TECHNICAL DATA SHEET H05VV–F

Ordinary duty PVC insulated and sheathed flexible cables, circular twin, 3–core, 4–core and 5–core, 300/500 V

Harmonized cable code: **H05VV–F**

European standards: **EN 50525–2–11:2011**

Conductor: **Class 5 copper, flexible**

Insulation: **PVC type TI 2**

Sheath: **PVC type TM 2**

Colour of sheath: **White or black *(other colours may be used by agreement between manufacturer and customer)***

Maximum operating temperature: **70 °C**

BASEC Product Certification Schedule No: **229/001/012 (expiry date: 04/12/2021)**

Range of approval: **EN 50525–2–11:2011 / Clause 4.2 / Table B.2 / 0.75 mm² to 4 mm² (Class 5 conductor) nominal cross–sectional area of conductors inclusive / Circular 2–core, 3–core, 4–core and 5–core inclusive**

Reaction to fire classification: **Eca**

TABLE 1: Core identification and sequence for type H05VV–F

Number of cores	Colour of cores
2	Blue – Brown
3	Green/Yellow – Blue – Brown
4	Green/Yellow – Brown – Black – Grey
5	Green/Yellow – Blue – Brown – Black – Grey

TABLE 2: General data for type H05VV–F

Number and nominal cross-sectional area of conductors	Nominal thickness of insulation	Nominal thickness of sheath	Mean overall diameter		Ovality (maximum difference)	Minimum insulation resistance at 70 °C	Maximum conductor resistance at 20 °C
			Lower limit	Upper limit			
(mm^2)	(mm)	(mm)	(mm)	(mm)	(mm)	(MΩ • km)	(Ω / km)
2 X 0.75	0.6	0.8	5.7	7.2	1.080	0.011	26.0
2 X 1.0	0.6	0.8	5.9	7.5	1.125	0.010	19.5
2 X 1.5	0.7	0.8	6.8	8.6	1.290	0.010	13.3
2 X 2.5	0.8	1.0	8.4	10.6	1.590	0.0095	7.98

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TABLE 2: General data for type H05VV–F *(continued)*

Number and nominal cross-sectional area of conductors	Nominal thickness of insulation	Nominal thickness of sheath	Mean overall diameter		Ovality (maximum difference)	Minimum insulation resistance at 70 °C	Maximum conductor resistance at 20 °C
			Lower limit	Upper limit			
(mm^2)	(mm)	(mm)	(mm)	(mm)	(mm)	(MΩ • km)	(Ω / km)
2 X 4	0.8	1.1	9.7	12.1	1.815	0.0078	4.95
3 G 0.75	0.6	0.8	6.0	7.6	1.140	0.011	26.0
3 G 1.0	0.6	0.8	6.3	8.0	1.200	0.010	19.5
3 G 1.5	0.7	0.9	7.4	9.4	1.410	0.010	13.3
3 G 2.5	0.8	1.1	9.2	11.4	1.710	0.0095	7.98
3 G 4	0.8	1.2	10.5	13.1	1.965	0.0078	4.95
4 G 0.75	0.6	0.8	6.6	8.3	1.245	0.011	26.0
4 G 1.0	0.6	0.9	7.1	9.0	1.350	0.010	19.5
4 G 1.5	0.7	1.0	8.4	10.5	1.575	0.010	13.3
4 G 2.5	0.8	1.1	10.1	12.5	1.875	0.0095	7.98
4 G 4	0.8	1.2	11.5	14.3	2.145	0.0078	4.95
5 G 0.75	0.6	0.9	7.4	9.3	1.395	0.011	26.0
5 G 1.0	0.6	0.9	7.8	9.8	1.470	0.010	19.5
5 G 1.5	0.7	1.1	9.3	11.6	1.740	0.010	13.3
5 G 2.5	0.8	1.2	11.2	13.9	2.085	0.0095	7.98
5 G 4	0.8	1.4	13.0	16.1	2.415	0.0078	4.95

TABLE 3: Electrical tests for type

Test	Details of test	Specified limit	Standard
Conductor resistance	20 °C	Not more than the maximum value specified in the table 2	EN 60228:2005
Voltage test	2.0 kV A.C. (5.0 kV D.C.) / 5 min	No breakdown of the insulation shall occur	EN 50395:2005 + A1:2011
Voltage test on completed cable	2.0 kV A.C. / 5 min	No breakdown of the insulation shall occur	EN 50395:2005 + A1:2011

TABLE 3: Electrical tests for type H05VV–F *(continued)*

Test	Details of test	Specified limit	Standard
Voltage test on cores in water	1.5 kV A.C. / 5 min [(1)]	No breakdown of the insulation shall occur	EN 50395:2005 + A1:2011
Voltage test on cores in water	2.0 kV A.C. / 5 min [(2)]	No breakdown of the insulation shall occur	EN 50395:2005 + A1:2011
Insulation resistance	70 °C	Not less than the minimum value specified in the table 2	EN 50395:2005 + A1:2011
Long term resistance of insulation to d.c.	220 V D.C. / 60 ± 5 °C / 10 days	No breakdown of the insulation and no damage to the surface	EN 50395:2005 + A1:2011
Absence of faults in the insulation	–	No breakdown of the insulation shall occur	EN 50395:2005 + A1:2011 + EN 62230:2007 + A1:2014

[(1)]: For insulation thickness up to and including 0.6 mm
[(2)]: For insulation thickness exceeding 0.6 mm

TABLE 4: Mechanical tests for type H05VV–F

Test	Details of test	Specified limit (insulation)	Specified limit (sheath)	Standard
Minimum tensile strength before ageing	–	10.0 N / mm^2	10.0 N / mm^2	EN 60811–501:2012 + A1:2018
Minimum elongation at break before ageing	–	150 %	150 %	EN 60811–501:2012 + A1:2018
Minimum tensile strength after ageing in air oven	80±2 °C / 7 days	10.0 N / mm^2	10.0 N / mm^2	EN 60811–401:2012 + A1:2017 + EN 60811–501:2012 + A1:2018
Maximum variation of tensile strength after ageing in air oven	80±2 °C / 7 days	±20 %	±20 %	EN 60811–401:2012 + A1:2017 + EN 60811–501:2012 + A1:2018
Minimum elongation at break after ageing in air oven	80±2 °C / 7 days	150 %	150 %	EN 60811–401:2012 + A1:2017 + EN 60811–501:2012 + A1:2018
Maximum variation of elongation at break after ageing in air oven	80±2 °C / 7 days	±20 %	±20 %	EN 60811–401:2012 + A1:2017 + EN 60811–501:2012 + A1:2018
Maximum loss of mass after ageing	80±2 °C / 7 days	2.0 mg / cm^2	2.0 mg / cm^2	EN 60811–401:2012 + A1:2017 + EN 60811–409:2012
Pressure test at high temperature (maximum depth of indentation)	70±2 °C / 4 hrs	50 %	50 %	EN 60811–508:2012 + A1:2017
Resistance to cracking	150±2 °C / 1 hr	No cracks	No cracks	EN 60811–509:2012 + A1:2017

TABLE 4: Mechanical tests for type H05VV–F *(continued)*

Test	Details of test	Specified limit (insulation)	Specified limit (sheath)	Standard
Bending test at low temperature	– 15±2 °C / 16 hrs	No cracks	No cracks [3]	EN 60811–504:2012
Elongation test at low temperature (minimum elongation at break)	– 15±2 °C / 4 hrs	–	30 % [4]	EN 60811–505:2012
Impact test at low temperature	– 5±2 °C / 16 hrs	–	No cracks	EN 60811–506:2012
Compatibility test of completed cable	80±2 °C / 7 days	No exudation of insulation	No exudation of sheath	EN 60811–401:2012 + EN 50525–2–11:2011
Minimum tensile strength after ageing of completed cable in air oven	80±2 °C / 7 days	10.0 N / mm^2	10.0 N / mm^2	EN 60811–401:2012 + A1:2017 + EN 60811–501:2012 + A1:2018
Maximum variation of tensile strength after ageing of completed cable in air oven	80±2 °C / 7 days	±20 %	±20 %	EN 60811–401:2012 + A1:2017 + EN 60811–501:2012 + A1:2018
Minimum elongation at break after ageing of completed cable in air oven	80±2 °C / 7 days	150 %	150 %	EN 60811–401:2012 + A1:2017 + EN 60811–501:2012 + A1:2018
Maximum variation of elongation at break after ageing of completed cable in air oven	80±2 °C / 7 days	±20 %	±20 %	EN 60811–401:2012 + A1:2017 + EN 60811–501:2012 + A1:2018
Test under fire conditions (minimum distance from the lower edge of the top support to the upper onset of charring)	1 kW pre–mixed flame	–	50 mm	EN 60332–1–2:2004 + A1:2015 + A11:2016
Test under fire conditions (maximum distance from the lower edge of the top support to the lower onset of charring)	1 kW pre–mixed flame	–	540 mm	EN 60332–1–2:2004 + A1:2015 + A11:2016
Test under fire conditions (maximum distance from the upper to the lower onset of charring)	1 kW pre–mixed flame	–	425 mm	EN 60332–1–2:2004 + A1:2015 + A11:2016

[3]: Only applicable to cables having mean overall diameters up to and including 12.5 mm
[4]: Only applicable if the mean overall outer diameter of the cable exceeds 12.5 mm

TABLE 4: Mechanical tests for type H05VV–F *(continued)*

Test	Details of test	Specified limit (insulation)	Specified limit (sheath)	Standard
Two pulley flexing test [5], followed, after immersion in water, by voltage test on cores	30,000 cycles 1.0 / 1.5 / 2.0 kg 80 / 120 mm 3 / 5 / 8 / 12.5 A 230 / 400 V AC	• No interruption of the current • No short circuit between the conductors • No short circuit between the cable and the pulley wheels (the flexing apparatus) • The sheath shall not show any cracks		EN 50396:2005 + A1:2011
	2.0 kV AC 5 min	No breakdown of the insulation shall occur		EN 50395:2005 + A1:2011

[5]: Not applicable to cables having conductors greater than 2.5 mm^2