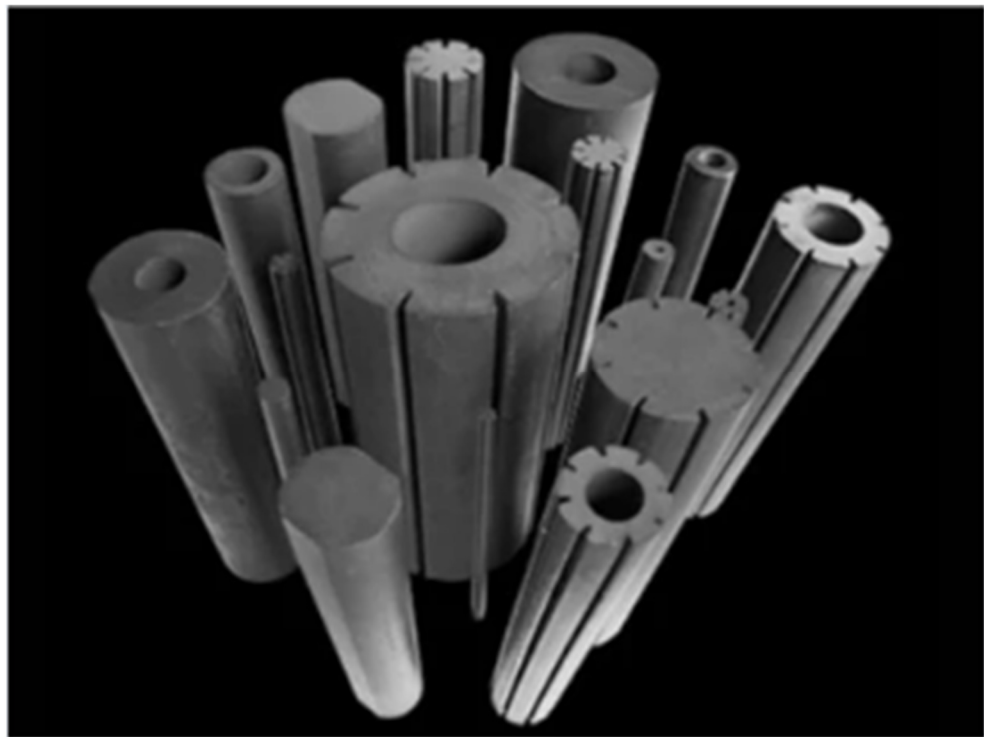




# Impeder Cores

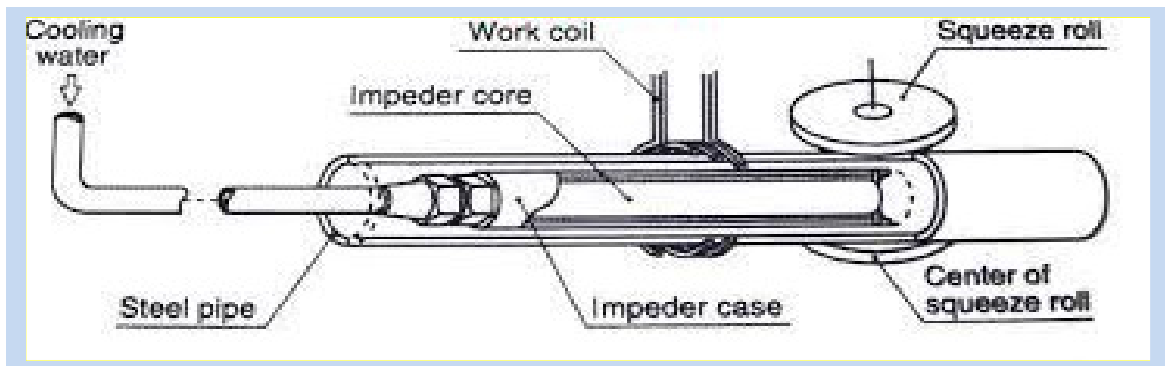
For High Frequency Welding



# Impeder Rods for High Frequency Welding

Cosmo Ferrites introduces a new product series of Impeder rod for high frequency welding applications. An impeder rod is an essential accessory for the welding of tubes and pipes using high frequency wave guide heating. The impeder core concentrates the magnetic flux generated by the work coil into the area of the pipe joint. Impeder core can concentrate magnetic flux at section of a pipe, and increase weld performance.

- Induction heating is the process of heating a metal by eddy current loss.
- Eddy current is introduced by magnetic flux. Using ferrite core, magnetic flux is concentrated.
- It makes heating performance up.
- This principle is the same as induction cooker that is used at household.



For these applications, special ferrite materials are offered. They are having following material properties:

- High flux density with high curie temperature allows for the most demanding welding applications.
- Low losses at high frequency with increase of temperature reduces up heating of the core, which increases the saturation flux density at the working point.
- High resistivity also reduces eddy currents of the core, which would again lead to heating up and lower saturation.
- A high permeability material to ensure optimum flux concentration.

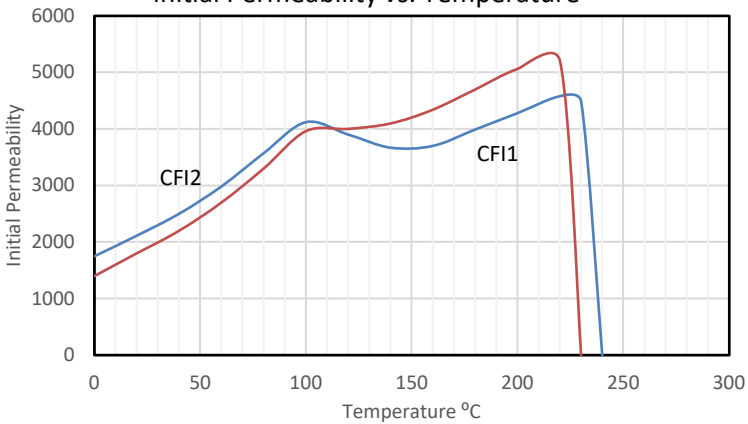
## Impeder Types:

1. CFR (Plain Rod)
2. CFRH (Hollow Rod)
3. CFRS (Solid Fluted Rod)
4. CFRSH (Hollow Fluted Rod)

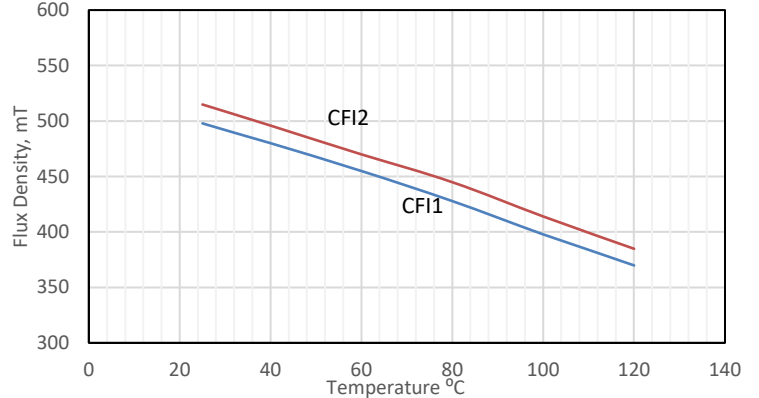
**CFI1 & CFI2 Material Characteristics**

	CONDITIONS	VALUE		UNIT
		CFI1	CFI2	
$\mu_i$		1700 ± 25 %	2200 ± 25 %	
B	25 °C, 10 kHz, 1200 A/m 100 °C, 10 kHz, 1200 A/m	490 390	510 410	mT
$P_v$	100 °C, 400 kHz, 200 mT 100 °C, 500 kHz, 100 mT	<8500	<6500 <3200	kW/m <sup>3</sup>
$\rho$	DC, 25 °C	3	8	$\Omega m$
Tc		>220	>230	°C
Density		4800	4850	kg/m <sup>3</sup>

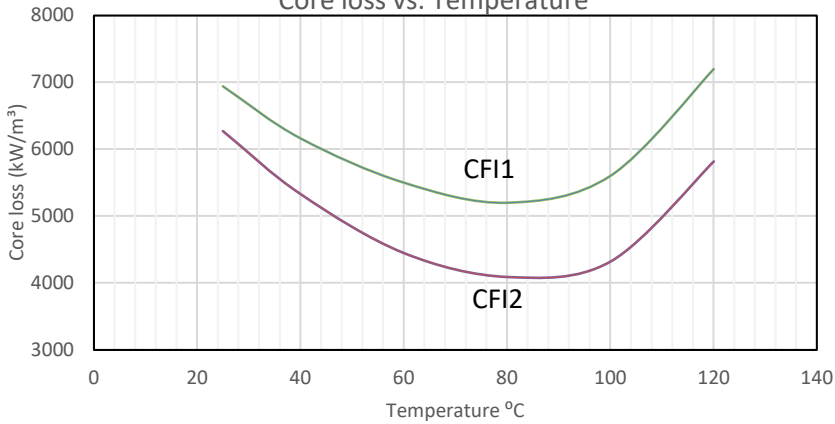
Initial Permeability vs. Temperature



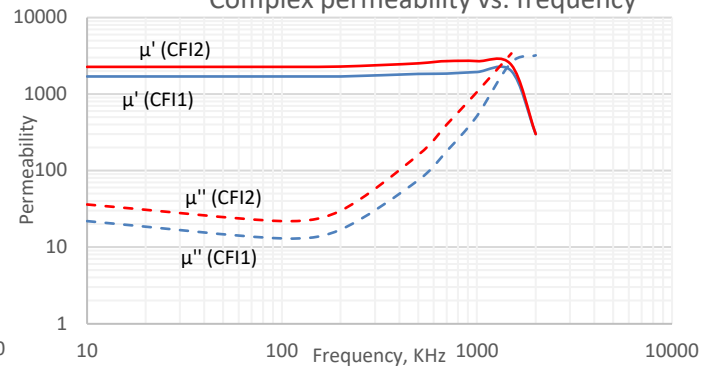
Saturation Flux Density vs. Temperature



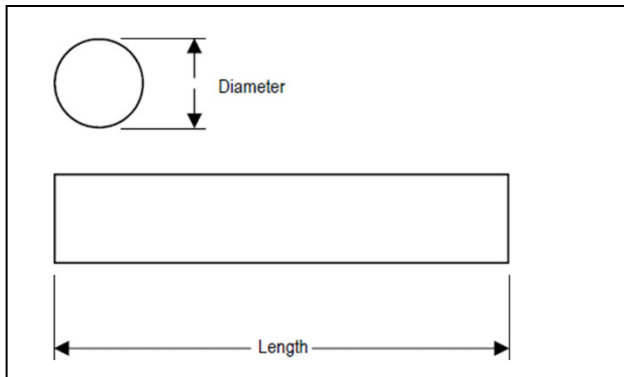
Core loss vs. Temperature



Complex permeability vs. frequency



## CFR Type (Plain Rods)

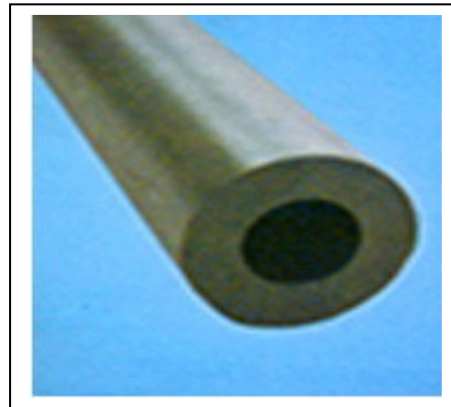
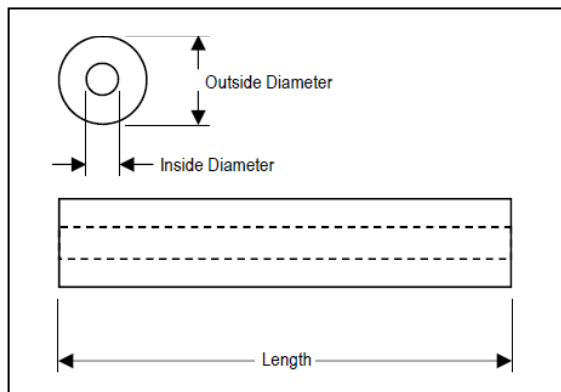


Type	D/mm	Length/mm	Case Internal diameter	Number of pieces joined (mm)
CFR3/200	3 ± 0.3	200 ± 1.0	4	One piece
CFR4/200	4 ± 0.3	200 ± 1.0	5	One piece
CFR5/200	5 ± 0.3	200 ± 1.0	6	One piece
CFR6/200	6 ± 0.3	200 ± 1.0	7	One piece
CFR7/200	7 ± 0.3	200 ± 1.0	8	One piece
CFR8/200	8 ± 0.3	200 ± 1.0	9	One piece
CFR9/200	9 ± 0.3	200 ± 1.0	10	One piece
CFR10/200	10 ± 0.4	200 ± 1.0	11	One piece
CFR11/200	11 ± 0.4	200 ± 1.0	12	One piece
CFR12/200	12 ± 0.4	200 ± 1.0	13	One piece
CFR13/200	13 ± 0.4	200 ± 1.0	14	One piece
CFR14/200	14 ± 0.4	200 ± 1.0	15	One piece
CFR15/200	15 ± 0.5	200 ± 1.0	16	One piece
CFR16/200	16 ± 0.5	200 ± 1.0	17	One piece
CFR17/200	17 ± 0.5	200 ± 1.0	18	One piece
CFR18/200	18 ± 0.6	200 ± 1.0	19	One piece
CFR19/200	19 ± 0.6	200 ± 1.0	20	One piece
CFR20/200	20 ± 0.6	200 ± 1.0	21	One piece

CFR Type (Plain Rods)  
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Type	D/mm	Length/mm	Case Internal diameter	Number of pieces joined (mm)
CFR21/200	21 ± 0.6	200 ± 1.0	22	One piece
CFR22/200	22 ± 0.65	200 ± 1.0	23	One piece
CFR23/200	23 ± 0.7	200 ± 1.0	24	8 Pieces Joined
CFR24/200	24 ± 0.7	200 ± 1.0	25	8 Pieces Joined
CFR25/200	25 ± 0.7	200 ± 1.0	26	8 Pieces Joined
CFR26/200	26 ± 0.7	200 ± 1.0	27	8 Pieces Joined
CFR27/200	27 ± 0.7	200 ± 1.0	28	8 Pieces Joined
CFR28/200	28 ± 0.7	200 ± 1.0	29	8 Pieces Joined
CFR29/200	29 ± 0.7	200 ± 1.0	30	8 Pieces Joined
CFR30/200	30 ± 1.0	200 ± 1.0	31	8 Pieces Joined
CFR35/200	35 ± 1.0	200 ± 1.0	37	8 Pieces Joined
CFR40/200	40 ± 1.0	200 ± 1.0	42	8 Pieces Joined

## CFRH Type (Hollow Rods)

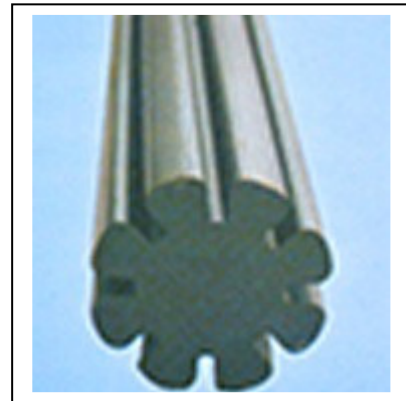
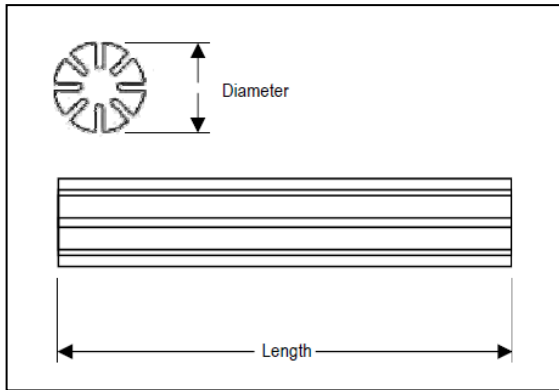


Type	OD/mm	ID/mm	Length/mm	Case Internal diameter	Number of pieces joined (mm)
CFRH 6/3/200	6 ± 0.3	3 ± 0.3	200 ± 1.0	7	One piece
CFRH 7/3/200	7 ± 0.3	3 ± 0.3	200 ± 1.0	8	One piece
CFRH 8/4/200	8 ± 0.3	4 ± 0.3	200 ± 1.0	9	One piece
CFRH 9/4/200	9 ± 0.3	4 ± 0.3	200 ± 1.0	10	One piece
CFRH 10/5/200	10 ± 0.4	5 ± 0.3	200 ± 1.0	11	One piece
CFRH 11/5/200	11 ± 0.4	5 ± 0.3	200 ± 1.0	12	One piece
CFRH 12/6/200	12 ± 0.4	6 ± 0.3	200 ± 1.0	13	One piece
CFRH 13/6/200	13 ± 0.4	6 ± 0.3	200 ± 1.0	14	One piece
CFRH 14/7/200	14 ± 0.4	7 ± 0.3	200 ± 1.0	15	One piece
CFRH 15/7/200	15 ± 0.5	7 ± 0.3	200 ± 1.0	16	One piece
CFRH 16/8/200	16 ± 0.6	8 ± 0.3	200 ± 1.0	17	One piece
CFRH 17/8/200	17 ± 0.6	8 ± 0.3	200 ± 1.0	18	One piece
CFRH 18/9/200	18 ± 0.6	9 ± 0.4	200 ± 1.0	19	One piece
CFRH 19/9/200	19 ± 0.6	9 ± 0.4	200 ± 1.0	20	One piece
CFRH 20/10/200	20 ± 0.7	10 ± 0.4	200 ± 1.0	21	One piece

## CFRH Type (Hollow Rods)

Type	OD/mm	ID/mm	Length/mm	Case Internal diameter	Number of pieces joined (mm)
CFRH 21/10/200	21 ± 0.7	10 ± 0.4	200 ± 1.0	22	One piece
CFRH 22/11/200	22 ± 0.7	11 ± 0.4	200 ± 1.0	23	One piece
CFRH 23/11/200	23 ± 0.7	11 ± 0.4	200 ± 1.0	24	8 Pieces Joined
CFRH 24/12/200	24 ± 0.7	12 ± 0.4	200 ± 1.0	25	8 Pieces Joined
CFRH 25/12/200	25 ± 0.7	12 ± 0.4	200 ± 1.0	26	8 Pieces Joined
CFRH 26/13/200	26 ± 0.7	13 ± 0.5	200 ± 1.0	27	8 Pieces Joined
CFRH 27/13/200	27 ± 0.7	13 ± 0.5	200 ± 1.0	28	8 Pieces Joined
CFRH 28/14/200	28 ± 0.8	14 ± 0.5	200 ± 1.0	29	8 Pieces Joined
CFRH 29/14/200	29 ± 0.8	14 ± 0.5	200 ± 1.0	30	8 Pieces Joined
CFRH 30/15/200	30 ± 0.8	15 ± 0.5	200 ± 1.0	31	8 Pieces Joined
CFRH 32/16/200	32 ± 1.0	16 ± 0.5	200 ± 1.0	34	8 Pieces Joined
CFRH 34/17/200	34 ± 1.0	17 ± 0.5	200 ± 1.0	36	8 Pieces Joined
CFRH 36/18/200	36 ± 1.0	18 ± 0.6	200 ± 1.0	38	8 Pieces Joined
CFRH 38/19/200	38 ± 1.0	19 ± 0.6	200 ± 1.0	40	8 Pieces Joined
CFRH 40/20/200	40 ± 1.0	20 ± 0.6	200 ± 1.0	42	8 Pieces Joined
CFRH 42/21/200	42 ± 1.2	21 ± 0.6	200 ± 1.0	44	8 Pieces Joined
CFRH 44/22/200	44 ± 1.2	22 ± 0.7	200 ± 1.0	46	8 Pieces Joined
CFRH 46/23/200	46 ± 1.5	23 ± 0.7	200 ± 1.0	48	8 Pieces Joined
CFRH 48/24/200	48 ± 1.5	24 ± 0.7	200 ± 1.0	50	8 Pieces Joined

## CFRS Type (Solid Fluted Rods)



Type	D/mm	Length/mm	Number of slits	Case Internal diameter	Number of pieces joined (mm)
CFRS 3/200	3 ± 0.3	200 ± 1.0	6	4	One piece
CFRS 4/200	4 ± 0.3	200 ± 1.0	6	5	One piece
CFRS 5/200	5 ± 0.3	200 ± 1.0	6	6	One piece
CFRS 6/200	6 ± 0.3	200 ± 1.0	6	7	One piece
CFRS 7/200	7 ± 0.3	200 ± 1.0	6	8	One piece
CFRS 8/200	8 ± 0.3	200 ± 1.0	6	9	One piece
CFRS 9/200	9 ± 0.3	200 ± 1.0	6	10	One piece
CFRS 10/200	10 ± 0.4	200 ± 1.0	8	11	One piece
CFRS 11/200	11 ± 0.4	200 ± 1.0	8	12	One piece
CFRS 12/200	12 ± 0.4	200 ± 1.0	8	13	One piece
CFRS 13/200	13 ± 0.4	200 ± 1.0	8	14	One piece
CFRS 14/200	14 ± 0.4	200 ± 1.0	8	15	One piece
CFRS 15/200	15 ± 0.5	200 ± 1.0	8	16	One piece
CFRS 16/200	16 ± 0.5	200 ± 1.0	8	17	One piece
CFRS 17/200	17 ± 0.6	200 ± 1.0	8	18	One piece
CFRS 18/200	18 ± 0.6	200 ± 1.0	8	19	One piece
CFRS 19/200	19 ± 0.6	200 ± 1.0	8	20	One piece
CFRS 20/200	20 ± 0.6	200 ± 1.0	8	21	One piece

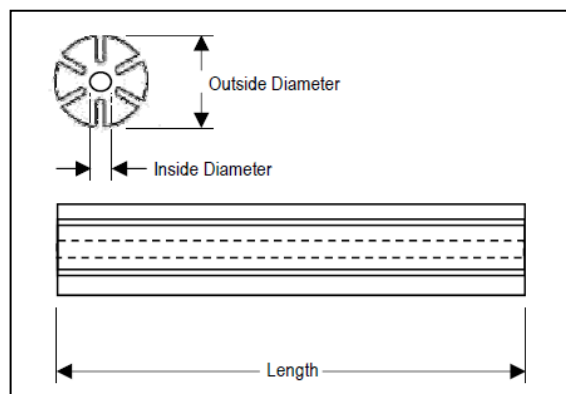


## CFRS Type (Solid Fluted Rods)

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Type	D/mm	Length/mm	Number of slits	Case Internal diameter	Number of pieces joined (mm)
CFRS 21/200	21 ± 0.6	200 ± 1.0	8	22	One piece
CFRS 22/200	22 ± 0.65	200 ± 1.0	8	23	8 Pieces Joined
CFRS 23/200	23 ± 0.65	200 ± 1.0	8	24	8 Pieces Joined
CFRS 24/200	24 ± 0.65	200 ± 1.0	8	25	8 Pieces Joined
CFRS 25/200	25 ± 0.65	200 ± 1.0	8	26	8 Pieces Joined
CFRS 26/200	26 ± 0.7	200 ± 1.0	8	27	8 Pieces Joined
CFRS 27/200	27 ± 0.7	200 ± 1.0	8	28	8 Pieces Joined
CFRS 28/200	28 ± 0.8	200 ± 1.0	8	29	8 Pieces Joined
CFRS 29/200	29 ± 0.8	200 ± 1.0	8	30	8 Pieces Joined
CFRS 30/200	30 ± 1.0	200 ± 1.0	8	31	8 Pieces Joined
CFRS 32/200	35 ± 1.0	200 ± 1.0	8	37	8 Pieces Joined

## CFRSH Type (Hollow Fluted Rods)



Type	OD/mm	ID/mm	Length/mm	Number of slits	Case Internal diameter	Number of pieces joined (mm)
CFRSH 6/3/200	6 ± 0.3	3 ± 0.3	200 ± 1.0	6	7	One piece
CFRSH 7/3/200	7 ± 0.3	3 ± 0.3	200 ± 1.0	6	8	One piece
CFRSH 8/3/200	8 ± 0.3	3 ± 0.3	200 ± 1.0	6	9	One piece
CFRSH 8/4/200	8 ± 0.3	4 ± 0.3	200 ± 1.0	6	9	One piece
CFRSH 9/3/200	9 ± 0.4	3 ± 0.3	200 ± 1.0	6	10	One piece
CFRSH 9/4/200	9 ± 0.4	4 ± 0.3	200 ± 1.0	6	10	One piece
CFRSH 9/5/200	9 ± 0.4	5 ± 0.3	200 ± 1.0	6	10	One piece
CFRSH 10/3/200	10 ± 0.4	3 ± 0.3	200 ± 1.0	8	11	One piece
CFRSH 10/4/200	10 ± 0.4	4 ± 0.3	200 ± 1.0	8	11	One piece
CFRSH 10/5/200	10 ± 0.4	5 ± 0.3	200 ± 1.0	8	11	One piece
CFRSH 11/3/200	11 ± 0.4	3 ± 0.3	200 ± 1.0	8	12	One piece
CFRSH 11/5/200	11 ± 0.4	5 ± 0.3	200 ± 1.0	8	12	One piece
CFRSH 12/3/200	12 ± 0.4	3 ± 0.3	200 ± 1.0	8	13	One piece
CFRSH 12/5/200	12 ± 0.4	5 ± 0.3	200 ± 1.0	8	13	One piece
CFRSH 12/6/200	12 ± 0.4	6 ± 0.3	200 ± 1.0	8	13	One piece
CFRSH 13/3/200	13 ± 0.4	3 ± 0.3	200 ± 1.0	8	14	One piece
CFRSH 13/5/200	13 ± 0.4	5 ± 0.3	200 ± 1.0	8	14	One piece
CFRSH 13/7/200	13 ± 0.4	7 ± 0.4	200 ± 1.0	8	14	One piece
CFRSH 14/3/200	14 ± 0.4	3 ± 0.3	200 ± 1.0	8	15	One piece

## CFRSH Type (Hollow Fluted Rods)

Type	OD/mm	ID/mm	Length/mm	Number of slits	Case Internal diameter	Number of pieces joined (mm)
CFRSH 14/5/200	14 ± 0.4	5 ± 0.3	200 ± 1.0	8	15	One piece
CFRSH 14/7/200	14 ± 0.4	7 ± 0.4	200 ± 1.0	8	15	One piece
CFRSH 15/3/200	15 ± 0.5	3 ± 0.3	200 ± 1.0	8	16	One piece
CFRSH 15/5/200	15 ± 0.5	5 ± 0.3	200 ± 1.0	8	16	One piece
CFRSH 15/7/200	15 ± 0.5	7 ± 0.4	200 ± 1.0	8	16	One piece
CFRSH 16/3/200	16 ± 0.5	3 ± 0.3	200 ± 1.0	8	17	One piece
CFRSH 16/5/200	16 ± 0.5	5 ± 0.3	200 ± 1.0	8	17	One piece
CFRSH 16/7/200	16 ± 0.5	7 ± 0.4	200 ± 1.0	8	17	One piece
CFRSH 17/3/200	17 ± 0.6	3 ± 0.3	200 ± 1.0	8	18	One piece
CFRSH 17/5/200	17 ± 0.6	5 ± 0.3	200 ± 1.0	8	18	One piece
CFRSH 17/7/200	17 ± 0.6	7 ± 0.4	200 ± 1.0	8	18	One piece
CFRSH 18/3/200	18 ± 0.6	3 ± 0.3	200 ± 1.0	8	19	One piece
CFRSH 18/5/200	18 ± 0.6	5 ± 0.3	200 ± 1.0	8	19	One piece
CFRSH 18/6/200	18 ± 0.6	6 ± 0.3	200 ± 1.0	8	19	One piece
CFRSH 18/8/200	18 ± 0.6	8 ± 0.4	200 ± 1.0	8	19	One piece
CFRSH 18/9/200	18 ± 0.6	9 ± 0.4	200 ± 1.0	8	19	One piece
CFRSH 19/3/200	19 ± 0.6	3 ± 0.3	200 ± 1.0	8	20	One piece
CFRSH 19/6/200	19 ± 0.6	6 ± 0.3	200 ± 1.0	8	20	One piece
CFRSH 19/8/200	19 ± 0.6	8 ± 0.4	200 ± 1.0	8	20	One piece
CFRSH 19/9/200	19 ± 0.6	9 ± 0.4	200 ± 1.0	8	20	One piece
CFRSH 19/11/200	19 ± 0.6	11 ± 0.4	200 ± 1.0	8	20	One piece
CFRSH 20/3/200	20 ± 0.6	3 ± 0.3	200 ± 1.0	8	21	One piece
CFRSH 20/6/200	20 ± 0.6	6 ± 0.3	200 ± 1.0	8	21	One piece
CFRSH 20/10/200	20 ± 0.6	10 ± 0.4	200 ± 1.0	8	21	One piece
CFRSH 20/11/200	20 ± 0.6	11 ± 0.4	200 ± 1.0	8	21	One piece
CFRSH 21/3/200	21 ± 0.6	3 ± 0.3	200 ± 1.0	8	22	One piece

## CFRSH Type (Hollow Fluted Rods)

Type	OD/mm	ID/mm	Length/mm	Number of slits	Case Internal diameter	Number of pieces joined (mm)
CFRSH 21/6/200	21 ± 0.6	6 ± 0.3	200 ± 1.0	8	22	One piece
CFRSH 21/10/200	21 ± 0.6	10 ± 0.4	200 ± 1.0	8	22	One piece
CFRSH 22/3/200	22 ± 0.7	3 ± 0.3	200 ± 1.0	8	23	8 Pieces Joined
CFRSH 22/6/200	22 ± 0.7	6 ± 0.3	200 ± 1.0	8	23	8 Pieces Joined
CFRSH 22/8/200	22 ± 0.7	8 ± 0.4	200 ± 1.0	8	23	8 Pieces Joined
CFRSH 22/10/200	22 ± 0.7	10 ± 0.4	200 ± 1.0	8	23	8 Pieces Joined
CFRSH 22/11/200	22 ± 0.7	11 ± 0.4	200 ± 1.0	8	23	8 Pieces Joined
CFRSH 22/14/200	22 ± 0.7	14 ± 0.5	200 ± 1.0	8	23	8 Pieces Joined
CFRSH 23/3/200	23 ± 0.7	3 ± 0.3	200 ± 1.0	8	24	8 Pieces Joined
CFRSH 23/6/200	23 ± 0.7	6 ± 0.3	200 ± 1.0	8	24	8 Pieces Joined
CFRSH 23/11/200	23 ± 0.7	11 ± 0.4	200 ± 1.0	8	24	8 Pieces Joined
CFRSH 24/3/200	24 ± 0.7	3 ± 0.3	200 ± 1.0	8	25	8 Pieces Joined
CFRSH 24/6/200	24 ± 0.7	6 ± 0.3	200 ± 1.0	8	25	8 Pieces Joined
CFRSH 24/8/200	24 ± 0.7	8 ± 0.4	200 ± 1.0	8	25	8 Pieces Joined
CFRSH 24/10/200	24 ± 0.7	10 ± 0.4	200 ± 1.0	8	25	8 Pieces Joined
CFRSH 24/12/200	24 ± 0.7	12 ± 0.5	200 ± 1.0	8	25	8 Pieces Joined
CFRSH 24/13/200	24 ± 0.7	13 ± 0.5	200 ± 1.0	8	25	8 Pieces Joined
CFRSH 25/3/200	25 ± 0.7	3 ± 0.3	200 ± 1.0	8	26	8 Pieces Joined
CFRSH 25/6/200	25 ± 0.7	6 ± 0.3	200 ± 1.0	8	26	8 Pieces Joined
CFRSH 25/10/200	25 ± 0.7	10 ± 0.4	200 ± 1.0	8	26	8 Pieces Joined
CFRSH 25/12/200	25 ± 0.7	12 ± 0.5	200 ± 1.0	8	26	8 Pieces Joined
CFRSH 26/3/200	26 ± 0.7	3 ± 0.3	200 ± 1.0	8	27	8 Pieces Joined
CFRSH 26/6/200	26 ± 0.7	6 ± 0.3	200 ± 1.0	8	27	8 Pieces Joined
CFRSH 26/13/200	26 ± 0.7	13 ± 0.5	200 ± 1.0	8	27	8 Pieces Joined
CFRSH 26/16/200	26 ± 0.7	16 ± 0.5	200 ± 1.0	8	27	8 Pieces Joined
CFRSH 27/3/200	27 ± 0.7	3 ± 0.3	200 ± 1.0	8	28	8 Pieces Joined

## CFRSH Type (Hollow Fluted Rods)

Type	OD/mm	ID/mm	Length/mm	Number of slits	Case Internal diameter	Number of pieces joined (mm)
CFRSH 27/6/200	27 ± 0.7	6 ± 0.3	200 ± 1.0	8	28	8 Pieces Joined
CFRSH 27/8/200	27 ± 0.7	8 ± 0.4	200 ± 1.0	8	28	8 Pieces Joined
CFRSH 27/11/200	27 ± 0.7	11 ± 0.5	200 ± 1.0	8	28	8 Pieces Joined
CFRSH 27/13/200	27 ± 0.7	13 ± 0.5	200 ± 1.0	8	28	8 Pieces Joined
CFRSH 27/14/200	27 ± 0.7	14 ± 0.5	200 ± 1.0	8	28	8 Pieces Joined
CFRSH 28/6/200	28 ± 0.8	6 ± 0.3	200 ± 1.0	8	29	8 Pieces Joined
CFRSH 28/10/200	28 ± 0.8	10 ± 0.4	200 ± 1.0	8	29	8 Pieces Joined
CFRSH 28/14/200	28 ± 0.8	14 ± 0.5	200 ± 1.0	8	29	8 Pieces Joined
CFRSH 30/6/200	30 ± 0.8	6 ± 0.3	200 ± 1.0	8	31	8 Pieces Joined
CFRSH 30/10/200	30 ± 0.8	10 ± 0.4	200 ± 1.0	8	31	8 Pieces Joined
CFRSH 30/12/200	30 ± 0.8	12 ± 0.5	200 ± 1.0	8	31	8 Pieces Joined
CFRSH 30/14/200	30 ± 0.8	14 ± 0.5	200 ± 1.0	8	31	8 Pieces Joined
CFRSH 30/15/200	30 ± 0.8	15 ± 0.5	200 ± 1.0	8	31	8 Pieces Joined
CFRSH 32/6/200	32 ± 0.8	6 ± 0.3	200 ± 1.0	8	34	8 Pieces Joined
CFRSH 32/10/200	32 ± 0.8	10 ± 0.4	200 ± 1.0	8	34	8 Pieces Joined
CFRSH 32/12/200	32 ± 0.8	12 ± 0.5	200 ± 1.0	8	34	8 Pieces Joined
CFRSH 32/16/200	32 ± 0.8	16 ± 0.5	200 ± 1.0	8	34	8 Pieces Joined
CFRSH 33/6/200	33 ± 0.8	6 ± 0.3	200 ± 1.0	8	35	8 Pieces Joined
CFRSH 33/10/200	33 ± 0.8	10 ± 0.4	200 ± 1.0	8	35	8 Pieces Joined
CFRSH 33/14/200	33 ± 0.8	14 ± 0.5	200 ± 1.0	8	35	8 Pieces Joined
CFRSH 33/15/200	33 ± 0.8	15 ± 0.5	200 ± 1.0	8	35	8 Pieces Joined
CFRSH 34/6/200	34 ± 0.8	6 ± 0.3	200 ± 1.0	8	36	8 Pieces Joined
CFRSH 34/12/200	34 ± 0.8	12 ± 0.5	200 ± 1.0	8	36	8 Pieces Joined
CFRSH 34/17/200	34 ± 0.8	17 ± 0.5	200 ± 1.0	8	36	8 Pieces Joined
CFRSH 34/20/200	34 ± 0.8	20 ± 0.6	200 ± 1.0	8	36	8 Pieces Joined
CFRSH 36/14/200	36 ± 0.9	14 ± 0.5	200 ± 1.0	8	38	8 Pieces Joined

## CFRSH Type (Hollow Fluted Rods)

Type	OD/mm	ID/mm	Length/mm	Number of slits	Case Internal diameter	Number of pieces joined (mm)
CFRSH 36/18/200	36 ± 0.9	18 ± 0.5	200 ± 1.0	8	38	8 Pieces Joined
CFRSH 38/6/200	38 ± 0.9	6 ± 0.3	200 ± 1.0	8	40	8 Pieces Joined
CFRSH 38/12/200	38 ± 0.9	12 ± 0.5	200 ± 1.0	8	40	8 Pieces Joined
CFRSH 38/19/200	38 ± 0.9	19 ± 0.6	200 ± 1.0	8	40	8 Pieces Joined
CFRSH 39/6/200	39 ± 0.9	6 ± 0.3	200 ± 1.0	8	41	8 Pieces Joined
CFRSH 39/12/200	39 ± 0.9	12 ± 0.5	200 ± 1.0	8	41	8 Pieces Joined
CFRSH 39/19/200	39 ± 0.9	19 ± 0.6	200 ± 1.0	8	41	8 Pieces Joined
CFRSH 39/20/200	39 ± 0.9	20 ± 0.6	200 ± 1.0	8	41	8 Pieces Joined
CFRSH 40/6/200	40 ± 1.0	6 ± 0.3	200 ± 1.0	8	42	8 Pieces Joined
CFRSH 40/12/200	40 ± 1.0	12 ± 0.5	200 ± 1.0	8	42	8 Pieces Joined
CFRSH 40/20/200	40 ± 1.0	20 ± 0.6	200 ± 1.0	8	42	8 Pieces Joined
CFRSH 42/6/200	42 ± 1.0	6 ± 0.3	200 ± 1.0	8	44	8 Pieces Joined
CFRSH 42/18/200	42 ± 1.0	18 ± 0.5	200 ± 1.0	8	44	8 Pieces Joined
CFRSH 42/20/200	42 ± 1.0	20 ± 0.6	200 ± 1.0	8	44	8 Pieces Joined
CFRSH 44/22/200	44 ± 1.0	22 ± 0.6	200 ± 1.0	8	46	8 Pieces Joined
CFRSH 45/20/200	45 ± 1.10	20 ± 0.6	200 ± 1.0	8	47	8 Pieces Joined
CFRSH 46/18/200	46 ± 1.20	18 ± 0.5	200 ± 1.0	8	48	8 Pieces Joined
CFRSH 46/23/200	46 ± 1.20	23 ± 0.6	200 ± 1.0	8	48	8 Pieces Joined
CFRSH 48/23/200	48 ± 1.20	23 ± 0.6	200 ± 1.0	8	50	8 Pieces Joined
CFRSH 49/20/200	49 ± 1.20	20 ± 0.6	200 ± 1.0	8	51	8 Pieces Joined
CFRSH 50/25/200	50 ± 1.20	25 ± 0.7	200 ± 1.0	8	52	8 Pieces Joined
CFRSH 55/20/200	55 ± 1.50	20 ± 0.6	200 ± 1.0	8	57	8 Pieces Joined
CFRSH 55/27/200	55 ± 1.50	27 ± 0.7	200 ± 1.0	8	57	8 Pieces Joined
CFRSH 56/28/200	56 ± 1.50	28 ± 0.8	200 ± 1.0	8	58	8 Pieces Joined
CFRSH 58/29/200	58 ± 1.50	29 ± 0.8	200 ± 1.0	8	60	8 Pieces Joined

## CFRSH Type (Hollow Fluted Rods)

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Type	OD/mm	ID/mm	Length/mm	Number of slits	Case Internal diameter	Number of pieces joined (mm)
CFRSH 60/30/200	60 ± 1.50	30 ± 0.8	200 ± 1.0	8	62	8 Pieces Joined
CFRSH 65/32/200	65 ± 1.65	32 ± 0.8	200 ± 1.0	8	67	8 Pieces Joined
CFRSH 70/35/200	70 ± 1.85	35 ± 0.9	200 ± 1.0	8	72	8 Pieces Joined
CFRSH 73/35/200	73 ± 1.85	35 ± 0.9	200 ± 1.0	8	76	8 Pieces Joined
CFRSH 75/35/200	75 ± 1.85	35 ± 0.9	200 ± 1.0	8	78	8 Pieces Joined
CFRSH 80/40/200	80 ± 2.00	40 ± 1.0	200 ± 1.0	8	83	8 Pieces Joined
CFRSH 85/42/200	85 ± 2.00	42 ± 1.0	200 ± 1.0	8	88	8 Pieces Joined
CFRSH 90/45/200	90 ± 2.00	45 ± 1.0	200 ± 1.0	8	93	8 Pieces Joined
CFRSH 95/48/200	95 ± 2.00	48 ± 1.0	200 ± 1.0	8	98	8 Pieces Joined



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