

UHPC

Ultra high performance concrete made of NANODUR® Compound 5941



Machine element made by Sudholt-Wasemann GmbH



Façade made by Benno Drössler GmbH & Bauuntern. KG

Conception and organizational processing

The company durcrete GmbH is a research and engineering company with many years of experience in UHPC technology, in structural and dynamic analysis of concrete elements and in conceptual design of prefab plants. On behalf of Dyckerhoff GmbH, durcrete provides support for concrete based applications on NANODUR®.

<http://durcrete.de/?lang=en>

Supplier of NANODUR® Compound 5941 binder

Dyckerhoff GmbH is one of the leading cement manufacturers in Germany. NANODUR® Compound 5941 is a cementitious binder for an easy and safe production of UHPC elements using locally available aggregates and conventional mixing technology. NANODUR® Compound 5941 is delivered worldwide to business clients, in bulk trucks or sea vessel .

<http://www.dyckerhoff-bohrtechnik.de/online/en/Home/Products/SpecialApplications.html>

Characteristics of UHPC with NANODUR[®] Compound 5941

Advantages in material supply

Nanodur[®] Compound 5941 is available without any distributor at the Dyckerhoff GmbH in Germany. Local mineral aggregates can be used air-dry and must not be oven-dry. Admixtures may be bought in Germany at first, after gaining experience local admixtures may be suitable, too. Depending on the application fibers can be added. Testing is possible in local laboratories. No license fee for patents or long term delivery contracts are required for this UHPC technology.

Advantages in production

No special mixing equipment is required. Ordinary compulsory or pan mixers are adequate. Moisture content of aggregates and admixtures should be constant and measured in order to control the total amount of water. The filling level of the mixer ranges at around max. 50 % compared to ordinary concrete. Mixing time is between 8 to 12 minutes. Nanodur concrete is self-compacting without any vibration.

Advantages of physical characteristics

Depending on the aggregates, admixtures and the recipe the following characteristic values may be reached:

Compressive strength f_{cm}	125 to 175 MPa
Flexural tensile strength f_{ctm} without fibers	15 to 20 MPa
Static modulus of elasticity E_c	40.000 to 85.000 MPa
Density of hardened concrete ρ_c	2.000 to 3.000 kg/m ³

Typical recipe

	material		amount kg/m ³	amount kg/to
1	Chips (air-dry crushed hard stone) 1/3, 2/5 or 4/8 mm (basalt, diabase, gabbro, quartz, granite etc.)		880	360
2	Pit sand 0/2mm (air-dry)		430	174
3	NANODUR [®] Compound 5941		1,050	429
4	PCE Superplasticizer BASF ACE 430		ca. 14	5.8
5	Shrinkage Reducer GRACE Eclipse		ca. 6	2.5
6	water to be added total water content (incl. PCE-water content)	(w/c = 0.26 / 0.27)	155 160 – 170	63
7	Total:		2,500	1,000

Services

- Support for concrete based applications on NANODUR® on behalf of Dyckerhoff GmbH. General consulting and first services are free of charge.
- Development of recipes with special demands.
- Design and calculation of concrete elements for machinery industry and construction business.
- Conceptual design of prefab plants.
- Training of staff.
- Services are offered worldwide in German and English.

Terms and Conditions, Prices

1. Consulting

Technical consulting for ultra-high performance concrete according to time, general fee for meetings, travel time, laboratory works, papers, expert opinion etc.

The fee includes all costs like mail, phone, secretary, but no travel expenses.

1 full days	á	1,800.00 €/day (< 12h)	only unit price
1 half day	á	1.000.00 €/half day (< 4h)	only unit price

2. Travelling

Full travel expenses will be charged to the client without surcharge.

Car: Rental car like Audi, BMW or Mercedes plus petrol
alternative 0.50 €/km

Train: First Class

Flight: Business Class, Star Alliance

Hotels: 4 Stars

3. Laboratory and Testing

If testing and laboratory work is arranged by durcrete, a handling fee of 10 % is charged in addition to the invoices of the supplier.

4. Terms and Conditions

VAT: All prices are without applicable value added taxes.

Patents: Please inform yourself about patents pending on the technology.

Place of Rights: Place of right is Limburg/Lahn in Germany.

Terms of payment: Without special agreement 100 % in advance payment on German account.

Date of delivery: According to prior agreement

Liability: The total cumulative liability shall be limited to one hundred percent (100%) of the total contract price.

Services

- Dyckerhoff produces the ready-to-use NANODUR® Compound 5941 for UHPC at cement plant Neuwied, Germany. The product is delivered worldwide to clients by truck (silo or flatbed) or in container.
- Presentation of the performance of Nanodur concrete is possible at Dyckerhoff R&D department in Wiesbaden, Germany, (organized by durcrete).
- 1 mix design with new mineral aggregates and admixtures (door delivery) is free, additional testing will be charged at costs.
- For application support, general consulting, testing and large scale applications please contact our technology partner durcrete.

Samples

- Sample up to 100 kg is free-of-charge, additional material has to be paid.
- Sample transport at customers responsibility. Pick-up at Dyckerhoff GmbH, Rheinstraße 159, D-56564 Neuwied, Germany.
- Customer ID of a parcel service is required.
- Detailed information about requested shipping documents to be provided prior to shipment.

Delivery and prices ex works Neuwied

Common form of delivery is bulk material in silo trucks up to 25 t.
For long distances > 1,000 km and oversea destinations 25-kg paper sacks are available (1000 kg/pallet).

Nanodur compound 5941	grey	white
Bulk material > 20 tons	366,00 €/ton	396,00 €/ton
25 kg Paper sacks > 50 tons	416,00 €/ton	446,00 €/ton

Freight charges upon request.

Safety data sheets

<http://www.dyckerhoff.com/online/de/Home/Grauzement/Lieferprogramm/Neuwied.html>

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