



DMFRO & RTFRO

Lightweight cables for marine diesel engines

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All data within this publication indicates nominal values in millimetres (mm) unless otherwise stated.
DISCLAIMER: Information is indicative and cannot be considered a binding representation or warranty for products and their use. Valid at the time of publication, it is subject to change without notice.

Lightweight cables for marine diesel engines

Our cable concepts DMFRO and RTFRO are developed with the variety of applications in the demanding areas of engine and control rooms in ships or other vessels in mind.

These lightweight cables are a perfect choice for marine diesel engines, where requirements on chemical resistance and temperature ratings are high.

By using advanced materials, the design technology allows the use of thin wall insulation, making the outer diameter of the cable smaller. A feature that also reduces the overall weight. For you, this means a saving in both space and weight in your installations. Furthermore, both cable ranges allow for installation with no added protection.

The cable range RTFRO has been used for many years to meet the toughest demands in marine engines, thanks to its high temperature resistance of +150°C. DMFRO is the latest development of the concept, a halogen free version – ensuring a minimum of smoke and toxic fume emissions in the case of fire. Reducing smoke and fumes in an emergency is crucial from a safety perspective for the people working in the area.

DMFRO

The DMFRO cable concept is the halogen free version (Low Smoke Zero Halogen – LSZH) and is flame retardant to IEC 60332-3-25. The cable range provides good flexibility and good resistance to oils, fuels and mud – tested according to the requirements of NEK TS 606.

The cables have a wide temperature range of -40°C to +135°C with a certified operational range of -30°C to +95°C.

RTFRO

The RTFRO cable concept is made of high performance fluoropolymers, offering high temperature resistance (+150°C). Flame retardant to IEC 60332-3-24. The cable range provides excellent mechanical strength and excellent resistance to hot oils and water.

RTFRO cables have a wide temperature range of -65°C to +150°C with a certified operational range of -40°C to +95°C. This ensures a long lifetime, even when placed close to a heat source.

Third party approval

Both DMFRO and RTFRO are approved by a number of internationally recognised standards authorities including:

- **ABS // American Bureau of Shipping**
2010 Steel Vessel Rules 1-1-4/7.7, 1-1-A3 and 4-8-3/9.5:
General power, lighting, control, instrumentation and communications for shipboard and offshore units
- **BV // Bureau Veritas S.A.**
Rules for the classification of steel ships: Lightweight cable used for General power, lighting, control, instrumentation and communication
- **CCS // China Classification Society**
Marine Electrical Cables Chapter 3, Part 4: Rules for Classification of sea-going Steel Ships 2018
- **DNV GL // (formerly Det Norske Veritas & Germanischer Lloyd)**
Rules for classification: Ships, offshore units and high speed and light craft - Generalpower and lighting. Control. Instrumentation and communications. Approved by DNV GL according to class programme DNVGL-CP-0400 (Lightweight electric cables).
- **LR // Lloyds Register**
Marine applications for fixed wiring on ship and offshore installations.
- **NK // Nippon Kaiji Kyokai**
Power, Lighting, Control, Instrumentation and Communication cable

As standards authorities differ in their requirements, please see individual page data for clarification on which sizes and types are approved to which standards authority.

Variants of the cable concepts


The approved DMFRO, RTFRO and RTFRO-TCK designs are rigidly defined and are included within this document. Habia can provide other sizes and constructions – the cable concepts can be adapted for cables with different numbers and sizes, colours etc. However, variants will not be covered by the existing approval and references to the name DMFRO or RTFRO cannot be made.

Should you require a variant of the concepts, please contact one of our sales offices for more information. Find your local contact details at habia.com



DMFRO // Multicores

HFI 140 insulated, HFS 125 XL sheathed, LSZH multicores for Ships, offshore units and high speed & light craft
Intended for use in equipment installed on classed vessels

Description	Cores				Finished Cable						
	DMFRO	No. of cores	Tin Plated Copper (TPC)			HFI 140	TPC braid	HFS 125 XL	Weight	Amps	
			Size	Stranding	Conductor	Insulation	Shield/s	Sheath/s			
600 / 1000V AC U ₀ /U	Lay up	mm ²	# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	@ 40°C	Article Number	
DMFRO 2 x 0,5	2	0.50	Class 5	0.88	1.28	3.5	5.5	47	10	700077102	
DMFRO 2 x 0,75		0.75	Class 5	1.05	1.45	3.8	5.8	57	13	700078397	
DMFRO 2 x 1,0		1.0	Class 5	1.20	1.60	4.1	6.1	61	16	700077144	
DMFRO 2 x 1,5		1.5	Class 5	1.50	2.00	5.0	7.0	95	21	700074243	
DMFRO 2 x 2,5		2.5	Class 5	1.95	2.45	5.9	8.1	113	30	700077161	
DMFRO 2 x 6		6	Class 5	2.92	4.00	9.0	11.4	227	56	* 700077170	
DMFRO 2 x 10	10	Class 5	3.93	5.10	11.4	13.7	354	84	* 700077174		
DMFRO 3 x 0,5	3	0.50	Class 5	0.88	1.28	3.7	5.7	54	9	700074244	
DMFRO 3 x 0,75		0.75	Class 5	1.05	1.45	4.0	6.0	64	12	700070252	
DMFRO 3 x 1,0		1.0	Class 5	1.20	1.60	4.3	6.3	72	15	700077145	
DMFRO 3 x 1,5		1.5	Class 5	1.50	2.00	5.3	7.5	106	20	700074245	
DMFRO 3 x 2,5		2.5	Class 5	1.95	2.45	6.3	8.5	141	28	700077162	
DMFRO 3 x 6		6	Class 5	2.92	4.00	9.6	12.0	295	52	* 700077171	
DMFRO 3 x 10	10	Class 5	3.93	5.10	12.2	14.8	481	77	* 700077175		
DMFRO 4 x 0,5	4	0.50	Class 5	0.88	1.28	4.0	6.0	62	8	700074246	
DMFRO 4 x 0,75		0.75	Class 5	1.05	1.45	4.4	6.4	75	11	700074247	
DMFRO 4 x 1,0		1.0	Class 5	1.20	1.60	4.8	6.8	86	13	700077146	
DMFRO 4 x 1,5		1.5	Class 5	1.50	2.00	5.8	8.0	126	18	700074248	
DMFRO 4 x 2,5		2.5	Class 5	1.95	2.45	6.9	9.1	170	26	700077163	
DMFRO 4 x 6		6	Class 5	2.92	4.00	10.9	13.2	381	47	* 700077172	
DMFRO 4 x 10	10	Class 5	3.93	5.10	13.5	16.2	608	70	* 700077176		
DMFRO 5 x 0,5	5	0.50	Class 5	0.88	1.28	4.4	6.4	71	8	700077106	
DMFRO 5 x 0,75		0.75	Class 5	1.05	1.45	4.8	6.8	86	10	700074249	
DMFRO 5 x 1,0		1.0	Class 5	1.20	1.60	5.2	7.2	99	12	700077147	
DMFRO 5 x 1,5		1.5	Class 5	1.50	2.00	6.4	8.6	148	17	700077154	
DMFRO 5 x 2,5		2.5	Class 5	1.95	2.45	7.6	9.8	200	24	700077164	
DMFRO 5 x 6		6	Class 5	2.92	4.00	12.0	14.6	466	44	* 700077173	
DMFRO 5 x 10	10	Class 5	3.93	5.10	15.0	17.7	734	66	* 700077177		
DMFRO 7 x 0,5	7	0.50	Class 5	0.88	1.28	4.7	6.7	84	7	700077108	
DMFRO 7 x 0,75		0.75	Class 5	1.05	1.45	5.3	7.3	106	9	700074251	
DMFRO 7 x 1,0		1.0	Class 5	1.20	1.60	5.7	7.9	126	11	700077148	
DMFRO 7 x 1,5		1.5	Class 5	1.50	2.00	7.0	9.4	189	14	700074252	
DMFRO 7 x 2,5		2.5	Class 5	1.95	2.45	8.4	10.8	260	21	700077165	
DMFRO 8 x 0,75	8	0.75	Class 5	1.05	1.45	6.1	8.1	121	6	700074253	
DMFRO 9 x 0,5	9	0.50	Class 5	0.88	1.28	5.6	8.1	117	6	700074254	
DMFRO 10 x 1,5	10	1.50	Class 5	1.50	2.00	9.0	11.4	256	13	700074255	

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Cable identification


Cores: White and numbered

1 2 3 4

Sheath: Black


Marking: HABIA CABLE DMFRO ## x ### 0.6/1 kV Article No. YYYY-Wwww - Factory batchcode - IEC 60332-3-25

Characteristics and key properties

	RoHS 2011/65/EU	REACH EC No. 1907/2006	LVD 2014/35/EU		Flame retardant to IEC 60332-3-25	Halogen free to IEC 60754-2	Chemical resistance to oils and fuels	MUD resistant sheath to NEK 606	Certified +95°C High temp	+135°C High temp
ABS approved	BV approved (excludes items with *)	CCS approved	DNV GL approved	LR approved	NK approved		Test voltage 1.5 kV AC	Current rating in free air to IEC 60287	Certified -30°C Low temp	-40°C Low temp

DMFRO // Multicores

HFI 140 insulated, HFS 125 XL sheathed, LSZH multicores for Ships, offshore units and high speed & light craft
Intended for use in equipment installed on classed vessels

Description	Cores				Finished Cable						
	DMFRO	No. of cores	Tin Plated Copper (TPC)			HFI 140	TPC braid	HFS 125 XL	Weight	Amps	
			Size	Stranding	Conductor	Insulation	Shield/s	Sheath/s			
600 / 1000V AC U ₀ /U	Lay up	mm ²	# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	@ 40°C	Article Number	
DMFRO 12 x 0,5	12	0.50	Class 5	0.88	1.28	6.3	8.5	135	6	700077112	
DMFRO 12 x 0,75		0.75	Class 5	1.05	1.45	7.0	9.2	171	7	700074256	
DMFRO 12 x 1,0		1.0	Class 5	1.20	1.60	7.7	9.9	199	9	700077149	
DMFRO 12 x 1,5		1.5	Class 5	1.50	2.00	9.3	11.7	289	12	700077155	
DMFRO 12 x 2,5		2.5	Class 5	1.95	2.45	11.4	13.8	423	17	700077166	
DMFRO 14 x 0,75	14	0.75	Class 5	1.05	1.45	7.4	9.6	190	7	700077131	
DMFRO 14 x 1,5		1.5	Class 5	1.50	2.00	10.0	12.3	336	11	700077156	
DMFRO 19 x 0,5	19	0.50	Class 5	0.88	1.28	7.4	9.6	183	5	700077117	
DMFRO 19 x 0,75		0.75	Class 5	1.05	1.45	8.3	10.5	238	6	700077135	
DMFRO 19 x 1,0		1.0	Class 5	1.20	1.60	9.0	11.4	285	8	700077150	
DMFRO 19 x 1,5		1.5	Class 5	1.50	2.00	11.2	13.8	436	10	700077157	
DMFRO 19 x 2,5		2.5	Class 5	1.95	2.45	13.5	16.2	623	15	700077167	
DMFRO 20 x 0,75	20	0.75	Class 5	1.05	1.45	8.7	10.9	250	6	* 700074257	
DMFRO 24 x 1,5	24	1.5	Class 5	1.50	2.00	13.2	16.0	544	9	* 700077158	
DMFRO 25 x 0,75	25	0.75	Class 5	1.05	1.45	9.9	12.3	320	6	* 700074258	
DMFRO 27 x 0,5	27	0.50	Class 5	0.88	1.28	8.9	11.3	258	4	* 700077120	
DMFRO 27 x 0,75		0.75	Class 5	1.05	1.45	9.9	12.3	322	5	* 700077138	
DMFRO 27 x 1,0		1.0	Class 5	1.20	1.60	11.1	13.3	391	7	* 700077151	
DMFRO 27 x 1,5		1.5	Class 5	1.50	2.00	13.5	16.3	594	9	* 700077159	
DMFRO 27 x 2,5		2.5	Class 5	1.95	2.45	16.3	19.3	859	13	* 700077168	
DMFRO 37 x 0,75	37	0.75	Class 5	1.05	1.45	11.4	13.8	429	5	* 700077141	
DMFRO 37 x 1,5		1.5	Class 5	1.50	2.00	15.2	18.2	776	8	* 700077160	
DMFRO 37 x 2,5		2.5	Class 5	1.95	2.45	18.3	21.5	1129	12	* 700077169	
DMFRO 50 x 0,5	50	0.50	Class 5	0.88	1.28	11.6	14.2	419	3	* 700077124	
DMFRO 50 x 0,75		0.75	Class 5	1.05	1.45	13.0	15.6	557	5	* 700077143	

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Cable identification


Cores: White and numbered

1 2 3 4

Sheath: Black


Marking: HABIA CABLE DMFRO ## x ### 0.6/1 kV Article No. YYYY-Wwww - Factory batchcode - IEC 60332-3-25

Characteristics and key properties

	RoHS 2011/65/EU	REACH EC No. 1907/2006	LVD 2014/35/EU		Flame retardant to IEC 60332-3-25	Halogen free to IEC 60754-2	Chemical resistance to oils and fuels	MUD resistant sheath to NEK 606	Certified +95°C High temp	+135°C High temp
ABS approved	BV approved (excludes items with *)	CCS approved	DNV GL approved	LR approved	NK approved		Test voltage 1.5 kV AC	Current rating in free air to IEC 60287	Certified -30°C Low temp	-40°C Low temp

DMFRO // Multipairs

HFI 140 insulated, HFS 125 XL sheathed, LSZH multicores for Ships, offshore units and high speed & light craft
Intended for use in equipment installed on classed vessels

Description	Cores				Finished Cable						
	DMFRO	No. of cores	Tin Plated Copper (TPC)			HFI 140	TPC braid	HFS 125 XL	Weight	Amps	
			Size	Stranding	Conductor	Insulation	Shield/s	Sheath/s			
600 / 1000V AC U ₀ /U	Lay up	mm ²	# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	@ 40°C	Article Number	
DMFRO 2x 2x 0,5	4	0.50	Class 5	0.88	1.28	4.0	6.0	75	8	700077103	
DMFRO 2x 2x 0,75		0.75	Class 5	1.05	1.45	4.4	6.4	100	11	700077125	
DMFRO 2x 2x 1,5		1.50	Class 5	1.50	2.00	5.8	8.0	156	18	700077152	
DMFRO 3x 2x 0,5	6	0.50	Class 5	0.88	1.28	6.0	8.2	100	7	700077104	
DMFRO 3x 2x 0,75		0.75	Class 5	1.05	1.45	6.5	8.7	119	9	700077126	
DMFRO 4x 2x 0,5	8	0.50	Class 5	0.88	1.28	6.6	8.8	116	6	700077105	
DMFRO 4x 2x 0,75		0.75	Class 5	1.05	1.45	7.2	9.4	142	8	700074783	
DMFRO 4x 2x 1,5		1.50	Class 5	1.50	2.00	9.7	12.1	233	12	700077153	
DMFRO 5x 2x 0,5	10	0.50	Class 5	0.88	1.28	7.2	9.4	133	6	700077107	
DMFRO 7x 2x 0,5	14	0.50	Class 5	0.88	1.28	7.9	10.1	162	5	700077109	
DMFRO 7x 2x 0,75		0.75	Class 5	1.05	1.45	8.8	11.0	205	7	700077127	
DMFRO 8x 2x 0,5	16	0.50	Class 5	0.88	1.28	9.5	11.9	206	5	700077110	
DMFRO 8x 2x 0,75		0.75	Class 5	1.05	1.45	10.6	13.2	264	7	700077128	
DMFRO 10x 2x 0,5	20	0.50	Class 5	0.88	1.28	10.4	12.8	238	5	700077111	
DMFRO 10x 2x 0,75		0.75	Class 5	1.05	1.45	11.6	14.2	308	6	700077129	
DMFRO 12x 2x 0,5	24	0.50	Class 5	0.88	1.28	10.8	13.4	271	4	700077113	
DMFRO 12x 2x 0,75		0.75	Class 5	1.05	1.45	12.0	14.4	337	6	700077130	
DMFRO 14x 2x 0,5	28	0.50	Class 5	0.88	1.28	11.4	14.0	300	4	700077114	
DMFRO 14x 2x 0,75		0.75	Class 5	1.05	1.45	12.7	15.3	383	5	700077132	
DMFRO 15x 2x 0,5	30	0.50	Class 5	0.88	1.28	12.0	14.6	318	4	700077115	
DMFRO 15x 2x 0,75		0.75	Class 5	1.05	1.45	13.4	16.1	412	5	700077133	
DMFRO 16x 2x 0,5	32	0.50	Class 5	0.88	1.28	12.0	14.6	329	4	700077116	
DMFRO 16x 2x 0,75		0.75	Class 5	1.05	1.45	13.4	16.1	427	5	700077134	
DMFRO 19x 2x 0,5	38	0.50	Class 5	0.88	1.28	12.7	15.3	369	3	700077118	
DMFRO 19x 2x 0,75		0.75	Class 5	1.05	1.45	14.2	17.1	492	5	700077136	
DMFRO 24x 2x 0,5	48	0.50	Class 5	0.88	1.28	15.0	17.8	460	3	* 700077119	
DMFRO 24x 2x 0,75		0.75	Class 5	1.05	1.45	16.8	19.9	614	5	* 700077137	
DMFRO 27x 2x 0,5	54	0.50	Class 5	0.88	1.28	15.4	18.4	506	3	* 700077121	
DMFRO 27x 2x 0,75		0.75	Class 5	1.05	1.45	17.2	20.3	666	4	* 700077139	
DMFRO 32x 2x 0,5	64	0.50	Class 5	0.88	1.28	16.6	19.6	576	2	* 700077122	
DMFRO 32x 2x 0,75		0.75	Class 5	1.05	1.45	18.6	21.9	773	3	* 700077140	
DMFRO 37x 2x 0,5	74	0.50	Class 5	0.88	1.28	17.3	20.3	638	1	* 700077123	
DMFRO 37x 2x 0,75		0.75	Class 5	1.05	1.45	19.4	22.7	862	2	* 700077142	

Cable identification


Pairs: Each pair white and numbered

1 2 3 4

Sheath: Black

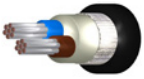
Marking: HABIA CABLE DMFRO ## x ### 0.6/1 kV Article No. YYYY-Wwww - Factory batchcode - IEC 60332-3-25

Characteristics and key properties

	RoHS 2011/65/EU	REACH EC No. 1907/2006	LVD 2014/35/EU		Flame retardant to IEC 60332-3-25	Halogen free to IEC 60754-2	Chemical resistance to oils and fuels	MUD resistant sheath to NEK 606	Certified +95°C High temp	+135°C High temp
ABS approved	BV approved (excludes items with *)	CCS approved	DNV GL approved	LR approved	NK approved		Test voltage 1.5 kV AC	Current rating in free air to IEC 60287	Certified -30°C Low temp	-40°C Low temp

RTFRO // Multicores

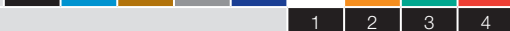
ETFE insulated & sheathed multicores to DNV GL - Ships, offshore units and high speed & light craft
Intended for use in equipment installed on classed vessels

Description	Cores				Finished Cable						
	RTFRO	No. of cores	Tin Plated Copper (TPC)			ETFE	TPC braid	ETFE	Weight		Amps
			Size	Stranding	Conductor	Insulation	Shield/s	Sheath/s			
300 / 500V AC U _y /U	Lay up	mm ²	# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	@ 40°C	Article Number	
RTFRO 2 x 0,75	2	0.75	Class 5	1.05	1.61	4.8 x 5.8	5.6 x 6.6	79	12.8	43171-001-07	
RTFRO 2 x 1,0		1.00	Class 5	1.20	1.76	5.2 x 5.8	6.1 x 6.7	80	14.5	700016590	
RTFRO 2 x 1,5		1.50	Class 5	1.50	2.26	6.3 x 7.3	7.3 x 8.3	123	20.2	43171-006-01	
RTFRO 3 x 0,5	3	0.50	Class 5	0.88	1.44	4.6 x 5.6	5.4 x 6.4	70	9.1	43171-008-03	
RTFRO 3 x 0,75		0.75	Class 5	1.05	1.61	5.1 x 6.1	5.4 x 6.9	87	11.9	43171-001-08	
RTFRO 3 x 1,0		1.00	Class 5	1.20	1.76	5.5 x 6.5	6.4 x 7.4	100	13.4	700016674	
RTFRO 3 x 1,5		1.50	Class 5	1.50	2.26	6.6 x 7.6	7.6 x 8.6	134	18.7	43171-006-02	
RTFRO 4 x 0,5	4	0.50	Class 5	0.88	1.44	4.8 x 5.8	5.6 x 6.6	72	8.2	43171-008-04	
RTFRO 4 x 0,75		0.75	Class 5	1.05	1.61	5.6 x 6.6	6.4 x 7.4	102	10.8	43171-001-09	
RTFRO 4 x 1,0		1.00	Class 5	1.20	1.76	5.9 x 6.5	6.8 x 7.4	110	12.2	700016621	
RTFRO 4 x 1,5		1.50	Class 5	1.50	2.26	7.0 x 8.0	8.0 x 9.0	157	17.0	43171-006-03	
RTFRO 5 x 0,75	5	0.75	Class 5	1.05	1.61	6.1 x 7.1	7.1 x 8.1	120	10.1	43171-001-10	
RTFRO 5 x 1,5		1.50	Class 5	1.50	2.26	8.0 x 9.0	9.1 x 10.1	192	15.9	43171-006-04	
RTFRO 7 x 0,75	7	0.75	Class 5	1.05	1.61	6.7 x 7.7	7.7 x 8.7	143	8.7	43171-001-11	
RTFRO 7 x 1,5		1.50	Class 5	1.50	2.26	8.7 x 9.7	9.8 x 10.8	215	13.8	43171-006-05	
RTFRO 8 x 0,5	8	0.50	Class 5	0.88	1.44	6.9 x 7.8	7.9 x 8.8	150	6.1	43171-008-06	
RTFRO 8 x 0,75		0.75	Class 5	1.05	1.61	7.2 x 8.2	8.2 x 9.2	164	8.3	43171-001-12	
RTFRO 9 x 0,5	9	0.50	Class 5	0.88	1.44	7.5 x 8.4	8.5 x 9.4	145	6.0	43171-008-12	
RTFRO 10 x 1,5	10	1.50	Class 5	1.50	2.26	11.2 x 12.2	12.4 x 13.4	318	12.5	43171-006-06	

Cable is un-round due to drain wire: Dimensions stated as A x B where A is the diameter over the normal shape of the cable and B is the diameter over the drain wire

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Cable identification

Cores: 1 st : Black, 2 nd : Light Blue, 3 rd : Brown, 4 th : Grey, 5 th : Blue, 6 th : White, 7 th : Orange, 8 th : Green, 9 th : Red	
Cores: 10+ cores: Black and numbered	
Sheath: Black	

Marking: HABIA CABLE Factory RTFRO ## x ### Voltage Batchcode YYWW IEC 60332-1 IEC 60332-3-24

Characteristics and key properties

	RoHS 2011/65/EU	REACH EC No. 1907/2006	LVD 2014/35/EU	All-round chemical resistance	Flame retar- dant to IEC 60332-3-24	Certified +95°C High temp	+150°C High temp
ABS approved	BV approved (excludes items with *)	DNV GL approved		Test voltage 1.5 kV AC	Current rating in free air to IEC 60287	Certified -40°C Low temp	-65°C Low temp



RTFRO // Multicores

ETFE insulated & sheathed multicores to DNV GL - Ships, offshore units and high speed & light craft
Intended for use in equipment installed on classed vessels

Description	Cores				Finished Cable						
	RTFRO	No. of cores	Tin Plated Copper (TPC)			ETFE	TPC braid	ETFE	Weight		Amps
			Size	Stranding	Conductor	Insulation	Shield/s	Sheath/s			
300 / 500V AC U _y /U	Lay up	mm ²	# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	@ 40°C	Article Number	
RTFRO 12 x 0,5	12	0.50	Class 5	0.88	1.44	TBC	8.4 x 9.0	TBC	5.4	TBC	
RTFRO 12 x 0,75		0.75	Class 5	1.05	1.61	8.6 x 9.6	9.7 x 10.7	216	7.4	43171-001-13	
RTFRO 12 x 1,5		1.50	Class 5	1.50	2.26	11.5 x 12.5	12.7 x 13.7	345	11.7	700031718	
RTFRO 14 x 0,75	14	0.75	Class 5	1.05	1.61	8.9 x 9.9	10.0 x 11.0	229	6.9	700031714	
RTFRO 19 x 0,75	19	0.75	Class 5	1.05	1.61	9.9 x 10.9	11.3 x 12.3	293	6.5	700031715	
RTFRO 20 x 0,75	20	0.75	Class 5	1.05	1.61	10.6 x 11.6	12.0 x 13.0	320	6.4	43171-010-05	
RTFRO 25 x 0,75	25	0.75	Class 5	1.05	1.61	11.8 x 12.4	13.2 x 13.8	370	5.7	43171-010-04	
RTFRO 27 x 0,75	27	0.75	Class 5	1.05	1.61	11.8 x 12.4	13.2 x 13.8	380	5.5	700031716	
RTFRO 40 x 0,75	40	0.75	Class 5	1.05	1.61	15.4 x 16.1	17.0 x 17.7	570	4.8	700004558	
RTFRO 50 x 0,75	50	0.75	Class 5	1.05	1.61	15.4 x 16.4	16.8 x 17.8	673	4.7	700031717	

Cable is un-round due to drain wire: Dimensions stated as A x B where A is the diameter over the normal shape of the cable and B is the diameter over the drain wire

Cable identification

Cores: 1 st : Black, 2 nd : Light Blue, 3 rd : Brown, 4 th : Grey, 5 th : Blue, 6 th : White, 7 th : Orange, 8 th : Green, 9 th : Red	
Cores: 10+ cores: Black and numbered	
Sheath: Black	

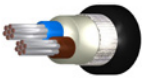
Marking: HABIA CABLE Factory RTFRO ## x ### Voltage Batchcode YYWW IEC 60332-1 IEC 60332-3-24

Characteristics and key properties

	RoHS 2011/65/EU	REACH EC No. 1907/2006	LVD 2014/35/EU	All-round chemical resistance	Flame retar- dant to IEC 60332-3-24	Certified +95°C High temp	+150°C High temp
ABS approved	BV approved (excludes items with *)	DNV GL approved		Test voltage 1.5 kV AC	Current rating in free air to IEC 60287	Certified -40°C Low temp	-65°C Low temp

RTFRO // Multipairs

ETFE insulated & sheathed multicores to DNV GL - Ships, offshore units and high speed & light craft
Intended for use in equipment installed on classed vessels

Description	Cores				Finished Cable						
	RTFRO	No. of cores	Tin Plated Copper (TPC)			ETFE	TPC braid	ETFE	Weight		Amps
			Size	Stranding	Conductor	Insulation	Shield/s	Sheath/s			
300 / 500V AC U ₀ /U	Lay up	mm ²	# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	@ 40°C	Article Number	
RTFRO 2 x 2 x 0,75	4	0.75	Class 5	1.05	1.61	7.7 x 8.7	8.8 x 9.8	136	10.8	700005995	
RTFRO 3 x 2 x 0,5	6	0.50	Class 5	0.88	1.44	TBC	7.7	TBC	7.1	TBC	
RTFRO 4 x 2 x 0,75	8	0.75	Class 5	1.05	1.61	8.9 x 9.9	10.0 x 11.0	170	8.3	700005996	
RTFRO 5 x 2 x 0,5	10	0.50	Class 5	0.88	1.44	TBC	9.9 x 10.5	TBC	6.1	TBC	
RTFRO 7 x 2 x 0,75	14	0.75	Class 5	1.05	1.61	9.7 x 10.5	11.6 x 12.6	240	7.1	700005997	
RTFRO 8 x 2 x 0,75	16	0.75	Class 5	1.05	1.61	13.0 x 13.7	14.8 x 15.5	370	6.8	700014332	
RTFRO 12 x 2 x 0,75	24	0.75	Class 5	1.05	1.61	13.2 x 14.2	14.7 x 15.7	390	5.8	700006727	
RTFRO 15 x 2 x 0,5	30	0.50	Class 5	0.88	1.44	14.5 x 15.1	15.9 x 16.5	420	4.1	401-66794-020	
RTFRO 15 x 2 x 0,75		0.75	Class 5	1.05	1.61	16.1 x 17.1	17.5 x 18.5	500	5.2	43171-001-14	
RTFRO 20 x 2 x 0,5	40	0.50	Class 5	0.88	1.44	15.4 x 16.4	16.8	470	3.7	43171-008-05	
300 / 500V AC U ₀ /U	Lay up	mm ²	# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	@ 40°C	Article Number	
RTFRO 4 x 3 x 0,5	12	0.50	Class 5	0.88	1.44	TBC	9.8 x 10.4	TBC	5.6	TBC	
RTFRO 4 x 3 x 0,75		0.75	Class 5	1.05	1.61	9.4 x 10.4	10.5 x 11.5	235	7.4	43171-001-15	
RTFRO 13 x 3 x 0,5	39	0.50	Class 5	0.88	1.44	TBC	17.4 x 18.0	TBC	3.7	TBC	
RTFRO 15 x 3 x 0,5	45	0.50	Class 5	0.88	1.44	16.4	17.8	560	3.6	43171-001-16	
RTFRO 15 x 3 x 0,75		0.75	Class 5	1.05	1.61	18.7	20.3	665	4.7	700022427	
RTFRO 20 x 3 x 0,5	60	0.50	Class 5	0.88	1.44	TBC	19.8 x 20.4	TBC	3.4	TBC	
RTFRO 20 x 3 x 0,75		0.75	Class 5	1.05	1.61	19.9	21.5	890	4.5	43171-001-17	

Cable is un-round due to drain wire: Dimensions stated as A x B where A is the diameter over the normal shape of the cable and B is the diameter over the drain wire

Cable identification

Pairs: Black and numbered

1 2 3 4 5 6

Sheath: Black

Marking: HABIA CABLE Factory RTFRO ## x ### Voltage Batchcode YYWW IEC 60332-1 IEC 60332-3-24

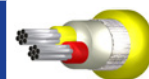
Characteristics and key properties

	RoHS 2011/65/EU	REACH EC No. 1907/2006	LVD 2014/35/EU	All-round chemical resistance	Flame retar- dant to IEC 60332-3-24	Certified +95°C High temp	+150°C High temp
ABS approved	BV approved (excludes items with *)	DNV GL approved		Test voltage 1.5 kV AC	Current rating in free air to IEC 60287	Certified -40°C Low temp	-65°C Low temp

RTFRO-TCK

ETFE insulated & sheathed thermocouple extension to DNV GL - Ships, offshore units and high speed & light craft
Intended for use in equipment installed on classed vessels

Description		Cores			Finished Cable					
RTFRO	No. of cores	Chromel (NiCr) and Alumel (NiAl)			ETFE	TPC braid	ETFE	Weight	Amps	Article Number
		Size	Stranding	Conductor	Insulation	Shield/s	Sheath/s			
60V AC	Lay up	mm ²	# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	@ 40°C	
RTFRO-TCK 2 x 0,5	2	0.50	Class 5	0.88	1.44	4.4	5.3 x 6.0	58	9.8	700024353
RTFRO-TCK 2 x 0.75		0.75	Class 5	1.05	1.61	4.8	5.6 x 6.6	75	12.8	29171-001-02
RTFRO-TCK 4 x 0,5	4	0.50	Class 5	0.88	1.44	5.2 x 5.8	6.0 x 6.6	87	8.2	29281-001-01
RTFRO-TCK 8 x 0,5	8	0.50	Class 5	0.88	1.44	7.1 x 8.1	8.2 x 9.2	165	6.4	29171-003-01
60V AC	Lay up	mm ²	# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	@ 40°C	Article Number
RTFRO-TCK 2x2 x 0,75	4	0.75	Class 5	1.05	1.61	5.8 x 6.8	6.6 x 7.6	109	10.8	205-40035-020
RTFRO-TCK 3x2 x 0,75	6	0.75	Class 5	1.05	1.61	8.0	9.1 x 10.1	170	9.3	29171-001-01
RTFRO-TCK 12x2 x 0,75	24	0.75	Class 5	1.05	1.61	14.3	15.8 x 16.8	400	5.8	29171-001-03



Cable is un-round due to drain wire: Dimensions stated as A x B where A is the diameter over the normal shape of the cable and B is the diameter over the drain wire
Calibrated to meet IEC 60584-3:

Temp. range: -25/+200°C, Tolerance class 1 ± 60 μv (± 1.5°C) and ISA-MC-96.1, Temperature range: 0/+200°C, Standard tolerance ± 2.2°C)

Cable identification

Cores: 1st: Red, 2nd: Yellow,

1 2 3 4 5 6

Sheath: Black

Marking: HABIA CABLE Factory RTFRO-TCK ## x ### Voltage Batchcode YYWW IEC 60332-1 IEC 60332-3-24

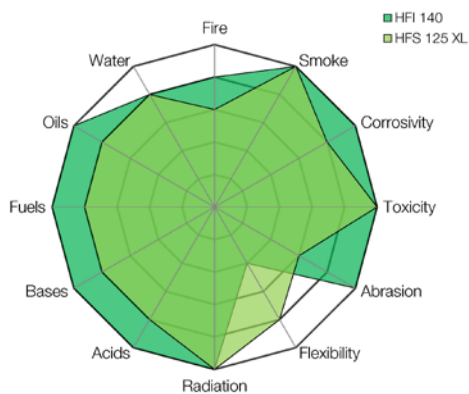
Characteristics and key properties

	RoHS 2011/65/EU	REACH EC No. 1907/2006	LVD 2014/35/EU	All-round chemical resistance	Flame retar- dant to IEC 60332-3-24	Certified +95°C High temp	+150°C High temp
	ABS approved	BV approved (excludes items with *)	DNV GL approved	Test voltage 1.5 kV AC	Current rating in free air to IEC 60287	Certified -40°C Low temp	-65°C Low temp

Materials // Insulation and sheath information

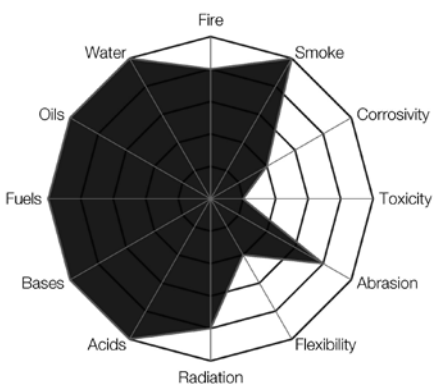
HFI 140 / HFS 125 XL

Insulation / Sheath materials used in DMFRO



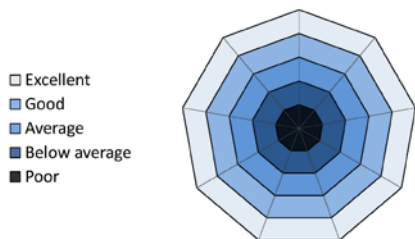
EFTE

Insulation and sheathing material used in RTFRO and RTFRO-TCK



Spider graphs

Our material performance can be compared via these simple key-property graphs. More detailed information can be provided on request.



Important

This information is offered solely as a convenience to Habia Cable's customers and is intended only as a guide. Data is based on typical values and might vary depending on cable construction and processing method.

Habia Cable has compiled the information contained herein from what it believes to be accurate and factual sources as of the date compiled. Any changes in the data will be made without notification.

Habia Cable is one of Europe's leading wire and cable manufacturers. We develop, manufacture and market custom design cables and harness systems for demanding applications in a number of diverse industries.

The company has a global presence and worldwide sales of custom design and standard products in more than 50 countries.

We aim to provide a high level of customer service and technical competence with competitive lead times and low minimum order quantities.

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