

## The high performance sandwich core

Divinycell HCP grade meets the demand for a high performance, low density buoyancy material with excellent characteristics. It is widely used in subsea buoyancy units, ROVs, diving bells and impact protection structures. As a result of its excellent hydraulic compressive properties and closed cell structure, it has very low buoyancy loss and water absorption under long-term loading conditions. The insulation properties of HCP are also good. HCP stands for Hydraulic Crush Point and is defined as the point of pressure in Bar, where the

material when subjected to an increasing pressure of 1-2 Bar/sec has lost 5% of its initial volume. The design of subsea buoyancy applications is complex and consideration has to be given to the required buoyancy loss and updrift over the expected lifetime and service conditions, with respect to long and short term hydraulic compressive creep, water absorption and hydraulic fatigue. Please contact Diab Technical Services for design proposal.

### Mechanical properties Divinycell® HCP - Imperial units

Property	Test Procedure	Unit		HCP 30	HCP50	HCP70	HCP90	HCP100
Hydraulic Crush Point		Bar		30-39	50-59	70-79	90-99	100-109
Compressive Strength <sup>1</sup>	ASTM D 1621	psi	Nominal	783	1,044	1,175	1,479	1,682
			Minimum	653	885	1,015	1,305	1,450
E-modulus (extensometer) <sup>1</sup>	ASTM D 1621	psi	Nominal	44,965	58,015	72,519	85,572	94,275
			Minimum	38,435	50,763	56,565	71,068	78,320
Tensile Strength <sup>1</sup>	ASTM D 1623	psi	Nominal	1,030	1,334	1,595	1,827	1,958
			Minimum	914	1,160	1,450	1,668	1,769
Shear Strength	ASTM C 273	psi	Nominal	508	653	754	943	1,059
			Minimum	464	566	609	870	943
Shear Modulus	ASTM C 273	psi	Nominal	10,590	14,070	16,679	21,321	24,656
			Minimum	9,427	11,748	13,053	18,275	21,175
Shear Strain	ASTM C 273	%	Nominal	45	45	35	35	35
Density	ISO 845	lb/ft <sup>3</sup>	Nominal	12.5	15.6	19.4	23.7	25.6
			Maximum	14.4	18.1	21.2	25.9	28.4
			Minimum	11.2	15	18.4	22.2	24.3

All values measured at +73.4°F

1. Properties measured perpendicular to the plane

*Nominal value* is an average value of a mechanical property at a nominal density

*Minimum value* is a minimum guaranteed mechanical property a material has independently of density

## Product Characteristics

- Excellent buoyancy performance
- High impact resistance
- Low water absorption
- Thermoformable
- Superior damage tolerance
- Fast and easy to machine
- Good chemical resistance
- High temperature resistance

# Technical Characteristics

Type	Buoyancy (lb/ft <sup>3</sup> )	Operational depth <sup>1</sup> (ft)	Crush depth (ft)
HCP30	51.5	623	984
HCP50	48.4	984	1,640
HCP70	44.6	1,476	2,297
HCP90	40.3	1,804	2,953
HCP100	38.4	2,133	3,281

- Operational depth above is calculated with a max 5% buoyancy loss over 10 years operational time.  
Depth shown are for guidance only and can be optimized for individual conditions. Always contact Diab for advice before selecting material.  
Buoyancy calculated from salt water (density 63.99 lb/ft<sup>3</sup>).

## Technical Characteristics Divinycell® HCP

Characteristics <sup>1</sup>	Unit	HCP30	HCP50	HCP70	HCP90	HCP100	Test method
Closed cells	%	>99	>99	>99	>99	>99	-
Thermal conductivity <sup>2</sup>	Btu x in / (ft <sup>2</sup> x h x °F)	0.340	0.354	0.396	0.403	0.416	EN 12667
Coeff, linear heat expansion	x10 <sup>-6</sup> /°F	20.6	20.6	20.6	20.6	20.6	ASTM D 696
Continuous temp range	°F	-325 to +176	-325 to +176	-325 to +176	-325 to +176	-325 to +176	-
Max process temp	°F	+194	+194	+194	+194	+194	-
Dissipation factor	-	0.0015	0.0020	0.0024	0.0030	0.0034	ASTM D 2520
Dielectric constant	-	1.25	1.32	1.39	1.47	1.53	ASTM D 2520

- Typical values
- Thermal conductivity at +50°F

Operating temperature is typically -325°F to +176°F. Normally Divinycell HCP can be processed up to +194°F without dimensional changes.

Maximum processing temperature is dependent on time, pressure and process conditions. Therefore users are advised to contact Diab Technical Services to confirm that Divinycell HCP is compatible with their particular processing parameters.

## Physical characteristics

Format		Unit	HCP30	HCP50	HCP70	HCP90	HCP100
Plain sheets	Length	inch	68.11	64.57	55.51	52.76	51.57
	Width	inch	33.46	31.50	27.56	25.98	25.20
	Thickness	inch	2.20	2.09	1.18	1.06	0.91

Can be bonded to larger dimensions upon request.

### Disclaimer:

This data sheet may be subject to revision and changes due to development and changes of the material. The data is derived from tests and experience. If not stated as minimum values, the data is average data and should be treated as such. Calculations should be verified by actual tests. The data is furnished without liability for the company and does not constitute a warranty or representation in respect of the material or its use. The company reserves the right to release new data sheets in replacement.

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Issued: Feb 2018 Doc No: HCP Feb 2018 rev16 IMP

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