

Components for Power Conversion ETD/EER-Series



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This catalogue contains information on all products of the ETD-Series and EER-Series.

Components of the ETD-Series and EER-Series are on-developments of the well known EC-range. They have been developed specially for converters in switch-mode power supplies.

We can supply coilformers made in high quality thermoplastics, matching your production requirements. Accessories, such as potting boxes, safety class spacers and clips, are also included in this catalogue.

All dimensions in mm/inch. The permissible deviations according to DIN 16901 apply as tolerances.

Wherever high-temperature soldering processes are used in connection with ETD/EER-Series collformers, we recommend irradiation cross-linked plastics. This ensures that the mechanical properties – in particular those of gfr-polyamides – are maintained and breakages are reduced. For this reason NORWE offers all plastic components of the ETD/EER-Series in irradiated cross-linked materials.

In the short term, the cross-linked materials can be exposed to very high temperatures. Apart from improved aspects in production there may be interesting cost advantages, and a discussion with us could be useful. Should you need further assistance, be it technical or to assist when placing your order, we look forward to hearing from you.

Fully tagged or pinned coilformers are – in small quantities – usually available from stock. We can also quote for coilformers with pins or tags fitted to your requirements. All lead-times are relatively short.

Our extensive range of modular tooling allows almost unlimited constructional changes to meet customers specification, often by simple changes of tool inserts.

In addition the modular tooling system allows extremely short tooling times and can be very cost effective.

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Description of the different designs ETD / EER-Series

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ETD Ir Coilformers

The ETD-Series Ir is a completely new design from NORWE. The coilformers feature a reduced weight and also a minimized overall height.

Special winding noses and a new wire routing provide tension-relief when binding on the wire. Due to their optimized design, the coilformers are very attractive with regard to technical and also economical aspects.

ETD Standard with Solder-Pins

A well-established design and – resulting there of – optimum features in the further processing characterize this solid series. All coilformers are suitable for automatic winding on computer controlled machines. They feature stand-offs on the PCB-side, thus reducing solder problems.

ETD Standard Side-Wrapping Pins

Due to integrate of side-wrapping pins the total height is reduced by 3 mm. The pins have a separate wrap area where wrapping and soldering is possible without any problem. The pin-side for contacting to the PCB, however, remains unaffected and free of tin.



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ETD Safety Class with Spacers DR

Clearance and creepage dimensions for safety-insulated components may vary from country to country. Accordingly, test voltages of 2500/ 4000/7500 V between primary and secondary and to the core require creepages and clearances from 4 to 12 mm (0.157 to 0.472 inch).



Spacers DR are advantageous for these applications. Examples are shown in the drawings below. Insulating tape between separate windings (across the total width including spacers) is required to achieve creepage and clearance dimensions.

With spacers DR on both sides of the winding creepage and clearance distances of 8 or 12 mm (0.315 or 0.472 inch) can be achieved.









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Survey of Solder-pins

The survey below contains the standard solder-pins matched to the coilformers of the ETD/EER-Series and informs you about the exact dimensions of the solder-pins. The material used is tin bronze, tinned. Further shapes and types are included in our catalogue "Stamped and Pressed Components for Electronic Applications". In addition we also supply individual solder-pins and solder-tags to customers specification – please contact us.



Survey of Solder-tags

The solder-tags below are the standard types matched to the coilformers of the ETD/EER-Series The survey contains the exact dimensions of the solder-tags. The material used is brass, tinned.

Special materials/designs on request, dimensions in mm/inch.



Solder-pin: z112/ua 73322-212



Solder-pin: z812/ua 73298-212



Solder-tag: s18/wd 75511-261



Solder-pin: z113/ua 73323-212



Solder-pin: z813/ua 73299-212



Solder-tag: s20/wd 75513-261



Solder-pin: h115/ua 73523-212

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Thermoplastic Materials

The following survey contains supplementary information on the different thermoplastic-qualities. The material quality orientates to the conventional use of the components. For technical reasons alternative materials cannot be used for all articles. Consult our qualified specialists regarding your individual material requests – we will be pleased to check whether your material requirements can be realized.

Further information on the materials can also be obtained from our homepage (e.g. to call up the UL cards).

NORWE MatCode	NORWE MatDescription	Chemical Symbol	Tradename, Manufacturer	UL-File- No.	Flammability Rating acc. UL 94	RTI Elec acc. UL
024	p6g	PA66 Polyamide 66	PA66 30% GF black Compound	-	-	(+125°C)
039	A3X2G5 sv.	PA66 Polyamide 66	A3X2G5 cross-linked Ultramid BASF AG	-	-	(+120°C)
047	pcg	PBT Polybutylene Terephthalate	B4225 Pocan Lanxess AG	E 245249	V-0 (1.50)	+130°C
087	rtg nat.	PET Polyethylene Terephthalate	FR 530 L Rynite DuPont	E 41938	V-0 (0.35)	+155°C
096	TE 250 F6	PA46 Polyamide 46	TE250F6 Stanyl DSM	E 47960	V-0 (0.35) V-0 (0.75)	+ 65°C +140°C
106	A RV250 nat.	PA66 Polyamid 66	Radiflam A RV250 AF RADICINOVACIPS SPA	E116324	V-0(0.75)	+100°C
181	A3X2G10	PA66 Polyamide 66	A3X2G10 Ultramid BASF AG	E41871	V-0 (1.50)	+115°C
186	SKYT.5220FR	PET Polyethylen- terephthalat	5220FR natur Skytra SK Chemicals Co. Ltd.	E 215991	V-0 (0.70)	+155°C
417	x2g5/m25	PA66 Polyamide 66	A3X2G5 Ultramid BASE AG	E 41871	V-0 (0.81)	+120°C

Explanations on the above survey of materials:

NORWE MatCode	designates the number NORWE fixed for the material. names the NORWE-abbreviation for the material. classifies the chemical product group of the material. designates the product name or trade name fixed by the manufacturer.
Manufacturer	name of manufacturer.
UL-File-No	material quality tested and certified with respect to safety and fflammability.
	The manufacturers of certified and approved products receive a so-called recognition card (yellow card) in which the product qualities are listed in detail. You find all relevant yellow cards – also called UL cards – for different material qualities on our website www.norwe.de or can obtain them from us. You can call up all relevant yellow cards – also called UL cards – for different material qualities just by clicking on the respective UL-file-number.
Flammability Rating acc. UL	determines the flammability of plastic materials based on burning tests in
RTI (Elec.)	Relative Temperature Index according to UL 746 B. The specified temperatures are valid vor long-range electrical load (Elec).

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Irradiation Cross-Linking of ETD/EER Components

NORWE cannot only look back on more than 40 years of experience in the development and production of coilformers but has in the meantime also gained almost 10 years of experience in irradiation cross-linking.

All components of the ETD/EER-series can on request be supplied in cross-linked material. A cross-linking enhancing material is added to the thermoplast granulates. After moulding the components are irradiated with Beta- or Gamma rays – depending on the penetration required.

The material loses its thermoplast characteristics (but it is not a thermoset) and withstands very high temperature peeks for short periods without any problems.

- Depending on the degree of cross-linking the coilformers and accessories withstand solder temperatures of 450–480°C for about 1–3 seconds. Irradiated cross-linked components easily tolerate the higher solder temperatures required due to the contact elements being changed to be leadfree.
- Unlike high temperature polymers also cost-effective granulates are suitable for irradiation cross-linking. The characteristic features of the coilformers and accessories do not change due to the cross-linking.
- In contrast to high temperature polymers lower temperatures of material and mould during the production process are required and thus the tool elements are less stressed resulting in longevity.
 The lower temperature profiles during the moulding process provide a lower wear and tear of the tool elements as well as a perceptible saving of energy costs.

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ETD Ferrite Cores

The tables below show the dimensions of the ferrite cores for the coilformers shown in this catalogue. The data can be used as an orientation in the design of application specific converters.



Specific details on the ferrite cores and materials should be available from the catalogues of the ferrite manufacturers.

- A_e effective area
- A_{min} core cross section
- Ve effective volume

Magnetic Characteristics per set	l _e mm/ inch	A _e mm²/ inch²	A _{min} mm²/ inch²	V _e mm ³ / inch ³
ETD 19/13/7	59.0	44.0	40.0	2600
	2.323	0.068	0.062	0.159
ETD 24/14/ 8	67.0	60.0	54.0	4020
	2.638	0.093	0.084	0.245
ETD 29/16/10	72.0	76.0	71.0	5470
	2.835	0.118	0.110	0.334
ETD 34/17/11	78.6	97.1	87.0	7640
	3.094	0.151	0.135	0.466
ETD 39/20/13	92.2	125.0	123.0	11500
	3.630	0.194	0.191	0.702
ETD 44/22/15	103.0	173.0	167.0	17800
	4.055	0.268	0.259	1.086
ETD 49/25/16	114.0	211.0	204.0	24000
	4.488	0.327	0.316	1.465
ETD 54/27/19	127.0	280.0	280.0	35700
	5.000	0.434	0.434	2.179
ETD 59/31/22	139.0	368.0	368.0	51500
	5.472	0.570	0.570	3.143





Туре	Α	В	С	D	E	G
ETD 19/13/ 7	$19,60 \pm 0,5$	13.80 - 0.3	7.60 - 0.4	7.60-0.4	14.40 +1.0	9.20 +0.4
ETD 24/14/ 8	24.40 ± 0.6	14.60 –0.3	8.70 –0.4	8.70 –0.4	18.00 +1.2	9.90 +0.4
	0.961 ± 0.024	0.575 –0.012	0.343 –0.016	0.343 –0.016	0.709 +0.047	0.390 +0.016
ETD 29/16/10	29.80 ± 0.8	16.00 –0.4	9.80 -0.6	9.80 -0.6	22.00 +1.4	10.70 +0.6
	1.173 ± 0.031	0.630 –0.016	0.386 -0.024	0.386 -0.024	0.866 +0.055	0.421 +0.024
ETD 34/17/11	34.00 ± 0.8	17.50 –0.4	11.10 –0.6	11.10 –0.6	25.60 +1.4	11.80 +0.6
	1.339 ± 0.031	0.689 –0.016	0.437 –0.024	0.437 –0.024	1.008 +0.055	0.465 +0.024
ETD 39/20/13	38.90 ± 0.9	20.00 –0.4	12.80 –0.6	12.80 –0.6	29.30 +1.6	14.20 +0.6
	1.531 ± 0.035	0.787 –0.016	0.504 –0.024	0.504 –0.024	1.154 +0.063	0.559 +0.024
ETD 44/22/15	43.80 ± 1.0	22.50 –0.4	15.20 –0.8	15.20 –0.8	32.50 +1.6	16.10 +0.7
	1.724 ± 0.039	0.886 –0.016	0.598 –0.031	0.598 –0.031	1.280 +0.063	0.634 +0.028
ETD 49/25/16	48.50 ± 1.1	24.90 –0.4	16.70 –0.8	16.70 –0.8	36.10 +1.8	17.70 +0.8
	1.909 ± 0.043	0.980 –0.016	0.657 –0.031	0.657 –0.031	1.421 +0.071	0.697 +0.031
ETD 54/27/19	54.50 ± 1.3	27.80 –0.4	19.30 – 0.8	19.30 –0.8	40.10 +2.2	19.80 +0.8
	2.146 ± 0.051	1.094 –0.016	0.760 – 0.031	0.760 –0.031	1.579 +0.087	0.780 +0.031
ETD 59/31/22	59.80 ± 1.4	31.20 –0.4	22.10 –0.9	22.10 –0.9	43.60 +2.2	22.90 +0.9
	2.354 ± 0.055	1.228 –0.016	0.870 –0.035	0.870 –0.035	1.717 +0.087	0.902 +0.035

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EER Ferrite Cores

The tables below show the dimensions of the ferrite cores for the coilformers shown in this catalogue. The data can be used as an orientation in the design of application specific converters.



Specific details on the ferrite cores and materials should be available from the catalogues of the ferrite manufacturers.

-	effective	length

۱_e

- A_e effective area
- A_{min} core cross section
- Ve effective volume

Magnetic Characteristics per set	I _e mm / inch	A _e mm²/ inch²	Amin mm²/ inch²	v _e mm³/ inch³
EER 28/14/11	64.0 2.520	81.4 0.126	77.0 0.119	5260 0.321
EER 28/17/11	75.5 2.972	81.4 0.126	77.0 0.119	6140 0.375
EER 35/21/11	90.8 3.575	107.0 0.166	100.0 0.155	9710 0.593
EER 40/22/13	98.0 3.858	149.0 0.231	139.0 0.215	14600 0.891
EER 42/22/15	99.0 3.898	170.0 0.264	170.0 0.264	16800 1.025
EER 46/17/18	79.0 <mark>3.110</mark>	233.0 0.361	226.0 0.350	18400 1.123
EER 48/18/18	100.0 3.937	255.0 0.395	248.0 0.384	20300 1.239
EER 48/21/21	87.0 3.425	231.0 0.358	221.0 0.343	25500 1.556
EER 49/27/17	118.0 4.646	243.0 0.377	225.0 0.349	28700 1.751
EER 54/18/18	91.8 3.614	250.0	240.0	23000





Туре	Α	В	С	D	E	G
EER 28/14/11	28.55 ±0.55	14.0 ±0.20	9.9 ±0.25	11.40 ±0.35	21.75 ±0.50	9.75 ±0.40
EER 28/17/11	28.55 ± 0.55	16.9 ±0.25	9.9 ±0.25	11.40 ± 0.35	21.75 ±0.50	12.65 ±0.010
	1.124 ±0.022	0.665 ±0.010	0.390 ±0.010	0.449 ±0.014	0.856 ±0.020	0.498 ±0.016
EER 35/21/11	35.00 ±0.65	20.7 ±0.20	11.3 ±0.25	11.40 ±0.35	26.15 ±0.55	14.75 ±0.35
	1.378 ±0.026	0.815 ±0.008	0.445 ±0.010	0.449 ±0.014	1.030 ±0.022	0.581 ±0.014
EER 40/22/13	40.00 ±0.70	22.4 ±0.20	13.3 ±0.25	13.40 ±0.35	29.60 ±0.60	15.45 ±0.35
	1.575 ±0.028	0.882 ±0.400	0.524 ±0.010	0.528 ±0.014	1.165 ±0.024	0.608 ±0.014
EER 42/22/15	42.00 +1 -0.7	21.8 –0.40	15.0 –0.60	15.00 –0.60	30.40 +1.20	15.60 +0.70
	1.654 +0.039 -0.028	0.858 –0.016	0.591 –0.024	0.591 –0.024	1.197 +0.047	0.614 +0.028
EER 46/17/18	46.00 –2.00	17.5 –0.40	18.0 –0.80	18.00 –0.80	33.00 +1.60	10.50 +0.50
	1.811 –0.079	0.689 –0.016	0.709 –0.031	0.709 –0.031	1.299 +0.063	0.413 +0.020
EER 48/18/18	48.00 ±1.00	18.0 ±0.20	17.6 ±0.40	17.60 ±0.40	36.80 ±0.80	11.45 ±0.25
	1.890 ±0.039	0.709 ±0.008	0.693 ±0.016	0.693 ±0.016	1.449 ±0.031	0.451 ±0.010
EER 48/21/21	48.00 ±1.00	21.2 –0.40	18.0 ±0.30	21.00 +0.3 -0.5	38.00 +0.50 -0.80	14.70 +0.70
	1.890 ±0.039	0.835 –0.016	0.709 ±0.012	0.827 +0.012-0.020	1.496 +0.020 -0.039	0.579 +0.028
EER 49/27/17	49.00 ±1.00	27.0 ±0.30	17.2 ±0.40	17.20 ±0.40	37.30 ±0.90	18.50 ±0.40
	1.929 ±0.039	1.063 ±0.012	0.677 ±0.016	0.677 ±0.016	1.469 ±0.035	0.728 ±0.016
EER 54/18/18	53.40 ±1.00	18.3 ±0.20	17.9 ±0.40	17.95 ±0.35	40.65 ±0.85	11.10 ±0.30
	2.102 ±0.039	0.720 ±0.008	0.705 ±0.016	0.707 ±0.014	1.600 ±0.033	0.437 ±0.012

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