AYAHA HYBRID WOVEN FABRIC for CFRTP/FRTP

HBDL (Hybrid Double Layer) & HB-UD (Hybrid UD)

【HBDL】 HYBRID DOUBLE LAYER Woven Fabric

Fabric Code		Structure	Reinforcement	Matrix	Binder	Weight	Weight Reinforcement/Matrix/Binder	Vf	Thickness	Fabric Width Actual/Effective	Thickness after molding
Category	Code	-	-	-	Type	g/㎡	g/㎡	%	mm	cm	mm
HBDL	CFPEEK T-001	Double Layer	PAN CF3K	PEEK	—	323	200 / 123	55	0.5	110 / 105	0.2
HBDL	CFPEI T-001	Double Layer	PAN CF3K	PEI	—	335	200 / 135	52	0.5	110 / 105	0.2
HBDL	CFPPS T-001	Double Layer	PAN CF3K	PPS	—	335	200 / 135	53	0.5	110 / 105	0.2
HBDL	CF9N T-001 S10	Double Layer	PAN CF3K	PA9T	S10	329	200 / 115 / 14	50	0.5	110 / 105	0.2
HBDL	CF6N T-007 S10	Double Layer	PAN CF3K	PA6	S10	349	200 / 135 / 14	46	0.5	110 / 105	0.2
HBDL	CF6N T-016 S40	Double Layer	PAN CF3K	PA6	S40	315	200 / 70 / 45	53	0.5	110 / 105	0.2
HBDL	CF12N T-005 S10	Double Layer	PAN CF3K	PA12	S10	324	200 / 110 / 14	48	0.5	110 / 105	0.2
HBDL	CF12N T-005 S40	Double Layer	PAN CF3K	PA12	S40	360	200 / 110 / 50	42	0.6	110 / 105	0.25
HBDL	CFPC T-001	Double Layer	PAN CF3K	PC	—	332	200 / 132	50	0.6	110 / 105	0.2
HBDL	CFPCFR T-001	Double Layer	PAN CF3K	PCFR *1	—	332	200 / 132	50	0.6	110 / 105	0.2
HBDL	CFPP T-001 M08	Double Layer	PAN CF3K	PP	M08	310	200 / 110 / 12	46	0.6	110 / 105	0.25
HBDL	CFPE T-001 X05	Double Layer	PAN CF3K	PE	X05	320	200 / 110 / 10	48	0.7	110 / 105	0.25
HBDL	CFPX T-001	Double Layer	PAN CF3K	Phenoxy	—	305	200 / 105	56	0.6	110 / 105	0.2
HBDL	KV12N T-001	Double Layer	Para-ARAMID(HM)	PA12	—	267	157 / 110	50	0.5	110 / 105	0.2
HBDL	GLPEI T-201	Double Layer	GLASS (75 1/0)	PEI	—	597	362 / 235	43	0.6	110 / 105	0.3
HBDL	FYPLA T-701	Double Layer	FLAX (Natural)	PLA	—	617	306 / 311	46	1.3	100 / 100	0.4
HBDL	FYPP T-701	Double Layer	FLAX (Natural)	PP	—	980	512 / 468	41	2.3	100 / 100	0.8
【HBDL-UD】 HYBRID DOUBLE LAYER UD Woven Fabric											
HBDL-UD	CF6N T-001	Double Layer-UD	PAN CF3K	PA6	—	303	200 / 103	56	0.5	110 / 105	0.2
【HBSL-UD】 HYBRID SINGLE LAYER UD Woven Fabric											
HBSL-UD	CFPEEK T-001	Single Layer-UD	PAN CF3K	PEEK	—	174	100 / 74	50	0.3	110	0.1
HBSL-UD	CFPEI T-001	Single Layer-UD	PAN CF3K	PEI	—	165	100 / 65	52	0.3	110	0.1
HBSL-UD	CFPPS T-001	Single Layer-UD	PAN CF3K	PPS	—	165	100 / 65	53	0.3	110	0.1
HBSL-UD	CFPC T-001	Single Layer-UD	PAN CF3K	PC	—	165	100 / 65	50	0.3	110	0.1
HBSL-UD	CFPCFR T-001	Single Layer-UD	PAN CF3K	PCFR *1	—	165	100 / 65	50	0.3	110	0.1
HBSL-UD	CF12N T-001 S10	Single Layer-UD	PAN CF3K	PA12	S10	163	100 / 55 / 8	48	0.3	110 / 105	0.1
HBSL-UD	CF12N T-051 S40	Single Layer-UD	PAN CF12K	PA12	S40	362	192 / 110 / 60	40	0.7	110 / 105	0.2
HBSL-UD	KV12N T-301	Single Layer-UD	Para-ARAMID(HM)	PA12	—	154	100 / 54	56	0.3	110	0.15
HBSL-UD	VCPET T-401	Single Layer-UD	H.T. Polyarylate	PET/Co-PET	—	191	83 / 108	43	0.6	110	0.15

Remarks: Above figures are representative one, and not guaranteed.
Thickness after molding is approximate figure. It may change depending on molding method and conditions.
*1 PCFR : Polycarbonate, Flame-retardant

【Reference Data】

【REINFORCEMENT】

Reinforcement	Density
Carbon Fiber (PAN)	1.76 ～ 1.8
E-Glass	2.55
Para-ARAMID (HM)	1.45
H.T. Polyarylate	1.41
FLAX	1.45

【MATRIX】

Matrix properties	Melting point	Tg point	Density
PA 6 (Polyamide 6)	220℃	50℃	1.14
PA 9T (Polyamide 9T)	265℃	120℃	1.14
PA 12 (Polyamide 12)	176℃	47℃	1.02
PEEK(Polyetheretherketone)	343℃	143℃	1.30
PEI (Polyetherimide)	-	217℃	1.27
PPS (Polyphenylenesulfide)	285℃	91℃	1.34
PC (Polycarbonate)	-	145～150℃	1.20
PCFR (Polycarbonate, Flame-retardant)	-	150℃	1.20
Phenoxy (Thermoplastic Epoxy)	-	84℃	1.18
PP (Polypropylene)	167℃	-20℃	0.91
PE (Polyethylene)	132℃	-120℃	0.96
PLA (Polylactic acid)	170℃	57℃	1.25

AYAHA HYBRID WOVEN FABRIC for CFRTP/FRTP

HYBRID FILAMENT Woven Fabric

Fabric Code		Yarn	Weave	Structure	Weight	Vf	Thickness	Fabric Width	Thickness after molding
Category	Code	Core&Seath	-	-	g/㎡	%	mm	cm	mm
【HBFIL GF & PP】									
HBFIL	GF&PP T-201	Glass Roving & PP	Plain	Hybrid x Hybrid	554	41	0.8	110	0.3
HBFIL	GF&PP T-202	Glass Roving & PP	Twill	Hybrid x Hybrid	554	41	0.7	110	0.3
【HBFIL GF & PA6】									
HBFIL	GF&PA6 T-201	Glass Roving & PA6	Plain	Hybrid x Hybrid	563	46	0.7	110	0.3
HBFIL	GF&PA6 T-202	Glass Roving & PA6	Twill	Hybrid x Hybrid	563	46	0.7	110	0.3
【HBFIL CF & PX】									
HBFIL	CF&PX T-091	Carbon Fiber & Phenoxy	Plain	Hybrid x Hybrid	297	48	0.3	110	0.2
HBFIL	CF&PX T-092	Carbon Fiber & Phenoxy	Twill	Hybrid x Hybrid	323	48	0.3	110	0.2
HBFIL-UD	CF&PX T-093	Carbon Fiber & Phenoxy	UD	Hybrid x Hybrid	175	48	0.2	110	0.1
【HBFIL PP & PE】									
HBFIL	PP&PE T-DL400	PP & PE	Double Layer, Twill	Hybrid x Hybrid	400	65	1.2	125	0.5
HBFIL	PP&PE T-DL540 BL02 *1	PP & PE	Double Layer, Twill	Hybrid x Regular mix	540	71	1.7	126	0.65
HBFIL	PP&PE T-DL500 BL04 *1	PP & PE	Double Layer, Twill	Hybrid x Regular mix	500	66	1.3	124	0.55
	*1: Other colors can be prepared.								
【HBFIL PET & CoPET】									
HBFIL	PET&CoPET T-800 White	PET & CoPET	Plain	Hybrid x Hybrid	221	73	0.3	110	0.2
HBFIL	PET&CoPET T-8C2 Red *1	PET & CoPET	Plain	Hybrid x Regular Color	221	87	0.3	110	0.2
HBFIL	PET&CoPET T-DL800 White	PET & CoPET	Double Layer, Plain	Hybrid x Hybrid	403	73	0.7	110	0.4
HBFIL	PET&CoPET T-DL8C2 Red *1	PET & CoPET	Double Layer, Plain	Hybrid x Regular Color	403	80	0.7	110	0.4
	*1: Other colors can be prepared.								

【HYBRID FILAMENT】

Core/Sheath	Melting point	Core/Sheath Ratio	Std. Molding temperature	Total Density
HBFIL GF & PP	- / 165℃	41% / 59%	200～220℃	1.65
HBFIL GF & PA6	- / 215℃	46% / 54%	240～260℃	1.84
HBFIL CF & PX	- /Amorphous	48% / 52%	220～240℃	1.54
HBFIL PP & PE	165℃ / 120℃	65% / 35%	120～140℃	0.9
HBFIL PET & CoPET	250℃ / 160℃	73% / 27%	170～180℃	1.38

HYBRID Woven for FRP

Fabric Code		Structure	Reinforcement	Weight (g/㎡)	Thickness (mm)	Fabric Width (cm)
HBWV	CFBAS T-F01	HB3/3 Twill	PAN CF3K &BASALT	290	0.30	110
WOVEN	BASALT T-F51	2/2 Twill	BASALT 100%	300	0.30	110

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