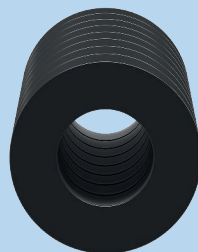
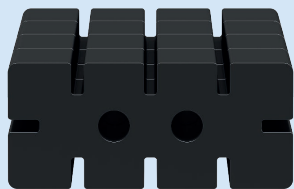
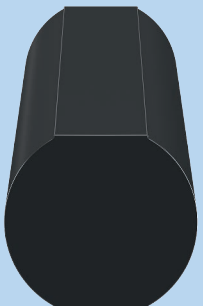


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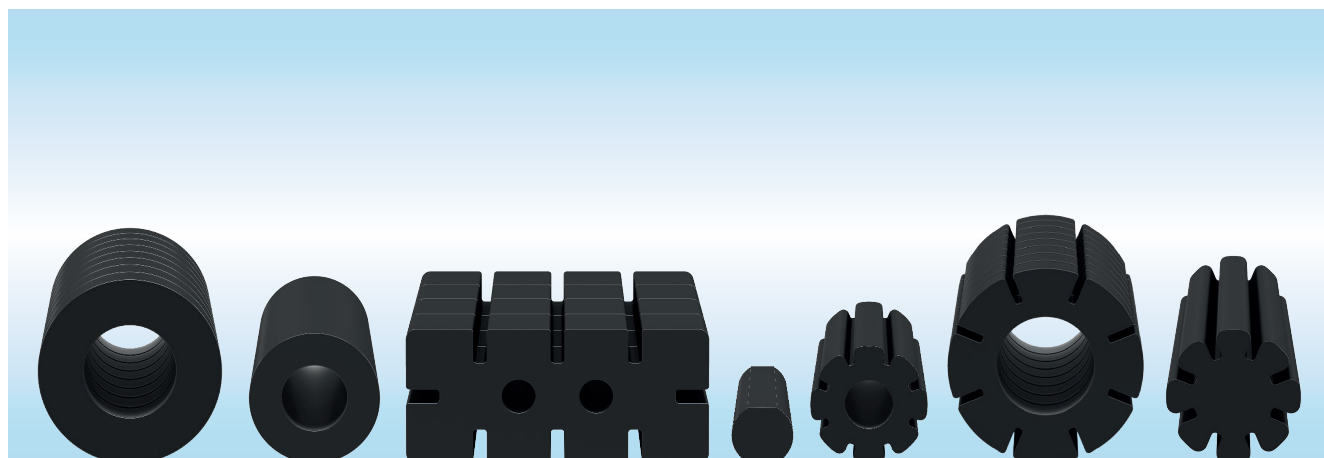
# Impeder Cores

For High Frequency Welding





# Impeder Cores for High Frequency Welding



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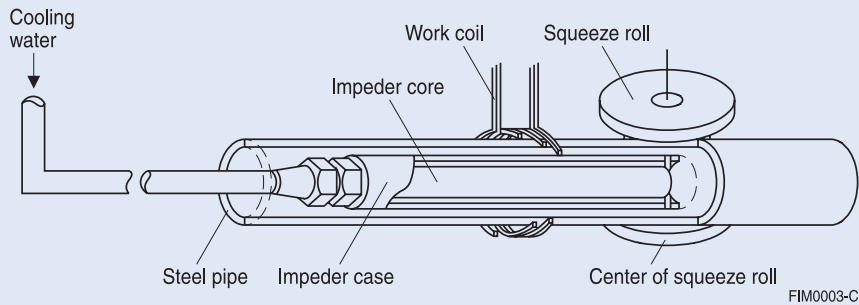
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# Impeder Cores for High Frequency Welding

## Application: pipe welding



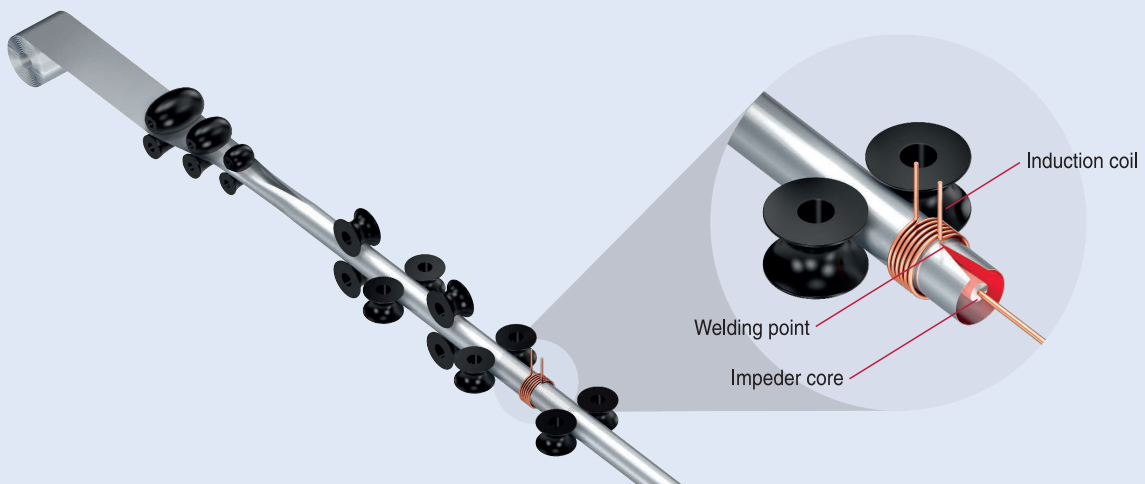
An impeder core is an essential accessory for welding tubes and pipes using high frequency waveguide heating. The impeder core concentrates the magnetic flux generated by the work coil into the area of the pipe joint. Consequently, using an impeder core greatly increases the efficiency of the welding process.

The characteristics and durability of the impeder core have a significant effect on the efficiency and stability of the welding process.

Thanks to advances in technology and experience gained from manufacturing with IP1 (TDK's previous impeder material), the IPH material has been introduced on the market to provide higher efficiency, better energy savings, and longer lifetimes.

Recent developments have led to a new material, IPH2, with improved properties compared to the previous IPH material.

## Material features



TDK has introduced IPH2 material, which has lower reluctance than the original IPH material at higher temperatures. IPH2 material is tuned to have lower loss closer to the application temperature. It has a slightly higher saturation flux density than the well-accepted IPH material currently in use in the industry.

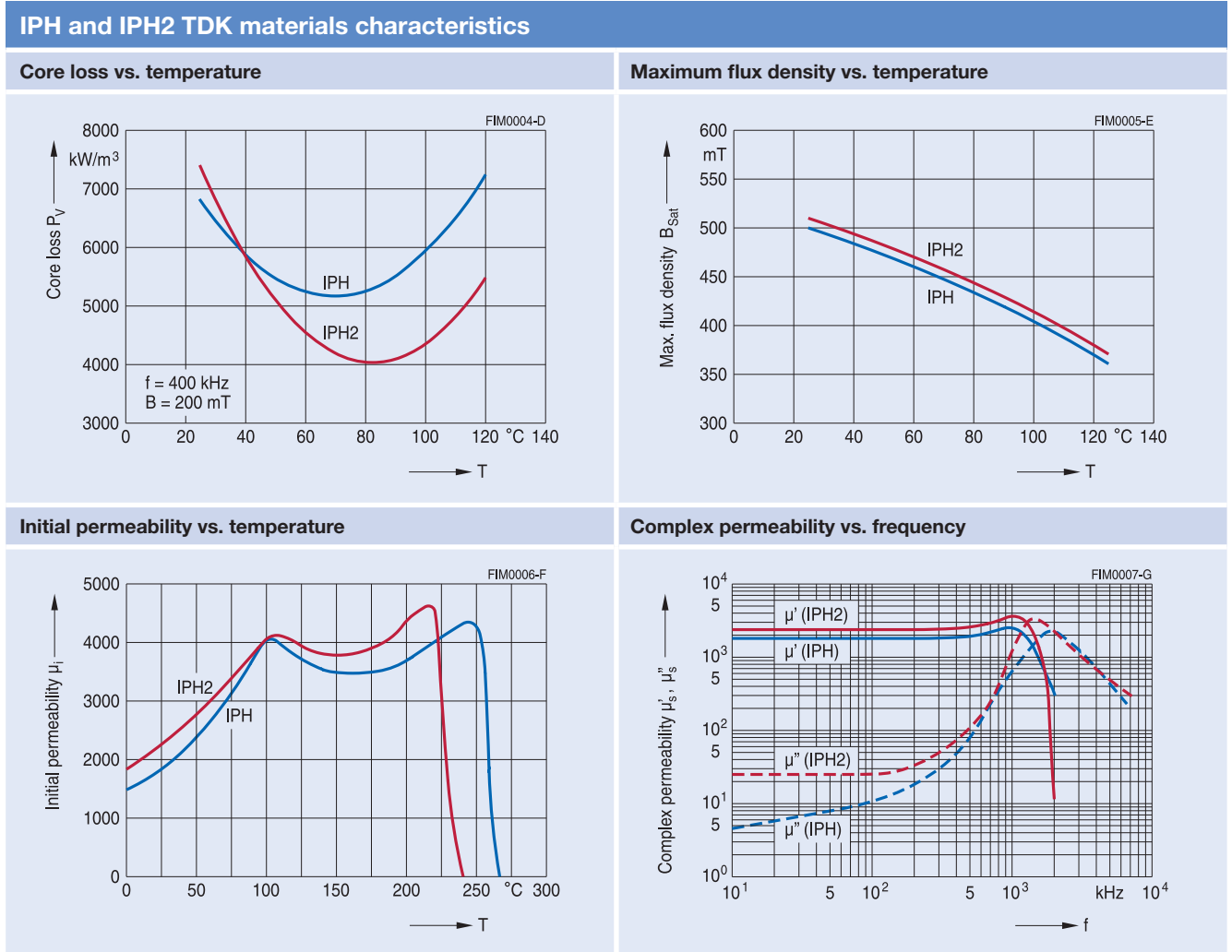
IPH2 material will also allow using an extended range of frequency compared to IPH material in welding applications. As a result of these improved features, IPH2 material will further improve the efficiency of the welding process.

# Impeder Cores for High Frequency Welding



TDK materials properties <sup>1)</sup>				
Preferred application			High frequency power transformer for welding applications	
Material			IPH	IPH2
Base material			MnZn	MnZn
	Symbol	Unit		
Initial permeability (T = 25 °C)	$\mu_i$		1800 ±25%	2300 ±25%
Saturation flux density (H = 1200 A/m, f = 10 kHz, 25 °C)	$B_{Sat}$	mT	500	510
Relative core losses (typical values)	$P_v$			
400 kHz, 200 mT, 100 °C		kW/m <sup>3</sup>	< 10000	< 8500
500 kHz, 100 mT, 100 °C		kW/m <sup>3</sup>	–	< 3500
Curie temperature	$T_c$	°C	> 260	> 230
Density (typical values)		kg/m <sup>3</sup>	4800	4850
Resistivity	$\rho$	$\Omega$ m	3	8

<sup>1)</sup> Measurements are based on a toroidal core.



# Impeder Cores for High Frequency Welding



## Impeder cores ZR, ZRH, ZRS, ZRSH-SQ series overview

Impeder types	Features	Core shape
ZR	<ul style="list-style-type: none"> <li>Truncated circular cross section</li> <li>Widely used in small pipes</li> <li>Medium or large cores can be combined to make a multiple-core impeder</li> </ul>	<p>FIM0008-H</p>
ZRH	<ul style="list-style-type: none"> <li>Tubular type with the center hole permitting the flow of cooling water</li> <li>Used individually, in both small and large diameter pipes</li> <li>A service bit can be passed through the center hole, but please be very careful when using a service bit, as the condition of the center hole may make insertion of the bit difficult</li> </ul>	<p>FIM0009-I</p>
ZRS	<ul style="list-style-type: none"> <li>Features deep grooves that permit optimal cooling of the entire core</li> </ul>	<p>FIM0010-J</p>
ZRSH	<ul style="list-style-type: none"> <li>Combines the features of the ZRS and ZRH types</li> <li>A service bit can be passed through the center hole, but please be very careful when using a service bit, as the condition of the center hole may make insertion of the bit difficult</li> </ul>	<p>FIM0011-K</p>
ZRSH (SQW)	<ul style="list-style-type: none"> <li>ZRSH square type</li> <li>Used in Modular Impeder Clusters for induction welding medium to large diameter pipe</li> </ul>	<p>FIM0012-L</p>

## Dimensions

- Impeder cores have a length  $L = (200 \pm 3.0)$  mm or  $(7.874 \pm 0.118)$  inches
- For  $D_o > 22$  mm the total length is realized by bonding pieces together end to end
- The number of bonded pieces, lengthwise, is mentioned for each type in the respective tables

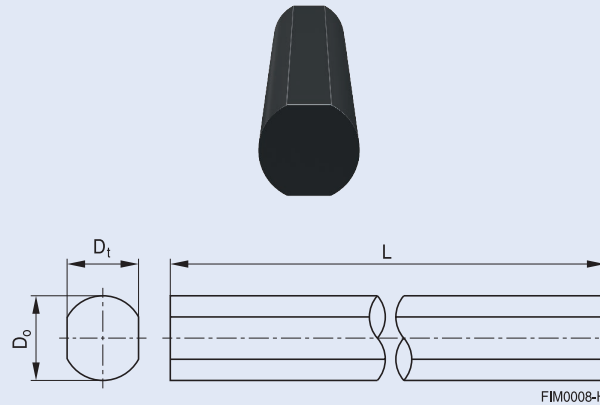
## Caution

Please take care to use an impeder case with an appropriate internal diameter only. It may not be possible to insert an impeder core into an impeder case that is smaller than the recommended internal diameter. Before using this product, please note that it is not guaranteed for use as anything other than an impeder.

# Impeder Cores for High Frequency Welding ZR Series



## Impeder cores ZR series



Type	Part no. IPH (* = 0) IPH2 (* = 1)	External diameter (D <sub>o</sub> )		Truncated length (D <sub>i</sub> , reference)		Number of pieces joined	Impeder case internal diameter <sup>1)</sup> mm
		mm	inch	mm	inch		
ZR 3/200	B67410Z0100X69*	3±0.20	0.118±0.008	2.7	0.106	1 piece	4
ZR 4/200	B67410Z0101X69*	4±0.20	0.157±0.008	3.6	0.142	1 piece	5
ZR 5/200	B67410Z0102X69*	5±0.25	0.197±0.010	4.5	0.177	1 piece	6
ZR 6/200	B67410Z0103X69*	6±0.25	0.236±0.010	5.4	0.213	1 piece	7
ZR 7/200	B67410Z0104X69*	7±0.20	0.276±0.008	6.3	0.248	1 piece	8
ZR 8/200	B67410Z0105X69*	8±0.20	0.315±0.008	7.2	0.283	1 piece	9
ZR 9/200	B67410Z0106X69*	9±0.25	0.354±0.010	8.1	0.319	1 piece	10
ZR 10/200	B67410Z0107X69*	10±0.25	0.394±0.010	9.0	0.354	1 piece	11
ZR 11/200	B67410Z0108X69*	11±0.30	0.433±0.012	9.9	0.390	1 piece	12
ZR 12/200	B67410Z0109X69*	12±0.30	0.472±0.012	10.8	0.425	1 piece	13
ZR 13/200	B67410Z0110X69*	13±0.35	0.512±0.014	11.7	0.461	1 piece	14
ZR 14/200	B67410Z0111X69*	14±0.35	0.551±0.014	12.6	0.496	1 piece	15
ZR 15/200	B67410Z0112X69*	15±0.40	0.591±0.016	13.5	0.531	1 piece	16
ZR 16/200 <sup>2)</sup>	B67410Z0113X69*	16±0.40	0.630±0.016	14.4	0.567	1 piece	17
ZR 17/200 <sup>2)</sup>	B67410Z0114X69*	17±0.45	0.669±0.018	15.3	0.602	1 piece	18
ZR 18/200 <sup>2)</sup>	B67410Z0115X69*	18±0.45	0.709±0.018	16.2	0.638	1 piece	19
ZR 19/200 <sup>2)</sup>	B67410Z0116X69*	19±0.50	0.748±0.020	17.1	0.673	1 piece	20
ZR 20/200	B67410Z0117X69*	20±0.50	0.787±0.020	18.0	0.709	1 piece	21
ZR 21/200 <sup>2)</sup>	B67410Z0118X69*	21±0.55	0.827±0.022	18.9	0.744	1 piece	22

<sup>1)</sup> Recommended value

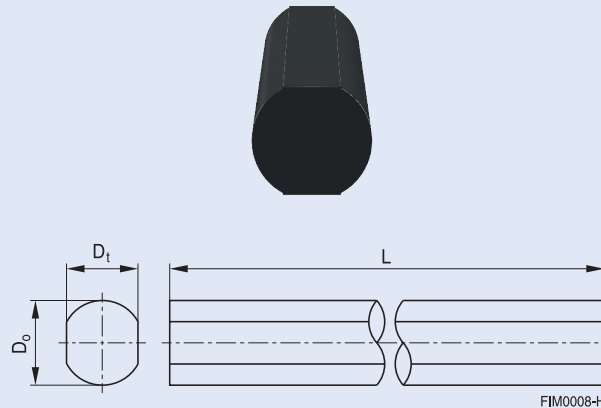
<sup>2)</sup> Availability on request



# Impeder Cores for High Frequency Welding ZR Series



## Impeder cores ZR series



Type	Part no. IPH (* = 0) IPH2 (* = 1)	External diameter (D <sub>o</sub> )		Truncated length (D <sub>i</sub> , reference)		Number of pieces joined	Impeder case internal diameter <sup>1)</sup>
		mm	inch	mm	inch		
ZR 22/200 <sup>2)</sup>	B67410Z0119X69*	22±0.55	0.866±0.022	19.8	0.780	1 piece	23
ZR 23/200 <sup>2)</sup>	B67410Z0120X69*	23±0.60	0.906±0.024	20.7	0.815	2 pieces	24
ZR 24/200 <sup>2)</sup>	B67410Z0121X69*	24±0.60	0.945±0.024	21.6	0.850	2 pieces	25
ZR 25/200 <sup>2)</sup>	B67410Z0122X69*	25±0.65	0.984±0.026	22.5	0.886	2 pieces	26
ZR 26/200 <sup>2)</sup>	B67410Z0123X69*	26±0.65	1.024±0.026	23.4	0.921	2 pieces	27
ZR 27/200 <sup>2)</sup>	B67410Z0124X69*	27±0.70	1.063±0.028	24.3	0.957	8 pieces	28
ZR 28/200 <sup>2)</sup>	B67410Z0125X69*	28±0.70	1.102±0.028	25.2	0.992	8 pieces	29
ZR 29/200 <sup>2)</sup>	B67410Z0126X69*	29±0.75	1.142±0.030	26.1	1.028	8 pieces	30
ZR 30/200 <sup>2)</sup>	B67410Z0127X69*	30±0.75	1.181±0.030	27.0	1.063	8 pieces	31
ZR 35/200 <sup>2)</sup>	B67410Z0128X69*	35±0.90	1.378±0.035	31.5	1.240	10 pieces	37
ZR 40/200 <sup>2)</sup>	B67410Z0129X69*	40±1.00	1.575±0.039	36.0	1.417	10 pieces	42
ZR 3/100 <sup>3)</sup>	B67410Z0130X69*	3±0.20	0.118±0.008	2.7	0.106	1 piece	4
ZR 4/100 <sup>3)</sup>	B67410Z0131X69*	4±0.20	0.157±0.008	3.6	0.142	1 piece	5
ZR 5/100 <sup>3)</sup>	B67410Z0132X69*	5±0.25	0.197±0.010	4.5	0.177	1 piece	6
ZR 6/200	B67410Z0133X69*	6±0.25	0.236±0.010	5.4	0.213	1 piece	7
ZR 8/100 <sup>3)</sup>	B67410Z0134X69*	8±0.20	0.315±0.008	7.2	0.283	1 piece	9
ZR 10/100 <sup>3)</sup>	B67410Z0135X69*	10±0.25	0.394±0.010	9.0	0.354	1 piece	11
ZR 12/100 <sup>3)</sup>	B67410Z0136X69*	12±0.30	0.472±0.012	10.8	0.425	1 piece	13

<sup>1)</sup> Recommended value

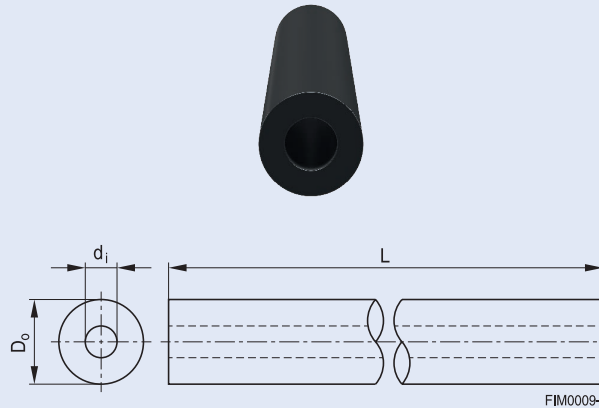
<sup>2)</sup> Availability on request

<sup>3)</sup> Length = (100 ±1.5) mm

# Impeder Cores for High Frequency Welding ZRH Series



## Impeder cores ZRH series



Type	Part no. IPH (* = 0) IPH2 (* = 1)	External diameter (D <sub>o</sub> )		Internal diameter (d <sub>i</sub> )		Number of pieces joined	Impeder case internal diameter <sup>1)</sup> mm
		mm	inch	mm	inch		
ZRH 6/200/3	B67410Z0200X69*	6±0.25	0.236±0.010	3±0.20	0.118±0.008	1 piece	7
ZRH 7/200/3 <sup>2)</sup>	B67410Z0201X69*	7±0.25	0.276±0.010	3±0.20	0.118±0.008	1 piece	8
ZRH 8/200/4 <sup>2)</sup>	B67410Z0202X69*	8±0.25	0.315±0.010	4±0.20	0.157±0.008	1 piece	9
ZRH 9/200/4 <sup>2)</sup>	B67410Z0203X69*	9±0.30	0.354±0.012	4±0.20	0.157±0.008	1 piece	10
ZRH 10/200/5	B67410Z0204X69*	10±0.30	0.394±0.012	5±0.25	0.197±0.010	1 piece	11
ZRH 11/200/5	B67410Z0205X69*	11±0.35	0.433±0.014	5±0.25	0.197±0.010	1 piece	12
ZRH 12/200/5	B67410Z0247X69*	12±0.35	0.472±0.014	5±0.25	0.197±0.010	1 piece	13
ZRH 12/200/6	B67410Z0206X69*	12±0.35	0.472±0.014	6±0.25	0.236±0.010	1 piece	13
ZRH 12/200/7	B67410Z0244X69*	12±0.35	0.472±0.014	7±0.25	0.276±0.010	1 piece	13
ZRH 13/200/6	B67410Z0207X69*	13±0.40	0.512±0.016	6±0.25	0.236±0.010	1 piece	14
ZRH 13/200/7	B67410Z0246X69*	13±0.40	0.512±0.016	7±0.25	0.276±0.010	1 piece	14
ZRH 14/200/7	B67410Z0208X69*	14±0.40	0.551±0.016	7±0.25	0.276±0.010	1 piece	15
ZRH 15/200/7	B67410Z0209X69*	15±0.45	0.591±0.018	7±0.25	0.276±0.010	1 piece	16
ZRH 16/200/8	B67410Z0210X69*	16±0.50	0.630±0.020	8±0.25	0.315±0.010	1 piece	17
ZRH 17/200/8	B67410Z0211X69*	17±0.50	0.669±0.020	8±0.25	0.315±0.010	1 piece	18
ZRH 18/200/9	B67410Z0212X69*	18±0.55	0.709±0.022	9±0.30	0.354±0.012	1 piece	19
ZRH 18/200/12	B67410Z0245X69*	18±0.55	0.709±0.022	12±0.40	0.472±0.016	1 piece	19
ZRH 19/200/9 <sup>2)</sup>	B67410Z0213X69*	19±0.55	0.748±0.022	9±0.30	0.354±0.012	1 piece	20
ZRH 20/200/10	B67410Z0214X69*	20±0.60	0.787±0.024	10±0.30	0.394±0.012	1 piece	21

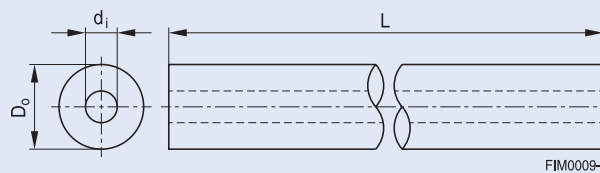
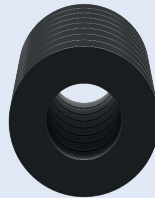
<sup>1)</sup> Recommended value

<sup>2)</sup> Availability on request

# Impeder Cores for High Frequency Welding ZRH Series



## Impeder cores ZRH series



FIM0009-I

Type	Part no. IPH (* = 0) IPH2 (* = 1)	External diameter (D <sub>o</sub> )		Internal diameter (d <sub>i</sub> )		Number of pieces joined	Impeder case internal diameter <sup>1)</sup>
		mm	inch	mm	inch		
ZRH 21/200/10 <sup>2)</sup>	B67410Z0215X69*	21±0.60	0.827±0.024	10±0.30	0.394±0.012	1 piece	22
ZRH 22/200/11	B67410Z0216X69*	22±0.65	0.866±0.026	11±0.35	0.433±0.014	1 piece	23
ZRH 23/200/11 <sup>2)</sup>	B67410Z0217X69*	23±0.60	0.906±0.024	11±0.30	0.433±0.012	8 pieces	24
ZRH 24/200/12 <sup>2)</sup>	B67410Z0218X69*	24±0.60	0.945±0.024	12±0.30	0.472±0.012	8 pieces	25
ZRH 25/200/12 <sup>2)</sup>	B67410Z0219X69*	25±0.65	0.984±0.026	12±0.30	0.472±0.012	8 pieces	26
ZRH 26/200/13 <sup>2)</sup>	B67410Z0220X69*	26±0.65	1.024±0.026	13±0.35	0.512±0.014	8 pieces	27
ZRH 27/200/13 <sup>2)</sup>	B67410Z0221X69*	27±0.70	1.063±0.028	13±0.35	0.512±0.014	8 pieces	28
ZRH 28/200/14 <sup>2)</sup>	B67410Z0222X69*	28±0.70	1.102±0.028	14±0.35	0.551±0.014	8 pieces	29
ZRH 29/200/14 <sup>2)</sup>	B67410Z0223X69*	29±0.75	1.142±0.030	14±0.35	0.551±0.014	8 pieces	30
ZRH 30/200/15 <sup>2)</sup>	B67410Z0224X69*	30±0.75	1.181±0.030	15±0.40	0.591±0.016	8 pieces	31
ZRH 32/200/16 <sup>2)</sup>	B67410Z0225X69*	32±0.80	1.260±0.031	16±0.40	0.630±0.016	8 pieces	34
ZRH 34/200/17 <sup>2)</sup>	B67410Z0226X69*	34±0.85	1.339±0.033	17±0.45	0.669±0.018	8 pieces	36
ZRH 36/200/18 <sup>2)</sup>	B67410Z0227X69*	36±0.90	1.417±0.035	18±0.45	0.709±0.018	8 pieces	38
ZRH 38/200/19 <sup>2)</sup>	B67410Z0228X69*	38±0.95	1.496±0.037	19±0.50	0.748±0.020	8 pieces	40
ZRH 40/200/20 <sup>2)</sup>	B67410Z0229X69*	40±1.00	1.575±0.039	20±0.50	0.787±0.020	8 pieces	42
ZRH 42/200/21 <sup>2)</sup>	B67410Z0230X69*	42±1.05	1.654±0.041	21±0.55	0.827±0.022	8 pieces	44
ZRH 44/200/22 <sup>2)</sup>	B67410Z0231X69*	44±1.10	1.732±0.043	22±0.55	0.866±0.022	8 pieces	46
ZRH 46/200/23 <sup>2)</sup>	B67410Z0232X69*	46±1.15	1.811±0.045	23±0.60	0.906±0.024	8 pieces	48
ZRH 48/200/24 <sup>2)</sup>	B67410Z0233X69*	48±1.20	1.890±0.047	24±0.60	0.945±0.024	8 pieces	50

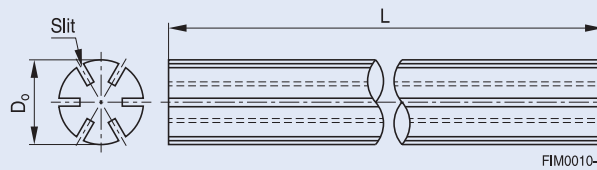
<sup>1)</sup> Recommended value

<sup>2)</sup> Availability on request

# Impeder Cores for High Frequency Welding ZRS Series



## Impeder cores ZRS series



FIM0010-J

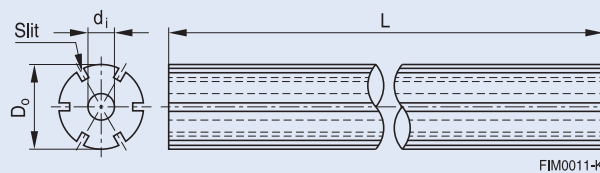
Type	Part no. IPH (* = 0) IPH2 (* = 1)	External diameter (D <sub>o</sub> )		Number of slits	Number of pieces joined	Impeder case internal diameter <sup>1)</sup>
		mm	inch			mm
ZRS 5/200	B67410Z0300X69*	5.0±0.25	0.197±0.010	6	1 piece	6
ZRS 6/200	B67410Z0301X69*	6.0±0.25	0.236±0.010	6	1 piece	7
ZRS 6.2/200	B67410Z0336X69*	6.2±0.25	0.244±0.010	6	1 piece	7
ZRS 7/200	B67410Z0302X69*	7.0±0.25	0.276±0.010	6	1 piece	8
ZRS 7.5/200	B67410Z0323X69*	7.5±0.25	0.295±0.010	6	1 piece	9
ZRS 8/200	B67410Z0303X69*	8.0±0.25	0.315±0.010	6	1 piece	9
ZRS 8.5/200	B67410Z0324X69*	8.5±0.25	0.335±0.010	6	1 piece	10
ZRS 9/200	B67410Z0304X69*	9.0±0.30	0.354±0.012	6	1 piece	10
ZRS 9.5/200	B67410Z0325X69*	9.5±0.30	0.374±0.012	6	1 piece	11
ZRS 10/200	B67410Z0305X69*	10.0±0.30	0.394±0.012	8	1 piece	11
ZRS 10.5/200	B67410Z0326X69*	10.5±0.35	0.413±0.014	6	1 piece	12
ZRS 11/200	B67410Z0306X69*	11.0±0.35	0.433±0.014	8	1 piece	12
ZRS 12/200	B67410Z0307X69*	12.0±0.35	0.472±0.014	8	1 piece	13
ZRS 13/200	B67410Z0308X69*	13.0±0.40	0.512±0.016	8	1 piece	14
ZRS 14/200	B67410Z0309X69*	14.0±0.40	0.551±0.016	8	1 piece	15
ZRS 15/200	B67410Z0310X69*	15.0±0.45	0.591±0.018	8	1 piece	16
ZRS 16/200	B67410Z0311X69*	16.0±0.50	0.630±0.020	8	1 piece	17
ZRS 17/200	B67410Z0312X69*	17.0±0.50	0.669±0.020	8	1 piece	18
ZRS 18/200	B67410Z0313X69*	18.0±0.55	0.709±0.022	8	1 piece	19
ZRS 19/200	B67410Z0314X69*	19.0±0.55	0.748±0.022	8	1 piece	20
ZRS 20/200	B67410Z0315X69*	20.0±0.60	0.787±0.024	8	1 piece	21
ZRS 21/200	B67410Z0316X69*	21.0±0.60	0.827±0.024	8	1 piece	22
ZRS 22/200	B67410Z0317X69*	22.0±0.55	0.866±0.022	8	8 pieces	23
ZRS 23/200	B67410Z0318X69*	23.0±0.60	0.906±0.024	8	8 pieces	24
ZRS 24/200	B67410Z0319X69*	24.0±0.60	0.945±0.024	8	8 pieces	25
ZRS 25/200	B67410Z0320X69*	25.0±0.65	0.984±0.026	8	8 pieces	26
ZRS 27/200	B67410Z0322X69*	27.0±0.75	1.063±0.030	8	8 pieces	28
ZRS 30/200	B67410Z0321X69*	30.0±0.75	1.181±0.030	8	8 pieces	31

<sup>1)</sup> Recommended value

# Impeder Cores for High Frequency Welding ZRSH Series



## Impeder cores ZRSH Series



FIM0011-K

Type	Part no. IPH (* = 0) IPH2 (* = 1)	External diameter (D <sub>o</sub> )		Internal diameter (d <sub>i</sub> )		Number of slits	Number of pieces joined	Impeder case internal diameter <sup>1)</sup>
		mm	inch	mm	inch			mm
ZRSH 7.5/200/3	B67410Z0487X69*	7.5±0.25	0.295±0.010	3±0.20	0.118±0.008	6	1 piece	9
ZRSH 8/200/3 <sup>2)</sup>	B67410Z0464X69*	8.0±0.25	0.315±0.010	3±0.20	0.118±0.008	8	1 piece	9
ZRSH 8/200/4	B67410Z0437X69*	8.0±0.30	0.315±0.012	4±0.20	0.157±0.008	6	1 piece	9
ZRSH 8.5/200/3	B67410Z0488X69*	8.5±0.30	0.335±0.012	3±0.20	0.118±0.008	8	1 piece	10
ZRSH 9/200/3 <sup>2)</sup>	B67410Z0465X69*	9.0±0.30	0.354±0.012	3±0.20	0.118±0.008	8	1 piece	10
ZRSH 9/200/4	B67410Z0426X69*	9.0±0.30	0.354±0.012	4±0.20	0.157±0.008	8	1 piece	10
ZRSH 9.5/200/3	B67410Z0489X69*	9.5±0.30	0.374±0.012	3±0.20	0.118±0.008	8	1 piece	11
ZRSH 10/200/3	B67410Z0400X69*	10.0±0.30	0.394±0.012	3±0.20	0.118±0.008	8	1 piece	11
ZRSH 10/200/5	B67410Z0438X69*	10.0±0.30	0.394±0.012	5±0.25	0.197±0.010	8	1 piece	11
ZRSH 10.5/200/3	B67410Z0490X69*	10.5±0.35	0.413±0.014	3±0.20	0.118±0.008	8	1 piece	12
ZRSH 11/200/3	B67410Z0401X69*	11.0±0.35	0.433±0.014	3±0.20	0.118±0.008	8	1 piece	12
ZRSH 11/200/5	B67410Z0427X69*	11.0±0.35	0.433±0.014	5±0.25	0.197±0.010	8	1 piece	12
ZRSH 12/200/3	B67410Z0402X69*	12.0±0.35	0.472±0.014	3±0.20	0.118±0.008	8	1 piece	13
ZRSH 12/200/5	B67410Z0439X69*	12.0±0.35	0.472±0.014	5±0.25	0.197±0.010	8	1 piece	13
ZRSH 12/200/6	B67410Z0428X69*	12.0±0.35	0.472±0.014	6±0.25	0.236±0.010	8	1 piece	13
ZRSH 13/200/5	B67410Z0403X69*	13.0±0.40	0.512±0.016	5±0.25	0.197±0.010	8	1 piece	14
ZRSH 13/200/7	B67410Z0429X69*	13.0±0.40	0.512±0.016	7±0.25	0.276±0.010	8	1 piece	14
ZRSH 14/200/3 <sup>2)</sup>	B67410Z0441X69*	14.0±0.40	0.551±0.016	3±0.20	0.118±0.008	8	1 piece	15
ZRSH 14/200/5	B67410Z0404X69*	14.0±0.40	0.551±0.016	5±0.25	0.197±0.010	8	1 piece	15
ZRSH 14/200/7	B67410Z0430X69*	14.0±0.40	0.551±0.016	7±0.25	0.276±0.010	8	1 piece	15
ZRSH 15/200/5	B67410Z0405X69*	15.0±0.45	0.591±0.018	5±0.25	0.197±0.010	8	1 piece	16

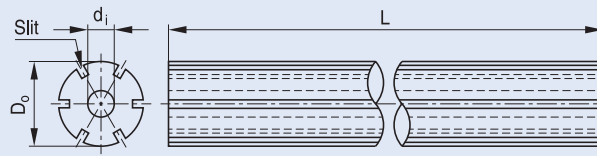
<sup>1)</sup> Recommended value

<sup>2)</sup> Availability on request

# Impeder Cores for High Frequency Welding ZRSH Series



## Impeder cores ZRSH Series



FIM0011-K

Type	Part no. IPH (* = 0) IPH2 (* = 1)	External diameter (D <sub>o</sub> )		Internal diameter (d)		Number of slits	Number of pieces joined	Impeder case internal diameter <sup>1)</sup>
		mm	inch	mm	inch			
ZRSH 15/200/7	B67410Z0431X69*	15±0.45	0.591±0.018	7±0.25	0.276±0.010	8	1 piece	16
ZRSH 16/200/5	B67410Z0406X69*	16±0.50	0.630±0.020	5±0.25	0.197±0.010	8	1 piece	17
ZRSH 16/200/6 <sup>2)</sup>	B67410Z0466X69*	16±0.50	0.630±0.020	6±0.25	0.236±0.010	8	1 piece	17
ZRSH 16/200/7	B67410Z0432X69*	16±0.50	0.630±0.020	7±0.25	0.276±0.010	8	1 piece	17
ZRSH 16/200/8	B67410Z0474X69*	16±0.50	0.630±0.020	8±0.25	0.315±0.010	8	1 piece	17
ZRSH 17/200/5	B67410Z0407X69*	17±0.50	0.669±0.020	5±0.25	0.197±0.010	8	1 piece	18
ZRSH 17/200/7	B67410Z0433X69*	17±0.50	0.669±0.020	7±0.25	0.276±0.010	8	1 piece	18
ZRSH 17/200/8 <sup>2)</sup>	B67410Z0442X69*	17±0.50	0.669±0.020	8±0.25	0.315±0.010	8	1 piece	18
ZRSH 18/200/5	B67410Z0408X69*	18±0.55	0.709±0.022	5±0.25	0.197±0.010	8	1 piece	19
ZRSH 18/200/5 <sup>3)</sup>	B67410Z0482X69*	18±0.55	0.709±0.022	5±0.25	0.197±0.010	8	1 piece	19
ZRSH 18/200/6 <sup>2)</sup>	B67410Z0475X69*	18±0.55	0.709±0.022	6±0.25	0.236±0.010	8	4 pieces	19
ZRSH 18/200/8	B67410Z0443X69*	18±0.55	0.709±0.022	8±0.25	0.315±0.010	8	1 piece	19
ZRSH 18/200/9	B67410Z0434X69*	18±0.55	0.709±0.022	9±0.30	0.354±0.012	8	1 piece	19
ZRSH 18/200/9 <sup>3)</sup>	B67410Z0484X69*	18±0.55	0.709±0.022	9±0.30	0.354±0.012	8	4 pieces	19
ZRSH 19/200/6 <sup>2)</sup>	B67410Z0409X69*	19±0.55	0.748±0.022	6±0.25	0.236±0.010	8	1 piece	20
ZRSH 19/200/9 <sup>2)</sup>	B67410Z0476X69*	19±0.55	0.748±0.022	9±0.30	0.354±0.012	8	1 piece	20
ZRSH 20/200/6	B67410Z0410X69*	20±0.60	0.787±0.024	6±0.25	0.236±0.010	8	1 piece	21
ZRSH 20/200/6 <sup>3)</sup>	B67410Z0483X69*	20±0.60	0.787±0.024	6±0.25	0.236±0.010	8	4 pieces	21
ZRSH 20/200/10	B67410Z0440X69*	20±0.60	0.787±0.024	10±0.30	0.394±0.010	8	1 piece	21
ZRSH 20/200/10 <sup>3)</sup>	B67410Z0485X69*	20±0.60	0.787±0.024	10±0.30	0.394±0.010	8	4 pieces	21
ZRSH 20/200/11 <sup>2)</sup>	B67410Z0444X69*	20±0.60	0.787±0.024	11±0.35	0.433±0.014	8	1 piece	21

<sup>1)</sup> Recommended value

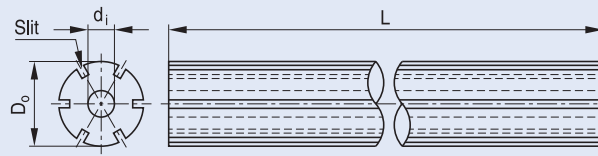
<sup>2)</sup> Availability on request

<sup>3)</sup> Also as pressed & glued type

# Impeder Cores for High Frequency Welding ZRSH Series



## Impeder cores ZRSH Series



FIM0011-K

Type	Part no. IPH (* = 0) IPH2 (* = 1)	External diameter (D <sub>o</sub> )		Internal diameter (d <sub>i</sub> )		Number of slits	Number of pieces joined	Impeder case internal diameter <sup>1)</sup>
		mm	inch	mm	inch			mm
ZRSH 21/200/6	B67410Z0411X69*	21±0.60	0.827±0.024	6±0.25	0.236±0.010	8	1 piece	22
ZRSH 21/200/10	B67410Z0435X69*	21±0.60	0.827±0.024	10±0.30	0.394±0.012	8	1 piece	22
ZRSH 21/200/10 <sup>4)</sup>	B67410Z0480X69*	21±0.60	0.827±0.024	10±0.30	0.394±0.012	8	4 pieces	22
ZRSH 22/200/6 <sup>2)</sup>	B67410Z0412X69*	22±0.65	0.866±0.026	6±0.25	0.236±0.010	8	1 piece	23
ZRSH 22/200/10	B67410Z0436X69*	22±0.65	0.866±0.026	10±0.30	0.394±0.012	8	1 piece	23
ZRSH 23/200/6 <sup>2)</sup>	B67410Z0413X69*	23±0.70	0.906±0.028	6±0.25	0.236±0.010	8	8 pieces	24
ZRSH 23/200/11	B67410Z0450X69*	23±0.60	0.906±0.024	11±0.30	0.433±0.012	8	8 pieces	24
ZRSH 24/200/11	B67410Z0420X69*	24±0.60	0.945±0.024	11±0.30	0.433±0.012	8	8 pieces	25
ZRSH 24/200/12 <sup>2)</sup>	B67410Z0453X69*	24±0.60	0.945±0.024	12±0.35	0.472±0.014	8	8 pieces	25
ZRSH 25/200/10	B67410Z0414X69*	25±0.65	0.984±0.026	10±0.25	0.394±0.010	8	8 pieces	26
ZRSH 25/200/12	B67410Z0451X69*	25±0.65	0.984±0.026	12±0.35	0.472±0.014	8	8 pieces	26
ZRSH 26/200/13 <sup>2)</sup>	B67410Z0415X69*	26±0.65	1.024±0.026	13±0.35	0.512±0.014	8	8 pieces	27
ZRSH 27/200/6 <sup>2)</sup>	B67410Z0463X69*	27±0.65	1.063±0.026	6±0.25	0.236±0.010	8	8 pieces	28
ZRSH 27/200/8 <sup>2)</sup>	B67410Z0462X69*	27±0.65	1.063±0.026	8±0.25	0.315±0.010	8	8 pieces	28
ZRSH 27/100/11 <sup>3)</sup>	B67410Z0422X69*	27±0.70	1.063±0.028	11±0.30	0.433±0.012	8	4 pieces	28
ZRSH 27/200/11	B67410Z0452X69*	27±0.70	1.063±0.028	11±0.30	0.433±0.012	8	8 pieces	28
ZRSH 27/200/13	B67410Z0416X69*	27±0.70	1.063±0.028	13±0.35	0.512±0.014	8	8 pieces	28
ZRSH 28/100/133	B67410Z0467X69*	28±0.70	1.102±0.028	13±0.35	0.512±0.014	8	4 pieces	29
ZRSH 28/200/13	B67410Z0417X69*	28±0.70	1.102±0.028	13±0.25	0.512±0.010	8	8 pieces	29
ZRSH 30/100/14 <sup>3)</sup>	B67410Z0446X69*	30±0.75	1.181±0.030	14±0.35	0.551±0.014	8	4 pieces	31
ZRSH 30/200/15	B67410Z0448X69*	30±0.70	1.181±0.028	15±0.40	0.591±0.016	8	8 pieces	31

<sup>1)</sup> Recommended value

<sup>2)</sup> Availability on request

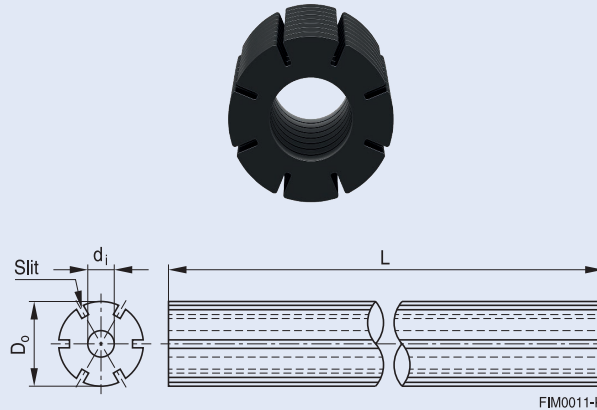
<sup>3)</sup> Length = (100 ± 1.5) mm

<sup>4)</sup> Also as pressed & glued type

# Impeder Cores for High Frequency Welding ZRSH Series



## Impeder cores ZRSH Series



Type	Part no. IPH (* = 0) IPH2 (* = 1)	External diameter (D <sub>o</sub> )		Internal diameter (d <sub>i</sub> )		Number of slits	Number of pieces joined	Impeder case internal diameter <sup>1)</sup>
		mm	inch	mm	inch			
ZRSH 32/200/16	B67410Z0449X69*	32±0.70	1.260±0.028	16±0.40	0.630±0.016	8	8 pieces	34
ZRSH 33/100/14 <sup>3)</sup>	B67410Z0424X69*	33±0.90	1.299±0.035	14±0.35	0.551±0.014	8	4 pieces	34
ZRSH 34/200/17	B67410Z0455X69*	34±0.70	1.339±0.028	17±0.45	0.669±0.018	8	8 pieces	36
ZRSH 34/200/18	B67410Z0456X69*	34±0.70	1.339±0.028	18±0.45	0.709±0.018	8	8 pieces	36
ZRSH 36/100/14 <sup>3)</sup>	B67410Z0468X69*	36±0.90	1.417±0.035	14±0.35	0.551±0.014	8	4 pieces	38
ZRSH 36/200/18	B67410Z0495X69*	36±0.90	1.417±0.035	18±0.45	0.709±0.018	8	8 pieces	38
ZRSH 39/100/20 <sup>3)</sup>	B67410Z0457X69*	39±1.15	1.535±0.045	20±0.55	0.787±0.022	8	4 pieces	41
ZRSH 40/200/20	B67410Z0458X69*	40±1.00	1.575±0.039	20±0.50	0.787±0.020	8	8 pieces	42
ZRSH 42/100/20 <sup>3)</sup>	B67410Z0447X69*	42±1.00	1.654±0.039	20±0.50	0.787±0.020	8	4 pieces	44
ZRSH 44/200/22	B67410Z0459X69*	44±0.80	1.732±0.031	22±0.55	0.866±0.022	8	8 pieces	46
ZRSH 45/100/20 <sup>3)</sup>	B67410Z0454X69*	45±1.10	1.772±0.043	20±0.50	0.787±0.020	8	4 pieces	47
ZRSH 46/200/23	B67410Z0460X69*	46±1.15	1.811±0.045	23±0.60	0.906±0.024	8	8 pieces	48
ZRSH 48/200/24	B67410Z0461X69*	48±1.20	1.890±0.047	23±0.60	0.906±0.024	8	8 pieces	50
ZRSH 49/100/20 <sup>3)</sup>	B67410Z0421X69*	49±1.20	1.929±0.047	20±0.60	0.787±0.024	8	4 pieces	50
ZRSH 55/100/20	B67410Z0425X69*	55±1.50	2.165±0.059	20±0.70	0.787±0.028	8	4 pieces	56
ZRSH 55/200/27	B67410Z0469X69*	55±1.50	2.165±0.059	27±0.70	1.063±0.028	8	8 pieces	57
ZRSH 60/200/30	B67410Z0470X69*	60±1.50	2.362±0.059	30±0.75	1.181±0.030	8	8 pieces	62
ZRSH 65/200/32	B67410Z0471X69*	65±1.65	2.559±0.065	32±0.80	1.260±0.031	8	8 pieces	67
ZRSH 73/200/35	B67410Z0472X69*	73±1.85	2.874±0.073	35±0.90	1.378±0.035	8	8 pieces	76
ZRSH 80/200/40	B67410Z0473X69*	80±2.00	3.150±0.079	40±1.00	1.575±0.039	8	8 pieces	83
ZRSH 80/100/40 <sup>3)</sup>	B67410Z0477X69*	80±2.00	3.150±0.079	40±1.00	1.575±0.039	8	4 pieces	83

<sup>1)</sup> Recommended value

<sup>2)</sup> Availability on request

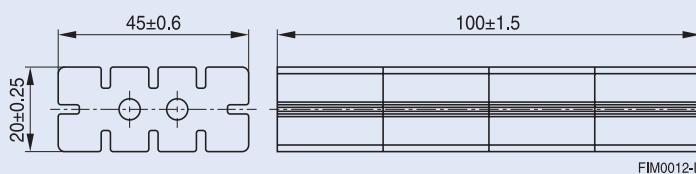
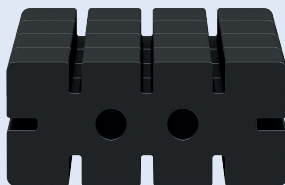
<sup>3)</sup> Length = (100 ± 1.5) mm



# Impeder Cores for High Frequency Welding ZRSH Squared Type



## Impeder cores ZRSH squared type



FIM0012-L

Type	Part no. IPH (* = 0) IPH2 (* = 1)	Width (W)		Height (H)		Number of slits	Number of pieces joined	Impeder case internal dimensions <sup>1)</sup>
		mm	inch	mm	inch			mm
ZRSH 45/100/20SQ	B67410Z0423X69*	45±0.60	1.772±0.024	20±0.25	0.787±0.010	8	4 pieces	47 x 22

<sup>1)</sup> Recommended value

## Compilation of ordering code

First block					Second block					Third block				
B	6	7	4	1	0	Z	0	1	0	7	X	6	9	0

Code for passive components

Family of soft ferrite cores

Impeder core

- \*1 ZR type
- \*2 ZRH type
- \*3 ZRS type
- \*4 ZRSH type

Code number for material:  
690 IPH  
691 IPH2

Dummy character

Serial numbers 00 99  
for sizes of each types

# Cautions and Warnings

## Mechanical stress and mounting

Ferrite cores have to meet mechanical requirements during assembling and for a growing number of applications. Since ferrites are ceramic materials one has to be aware of the special behavior under mechanical load.

As valid for any ceramic material, ferrite cores are brittle and sensitive to any shock, fast temperature changing or tensile load. Especially high cooling rates under ultrasonic cleaning and high static or cyclic loads can cause cracks or failure of the ferrite cores.

For detailed information see data book, chapter "*General - Definitions, 8.1*".

## Effects of core combination on $A_L$ value

Stresses in the core affect not only the mechanical but also the magnetic properties. It is apparent that the initial permeability is dependent on the stress state of the core. The higher the stresses are in the core, the lower is the value for the initial permeability. Thus the embedding medium should have the greatest possible elasticity.

For detailed information see data book, chapter "*General - Definitions, 8.1*".

## Heating up

Ferrites can run hot during operation at higher flux densities and higher frequencies.

## NiZn-materials

The magnetic properties of NiZn-materials can change irreversible in high magnetic fields.

## Ferrite accessories

EPCOS ferrite accessories have been designed and evaluated only in combination with EPCOS ferrite cores. EPCOS explicitly points out that EPCOS ferrite accessories or EPCOS ferrite cores may not be compatible with those of other manufacturers. Any such combination requires prior testing by the customer and will be at the customer's own risk.

EPCOS assumes no warranty or reliability for the combination of EPCOS ferrite accessories with cores and other accessories from any other manufacturer.

## Processing remarks

The start of the winding process should be soft. Else the flanges may be destroyed.

- Too strong winding forces may blast the flanges or squeeze the tube that the cores can not be mounted any more.
- Too long soldering time at high temperature (> 300 °C) may effect coplanarity or pin arrangement.
- Not following the processing notes for soldering of the J-leg terminals may cause solderability
- problems at the transformer because of pollution with Sn oxyde of the tin bath or burned insulation of the wire. For detailed information see chapter "*Processing notes*", section 2.2.
- The dimensions of the hole arrangement have fixed values and should be understood as a recommendation for drilling the printed circuit board. For dimensioning the pins, the group of holes can only be seen under certain conditions, as they fit into the given hole arrangement. To avoid problems when mounting the transformer, the manufacturing tolerances for positioning the customers' drilling process must be considered by increasing the hole diameter.

## Display of ordering codes for EPCOS products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications and the website of EPCOS, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.** Detailed information can be found on the Internet under [www.epcos.com/orderingcodes](http://www.epcos.com/orderingcodes).

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