concrete strength class C20/25
- load factors $\xi\Upsilon_G$ = 1,2 and Υ_Q = 1.5 (consequence class CC2)
- Dutch standards

Table 3: Permissible concentrated load LEWIS® top floor

Span (mm)	Slab depth (mm)	Permissible concentrated load Qk in kN/m² (excl. load factor)*	
		no free edges	
		non-reinforced	reinforced **
600	50	4,7	6,6
900	50	4,4	6,3
1200	50	4,2	6,2

Assumptions
- load factors $\xi\Upsilon_{GQ}$ = 1,2 and Υ_Q = 1.5 (consequence class CC2)
- load surface dimension 100 mm x 100 mm
- concrete strength class C20/25
- Dutch standards

*For higher concentrated loads please contact us
**Reinforcement mesh Ø5-150 (Q131)

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