



TECHNICAL DATA SHEET – DUCORIT® CEMENTITIOUS GROUTS FOR ONSHORE APPLICATIONS

Revised: 05/2018

DESCRIPTION

Ducorit® R and A product lines are based on innovative ultra high performance cementitious technology that was developed in house by Densit® for use in structural grouted connections for wind turbine foundations and concrete tower joints.

PRODUCTS

Central to the Ducorit® products is the state of the art UHPC and HPC Densit® Technology. The different properties of Ducorit® A2G and Ducorit® R5G are obtained by a unique mix of high quality cement, aggregates and additives. The products are manufactured as ready-to-mix grout, in 25 kg to 1000 kg bags. Ducorit® products are characterized by extreme strength and high stiffness making Ducorit® a strong structural component, meeting international high design standards. Using Ducorit® does not require special precautions with respect to environmental or personal hazards.

CERTIFICATION

Ducorit® products are tested in compliance with: Ü sign, German DAfStb “production and use of cement-bound cast concrete and mortars, 2011.” CE-marking.
GL Design guideline 2010.
NF/EN 12620

STRENGTH DEVELOPMENT

Ducorit® develops a significant early strength. After 24 hours of curing the strength reaches approximately 50% of the long term strength value at 20°C (68°F). The early strength is even more pronounced with regard to the material stiffness. (See graph on page 2-3: Strength development at different temperatures).

FATIGUE

Due to the ultra-high strength and durability of Ducorit® products, the fatigue strength is outstanding compared to normal concrete.

INSTALLATION

The versatile Ducorit® grout can be installed in multiple applications, both for the grouting of the connection between the steel tower flange, and in pre-cast concrete element towers, in both vertical and horizontal joints. To secure a good and reliable connection and structural integrity, the material can be installed at ambient temperatures from 2°C to 30°C (up to 35°C for A2G) without any additional temperature precautions. Please refer to the ITW Performance Polymers Method Statement regarding specific installation requirements.

PUMPABILITY

Ducorit® products can be pumped through hoses from 2" and larger. The general pumpability specifications are stated below the water dosage chart on the bottom of page 2. Contacting ITW Performance Polymers for guidance on the specific pump and hose setup for each application is recommended.

PREPARATORY WORK

Please refer to the ITW Performance Polymers Method Statement regarding specific installation requirements.

GENERAL MIXING INSTRUCTIONS

Ducorit® grout should only be mixed in paddle pan mixers. Water is added and the wet mix is continued

for 6-8 minutes. Please also refer to the ITW Performance Polymers Method Statement regarding specific installation requirements.

LOW OR HIGH TEMPERATURE INSTRUCTION

To ensure a good end result and quality installation, it might be necessary to make counter measure at temperatures below 2°C or above 30°C (above 35°C for A2G), please contact ITW Performance Polymers. For guidance, refer to the ITW Performance Polymers Method Statement.

CURING CONDITIONS

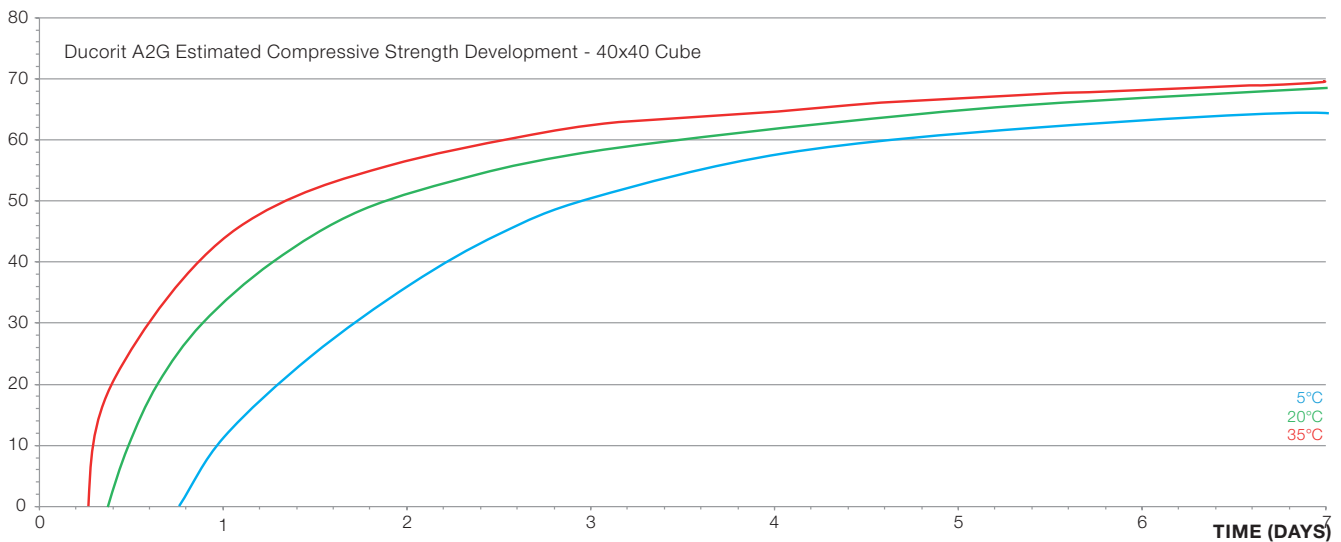
The fresh grout installation must be protected from wind, drafts and evaporation of water.



DUCORIT® A2G

ESTIMATED SHORT TERM STRENGTH DEVELOPMENT

COMPRESSIVE STRENGTH - MPA



PUMPABILITY

It is recommended to dose the water content so the flow properties are in the upper level.

If intending to pump using a >120 m hose length or 10 bar of pump pressure, please contact ITW Performance Polymers for guidance in the specific pump and hose set-up.

	DUCORIT® A2G	DUCORIT® R5G
STRENGTH PROPERTIES		
EN 206-1 Compressive Strength Class	C70/85	C100/115
Early strength Class	B	A
Compressive strength, EN196-1 40*40*40 mm Cube at 20°C (Typical values)		
24 hour strength - MPa	38	50
7 day strength - MPa	68	90
28 day strength - MPa	85	120
91 day strength - MPa	88	135
Flexural strength EN 196-1, 28 days at 20°C - MPa	12.4	16.5
Conversion factor Cube 40*40*40 to 150*300 Cyl.	0.93	0.93
E-MODULUS		
Static - GPa	22	50
FLOW PROPERTIES		
Consistency	DIN EN 1015-3	DIN EN 12350-5
[mm] at 20°C	360	600
DAfStb Class	Class f2	Class a2
Max. spread flow rate at 20°C - mm	390	645
Consistency over time at 20°C - Min	120	90
SHRINKAGE		
ε _{s,m,91} - ‰	1.2	0.36
ε _{s,l,91} - ‰	1.4	0.35
Shrinkage Class	SKVM II	SKVB 0
Expansion EN 445 - ‰	>0,1	>0,1
PHYSICAL PROPERTIES		
Max grain size - mm	0.5	5
Minimum grout height - mm	10	50
Maximum grout height - mm	150	350
Temperature range without counter measure - °C	2-35	2-30
Dry power estimated yield factor - kg/l	1.8	2.2
Fresh grout density - Kg/m ³	2160	2380
Shelf life - Storage	9 month (dry and RH<70%)	9 month (dry and RH<70%)
TEST AND COMPLIANCE		
DIN EN 1881 Testing of Anchoring by pull-out method		
Freeze/Thaw CDF-test according to BAW Code	√	√
Compliance to DAfStb "Production and use of cement-bound cast concrete and mortars, 2011"	√	√
Compliance to GL Design Guideline 2010	√	√
Exposure class according to DIN1045-2	WS,XC4,XD3,XS3,XF3,XA3,XM3	WS,XC4,XD3,XS3,XF3,XA3,XM3
MIXING WATER RATIO		
Min./ max at 2°C - ‰	16,3/16,7	7,2/8,1
Min./ max at 20°C - ‰	16,8/17,2	7,2/8,1
Min./ max at 30°C - ‰	17,1/17,5	7,2/8,1
Mixing time - min.	6-8	6-8
PUMPABILITY		
Minimum recommended hose inner diameter - mm	50	50
Maximum recommended hose length - m	120	40
Maximum recommended pump pressure excluding grout head - Bar	10	10
Recommended ASTM-C230 flow for pumping - mm	330-340	250-255