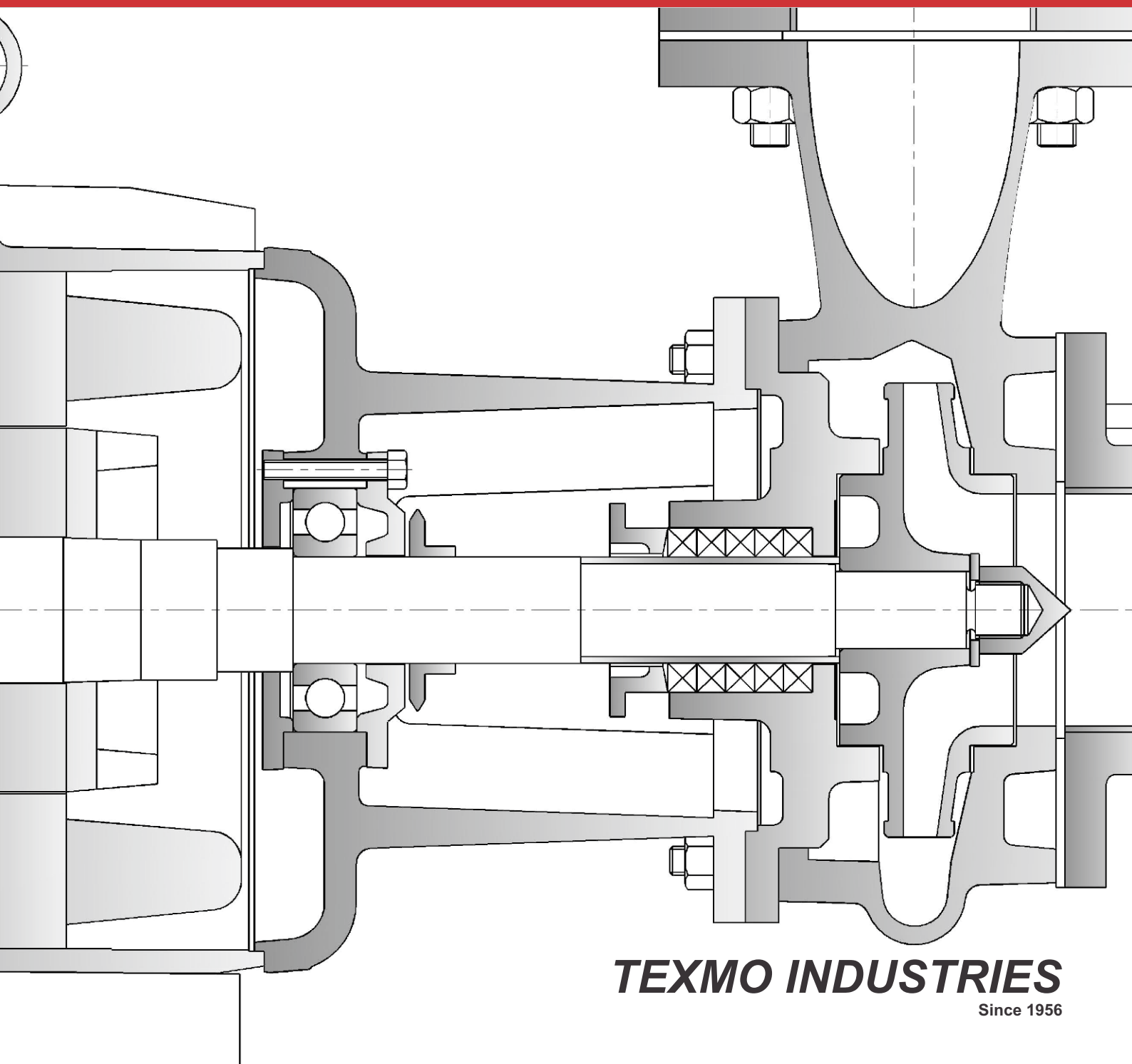


75 mm & 100 mm BOREWELL SUBMERSIBLE PUMPSET  
PERFORMANCE CHART



**TEXMO INDUSTRIES**

Since 1956

## GENERAL INFORMATION

### PERFORMANCE RELATED SPECIFICATIONS

- Recommended voltage range :  
(At motor terminal)

Single Phase	Three Phase
180 - 240 V	350 - 440 V
150 - 200 V (L-Series)	250 - 380 V (L-Series)

- Electric power supply : 415 / 220 V, 50 Hz, AC power supply

- Connection :

Group	DOL	SD
BWS	Up to 7.5 HP	7.5 HP & above

- Suitable overload relay for three phase and MCB for single phase products are to be provided as an electrical safety measure for the machine.
- Advisable to operate in the pump set in the recommended range for trouble free operation and to ensure a long life.
- Time interval between subsequent starts : 5 minutes (minimum)
- Pump sets are suitable for pumping clear, cold, non-aggressive water without any abrasive solid particles with the following characteristics

Temperature : 33°C Maximum

Allowable sand content : 50 mg / lit Maximum

Total Dissolved Solids : 3000 mg / lit Maximum

Hardness : 300 Maximum

pH value : 6.5 - 8.5

Direction of rotation : Anti clockwise when viewed from the delivery side of the pump

### Others

- Performance values given are subject to change in accordance with prevailing voltage and frequency conditions.
- Head values given in the performance charts are exclusive of pipe friction and fitting losses. These losses need to be taken into account while calculating the actual total head before selecting a suitable pump set.
- In view of continuous improvements on existing products, information and performance values given in the catalogue are subject to change without notice.

Note : Shaded figures in the chart indicate the recommended operating range.



## PUMP SELECTION

Irrigation wells and pumps are costly installations, which require efficient utilization. A major part of the energy used in agriculture is in pumping water. Hence efficient utilization of the limited energy resources calls for the selection of the most suitable pump, keeping in view the requirements of irrigation, characteristics of the well / water source, kind of power available, economic conditions of the farmer and other factors. It is a process of matching of well and pump characteristics for optimum water output.

### CRITERIA FOR SELECTION

The main factors influencing the selection of pumping sets are :

- i. Peak water requirement
- ii. Yield of well or water source
- iii. Availability of energy

### WATER REQUIREMENT, V IN L/D

It is the maximum quantity of water required in litres / day to meet out the daily crop water requirement and pumping rate in l/s is calculated by  $V / (T \times 3600)$  where, T – Average pumping hours.

#### Relevant Details

1. Daily crop water requirement in litres or cm for different stages
2. Cropped area in  $m^2$  ( $m^2 \times cm \times 10$  will give water requirement in litres)

### YIELD OF WELL OR WATER SOURCE, Y IN L/S

It is the recuperation rate at which water recharges into the well and it is the maximum rate at which water can be pumped out under steady draw down conditions. This can be assessed directly from pump testing results or converted from inch to lit./s referring to discharge table.

#### Relevant Details

1. Type of water source (Open well / Borewell / River / Sump)
2. Size of borewell
3. Static water level below ground level (Water level when pump is switched off)
4. Dynamic water level below ground level (Expected level when pump is switched on)
5. Expected maximum low water level during summer
6. Proposed pump set erection depth
7. Existing / proposed pipe details (Sizes and lengths)
8. Vertical elevation from water source to discharge point
9. Number of fittings like (Tee, Bends, Valves etc..)

### ENERGY AVAILABLE, HP

It is the quantitative and qualitative data on the power available for pumping out the water from the water source. This includes phase, sanctioned HP, frequency, voltage fluctuation and three and two phase power supply and time of which power is available.

#### Relevant Details

1. Main line to starter distance
2. Starter to pump set distance



## Selection Procedure

### Step 1 - Discharge calculation, Q

- V – Maximum crop water requirement in litres, D in case of irrigation depth in cm for peak demand of water for the selected cropping pattern
- A – Cropped area in m<sup>2</sup>
- T – Allowed water filling time or pumping time in sec (considering power availability hrs)

Required pumping rate,  $Q = V/T$  or  $(D \times A \times 10) / T$

[In case of trying out maximum possible discharge, Q is to be assumed]

### Step 2 – Comparison of discharge, Q with yield, Y

As indicated earlier, discharge rate has to be limited to 80% of the safe yield for trouble free performance and better pump life avoiding any dry running

### Step 3 – Selection of pump size or series

Based on the calculated discharge rate, Q the suitable pump size is to be selected. In case of Borewell submersibles, suitable pump series is to be selected considering Borewell size also.

### Step 4 – Total head calculation, H

#### Suction head, H<sub>s</sub>

D<sub>s</sub> – Size of suction pipe in mm

L<sub>s</sub> – Length of suction pipe in m including equivalent length of pipe for the fittings

V<sub>s</sub> – Vertical distance of pump set from working water level in m

Refer to pipe friction loss chart or table and read friction value, F<sub>s</sub>% in m / 100 m length of suction pipe against discharge, Q and existing or selected pipe size, D<sub>s</sub>.

Pipe friction in suction pipe,  $F_s = (L_s \times F_s\%) / 100$

Suction head,  $H_s = V_s + F_s$

Note: For Submersible pump sets the suction head value is zero

#### Delivery head, H<sub>d</sub>

D<sub>d</sub> – Size of delivery pipe in mm

L<sub>d</sub> – Length of delivery pipe in m including equivalent length of pipe for the fittings

V<sub>d</sub> – Vertical distance of discharge point from pump set level in m including ground elevation

Refer to pipe friction loss chart or table and read friction value, F<sub>d</sub>% in m per 100 m length of delivery pipe, against discharge, Q and existing or selected pipe size, D<sub>d</sub>.

Pipe friction in delivery pipe,  $F_d = (L_d \times F_d\%) / 100$

Delivery head,  $H_d = V_d + F_d$

### Step 5 – Total head

Total head,  $H = H_s + H_d + H_f + H_e$

H<sub>f</sub> – Fitting loss in the entire pipeline system (Refer to fitting loss table)

H<sub>e</sub> – Exit pressure head at discharge point as required



## Step 6 – Energy requirement

Approx. energy requirement,  $HP = (Q \times H) / (75 \times Ep)$

$Ep$  – Pump efficiency value in fraction, which varies with product HP and pipe size

Select an appropriate pump model or stage for the given total head,  $H$  and discharge,  $Q$  referring to the product performance chart. Best efficiency point (declared duty point) is always preferred. If the HP of the selected pump model is less than the sanctioned HP, then we may proceed with the same. If not, assumed or calculated  $Q$  has to be reduced and above steps are to be repeated.

In case of borewell submersible pump sets, correct product series is to be decided based on the required pumping rate  $Q$  before selecting a suitable pump model and number of stages.

## SELECTION OF PUMPS FOR PARALLEL CONNECTIONS

Requirement of parallel connections arises when the required discharge rate is not met with the available pump models. In this case two or more pumps with almost matching pressure head should be selected. Following factors are to be considered for parallel operations.

- a. Pumps of similar head characteristics are to be selected
- b. No pump should operate at its shut off head or above maximum permissible head
- c. No pump should operate below recommended head range as this leads to cavitation

## SELECTION OF PUMPS FOR SERIES CONNECTIONS

Requirement of series connections arises when the required total head is not met with the available pump models. In this case two or more pumps with almost matching discharge rate should be selected. Series installations of pumps are to be spaced in such a way that neither the pump gets overloaded or ends up with discharge cavitation.

## OTHER FACTORS AFFECTING THE PUMP PERFORMANCE (after installation)

1. Suction head variation
2. Dynamic water level i.e., draw down variation
3. Condition of existing pipe line including inner roughness / amount of sedimentation and the life
4. Recharge rate of water source
5. Frequency and voltage conditions

### Cable selection

$V_a$  – Actual voltage available in the field (Volts)

$V_r$  – Rated voltage of the motor (Volts)

$L_a$  – Actual cable length from starter to motor terminal (metre)

$HP$  – Power of the selected motor

$I$  – Full load current of the selected motor [For SD motors, it is  $1/\sqrt{3}$  times the FL current] (Amperes)

$L_c$  – Calculated equivalent cable length  $(V_r \times L_a) / V_a$  (metre)

Refer to cable selection chart and select appropriate cable size for the given  $I$  and  $L_c$  values.

Follow the same procedure for selecting suitable wire / cable size for mail line to starter.



## 75mm Borewell Submersibles (TRT)



### PRODUCT FEATURES

- Light weight and easy to install.
- Improved hydraulic design with increased efficiency and reduced power consumption.
- Noise free operation
- Modular construction and easily interchangeable parts.
- Available in radial flow impeller design in shell type assembly.
- Impellers and diffusers of high quality engineering polymer.
- Stainless steel pump shell for corrosion resistance and LTB bushes for high wear resistance and longer life.
- Built in NRV with minimum friction.
- Easily rewindable Squirrel-cage motor of water-cooled, designed for 200 - 240 V, 50 Hz, AC power supply.
- High quality water-resistant polymer insulated wires for longer life even under adverse voltage conditions.
- Pressure diaphragm to compensate excess pressure due to heating up of filled water

### MATERIAL OF CONSTRUCTION

Part Name	Material	Part Name	Material
Impeller	Noryl	Motor body	AISI 304
Diffuser / Diffuser Housing	Noryl	Bearing housing	CI - FG 200
Pump Shaft	AISI 410	Motor shaft	AISI 410
Pump Shell	AISI 304	Journal bush	LTB-4
Bearing Bush	NBR	Thrust Bearing	AISI 420 - Carbon
Non return valve	AISI 304 / NBR	Winding wire	Poly wrapped copper

### APPLICATIONS

Domestic water supply | Water supply to high rise buildings, housing complexes, bungalows and industries | Cattle and poultry farms | Dairies  
Fountains | Unshaped & crooked 4" Borewell



## PERFORMANCE CHART

### TARO "TRT 3 - 6 / TBRT 6 SERIES" - SINGLE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 80 mm (3") BOREWELLS

Approximate performance values of TRT 3 - 6 / TBRT 6 Series at 220 V (-15% to +6%), 2850rpm, 50Hz AC Power supply

Model Name		Motor Rating		Stages	Pipe Size (mm)	CAPACITY														FL Current (A)				
						Gpm	0.0	2.6	4.0	5.3	6.6	7.9	9.2	10.6	11.9	13.2	14.5	15.8	17.2		18.5	19.8		
Pump	Motor	kW	HP			l/m	0.0	12	18	24	30	36	42	48.0	54	60	66	72	78	84	90			
						M <sup>3</sup> /hr	0.0	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0	4.3	4.7	5.0	5.4			
						l/s	0.0	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5			
TRT 320 S	ST 005	0.55	0.75	20	25	↑ HEAD VALUES IN METRES ↓	62.4	53.7	49.0	44.0	36.7	28.1	16.4										6.5	
TRT 328 S <sup>⚡</sup>	ST 007	0.75	1	28			87.4	75.2	68.6	61.6	51.4	39.4	23.0											7
TRF 330 S	ST 007	0.75	1	30			93.6	80.6	73.5	66.0	55.1	42.2	24.6											7
TRT 616 S <sup>⚡</sup>	ST 007	0.75	1	16	30	↑ HEAD VALUES IN METRES ↓	43.2				39.8	38.6	37.3	35.8	33.9	32.0	29.8	27.2	24.5	21.0	17.0	7		
TBRT 610 HS <sup>⚡</sup>	ST 007	0.75	1	10			45.3			42.7	41.9	40.6	38.5	36.0	33.4	30.2	26.5	22.4	18.7	14.8	9.5	7.7		

Performance conforming to IS : 8034 and 9283

<sup>⚡</sup> - 'R' Series only available

Maximum outer diameter : 78 mm

#### PRODUCT TYPE KEY

TRT 330 S - Taro, Radial flow, Three inch, 3 series, 30 Stages, Single phase

ST 005 - Single phase, Three inch motor (005 Power code)

TBRT 610 HS - Taro, Boxtype, Radial flow, Three inch, 6 series, 10 Stages, High head, Single phase

ST 007 - Single phase, Three inch motor (007 Power code)



## 100mm Borewell Submersibles (TRF / TRF-H / TMF)



### PRODUCT FEATURES

- Light weight and easy to install.
- Improved hydraulic design with increased efficiency and reduced power consumption.
- Noise free operation
- Modular construction and easily interchangeable parts.
- Radial and mixed flow impeller designs including high head versions in shell type assembly
- Impellers and diffusers of high quality engineering polymer.
- Stainless steel pump shell for corrosion resistance and LTB bushes for high wear resistance and longer life.
- Built in NRV with minimum friction.
- Easily rewindable Squirrel-cage motor of water-cooled, designed for 200 - 240 V / 350 - 440V, 50 Hz, AC power supply.
- High quality water-resistant polymer insulated wires for longer life even under adverse voltage conditions.
- Pressure diaphragm to compensate excess pressure due to heating up of filled water

### MATERIAL OF CONSTRUCTION

Part Name	Material	Part Name	Material
Impeller	Noryl	Motor body	AISI 304
Diffuser / Diffuser Housing	Noryl	Bearing housing	CI - FG 200
Pump Shaft	AISI 410	Motor shaft	AISI 410 / AISI 431
Pump Shell	AISI 304 / AISI 202	Journal bush	LTB-4 / Carbon
Bearing Bush	NBR	Thrust Bearing	AISI 420 - Carbon
Non return valve	Noryl	Winding wire	Poly wrapped copper

### APPLICATIONS

Domestic and community water supply | Water supply to high rise buildings, housing complexes, bungalows and industries | Cattle and poultry farms | Irrigation of farms | Dairies | Cooling water circulating systems | Fire fighting systems | Fountains





## PERFORMANCE CHART

### TARO "TRF 4H SERIES" - SINGLE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 4H series at 200 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)		
			kW	HP			Gpm	0.0	1.6	2.2	2.9	3.6	4.2	4.9	5.9	7.3			
Pump	Motor						l/m	0.0	7.2	10.2	13.2	16.2	19.2	22.2	27.0	33.0			
							M <sup>3</sup> /hr	0.0	0.4	0.6	0.8	1.0	1.2	1.3	1.6	2.0			
								l/s	0.0	0.12	0.17	0.22	0.27	0.32	0.37	0.45	0.55		
TRF 410 HS	SF 003	-	0.37	0.5	10	30	HEAD VALUES IN METRES	67.8	62.7	60.5	58.0	55.2	52.1	48.6	42.4	33.6	4.5		
TRF 413 HS	SF 005	-	0.55	0.75	13			88.1	81.5	78.7	75.4	71.8	67.7	63.2	55.1	43.7	5.4		
TRF 418 HS	SF 007	-	0.75	1	18			122.0	112.9	108.9	104.4	99.4	93.8	87.5	76.3	60.5	7		
TRF 426 HS	SF 011	-	1.1	1.5	26			176.3	163.0	157.3	150.8	143.5	135.5	126.4	110.2	87.4	9.5		

### TARO "TRF 5H SERIES" - THREE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 5H series at 415 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)			
			kW	HP			Gpm	0.0	2.6	3.3	4.0	4.6	5.0	6.6	7.9	9.2		10.6		
Pump	Motor						l/m	0.0	12	15	18	21	23	30	36	42	48			
							M <sup>3</sup> /hr	0.0	0.7	0.9	1.1	1.3	1.4	1.8	2.2	2.5	2.9			
								l/s	0.0	0.2	0.25	0.30	0.35	0.4	0.5	0.6	0.7	0.8		
TRF 525 H	TF 015	DOL	1.5	2	25	30	HEAD VALUES IN METRES	190.4	171.3	166	160	154	150	131	113	90.8	66.7	4.5		
TRF 530 H	TF 015	DOL	1.5	2	30			228.5	205.5	199	193	185	180	158	135	109.0	80.0	4.5		
TRF 540 H	TF 022	DOL	2.2	3	40			304.7	274.0	265	257	247	240	210	180	145.3	106.7	6.5		
TRF 550 H	TF 030	DOL	3	4	50			380.8	342.5	332	321	308	300	263	225	181.7	133.3	8.5		
TRF 552 H	TF 030	DOL	3	4	52			396.1	356.2	345	334	321	312	273	234	188.9	138.7	8.5		

Performance conforming to IS : 8034 and 9283

DOL - Direct On Line

☒ - Against batch order

All motors (1 & 3 Phase) are ISI marked

☒ - 'R' Series only available

Maximum outer diameter : 98 mm

▲ - ISI Marked sets

#### PRODUCT TYPE KEY

TRF 4 10 HS - Taro, Radial flow, Four inch, 4 series, 10 Stages, (High head, S - Single phase)

TRF 5 30 H - Taro, Radial flow, Four inch, 5 series, 30 Stages, (High head)

SF 003 - Single phase, Four inch motor (003 Power code)

TF 015 - Three phase, Four inch motor (015 Power code)



# PERFORMANCE CHART

## TARO "TRF 5H SERIES" - SINGLE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 5H series at 200 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)	
			kW	HP			Gpm	0.0	2.6	3.3	4.0	4.6	5.0	6.6	7.9	9.2		10.6
Pump	Motor						l/m	0.0	12	15	18	21	23	30	36	42	48	
							M <sup>3</sup> /hr	0.0	0.7	0.9	1.1	1.3	1.4	1.8	2.2	2.5	2.9	
								l/s	0.0	0.2	0.25	0.30	0.35	0.4	0.5	0.6	0.7	0.8
TRF 507 HS	SF 003	-	0.37	0.5	7	30	HEAD VALUES IN METRES	53.3	48.0	46	45	43	42.0	37	32	25.4	18.7	4.5
TRF 510 HS	SF 005	-	0.55	0.75	10			76.2	68.5	66	64	62	60.0	53	45	36.3	26.7	5.4
TRF 513 HS	SF 007	-	0.75	1	13			99.0	89.1	86	83	80	78.0	68	59	47.2	34.7	7
TRF 518 HS	SF 011	-	1.1	1.5	18			137.1	123.3	119	116	111	108.0	95	81	65.4	48.0	9.5
TRF 520 HS	SF 011	-	1.1	1.5	20			152.3	137.0	133	128	123	120.0	105	90	72.7	53.3	9.5
TRF 525 HS	SF 015	-	1.5	2	25			190.4	171.3	166	160	154	150.0	131	113	90.8	66.7	12
TRF 530 HS	SF 015	-	1.5	2	30			228.5	205.5	199	193	185	180.0	158	135	109.0	80.0	12
TRF 540 HS	SF 022	-	2.2	3	40			304.7	274.0	265	257	247	240.0	210	180	145.3	106.7	18

## TARO "TRF 7H SERIES" - THREE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 7H series at 415 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)	
			kW	HP			Gpm	0.0	6.6	6.6	7.9	9.2	11.9	11.9	13.2	14.5		15.8
Pump	Motor						l/m	0.0	30	30	36	42	54	54	60	66	72	
							M <sup>3</sup> /hr	0.0	1.8	1.8	2.2	2.5	3.2	3.2	3.6	4.0	4.3	
								l/s	0.0	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
TRF 715 H	TF 011	DOL	1.1	1.5	15	30	HEAD VALUES IN METRES	120	107	101	94.7	87.0	79.1	70.8	61.7	51.5	40	3.25
TRF 720 H	TF 015	DOL	1.5	2	20			160	142	135	126.2	116.0	105.4	94.4	82.2	68.6	53	4.5
TRF 725 H	TF 022	DOL	2.2	3	25			200	178	169	157.8	145.0	131.8	118.0	102.8	85.8	66	6.5
TRF 730 H	TF 022	DOL	2.2	3	30			240	214	203	189.3	174.0	158.1	141.6	123.3	102.9	79	6.5
TRF 740 H	TF 030	DOL	3	4	40			320	285	270	252.4	232.0	210.8	188.8	164.4	137.2	106	8.5
TRF 750 H	TF 037	DOL	3.7	5	50			400	356	338	315.5	290.0	263.5	236.0	205.5	171.5	132	10

Performance conforming to IS : 8034 and 9283

DOL - Direct On Line

^ - Oil cooled motor also available

All motors (1 & 3 Phase) are ISI marked

⚡ - 'R' Series only available

Maximum outer diameter : 98 mm

▲ - ISI Marked sets

### PRODUCT TYPE KEY

TRF518HS - Taro, Radial flow, Four inch, 5 series, 18 Stages, (High head, S - Single phase)

TRF530HS - Taro, Radial flow, Four inch, 5 series, 30 Stages, (High head, S - Single phase)

TRF740H - Taro, Radial flow, Four inch, 7 series, 40 Stages, (High head)

SF011 - Single phase, Four inch motor (011 Power code)

SF015 - Single phase, Four inch motor (015 Power code)

TF030 - Three phase, Four inch motor (030 Power code)



## PERFORMANCE CHART

### TARO "TRF 7H SERIES" - SINGLE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 7H series at 220 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)	
			kW	HP			Gpm	0	6.6	6.6	7.9	9.2	10.6	11.9	13.2	14.5		15.8
Pump	Motor						Gpm	0	6.6	6.6	7.9	9.2	10.6	11.9	13.2	14.5	15.8	
							l/m	0	30	30	36	42	48	54	60	66	72	
								M <sup>3</sup> /hr	0	1.8	1.8	2.2	2.5	2.9	3.2	3.6	4.0	4.3
								l/s	0	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
TRF 710 HS	SF 007	-	0.75	1	10	30	HEAD VALUES IN METRES	80.0	71.2	67.6	63.1	58.0	52.7	47.2	41.1	34.3	26.4	7
TRF 715 HS	SF 011	-	1.1	1.5	15			120	107	101	95	87	79	71	62	51	40	9.5
TRF 720 HS	SF 015	-	1.5	2	20			160	142	135	126	116	105	94	82	69	53	12
TRF 725 HS	SF 022	-	2.2	3	25			200	178	169	158	145	132	118	103	86	66	18
TRF 730 HS	SF 022	-	2.2	3	30			240	214	203	189	174	158	142	123	103	79	18

### TARO "TRF 9H SERIES" - THREE / SINGLE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 9H series at 415 V / 200 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)		
			kW	HP			Gpm	0.0	6.6	7.9	9.2	10.6	11.9	13.2	15.8	17.2		18.5	19.8
Pump	Motor						Gpm	0.0	6.6	7.9	9.2	10.6	11.9	13.2	15.8	17.2	18.5	19.8	
							l/m	0.0	30	36	42	48	54	60	72	78	84	90	
								M <sup>3</sup> /hr	0.0	1.8	2.2	2.5	2.9	3.2	3.6	4.3	4.7	5.0	5.4
								l/s	0.0	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.4	1.5
TRF 936 H	TF 037	DOL	3.7	5	36	30	HEAD VALUES IN METRES	282.9	247.4	238.6	229.9	220.1	208.8	197.0	167.7	150.2	131.1		10
TRF 908 HS	SF 007	-	0.75	1	8			62.9	55.0	53.0	51.1	48.9	46.4	43.8	37.3	33.4	29.1		7.0

Performance conforming to IS : 8034 and 9283

DOL - Direct On Line

Maximum outer diameter : 98 mm

- Star rated pump sets

All motors (1 & 3 phase) are ISI marked

- 'R' Series only available

- Against batch order

#### PRODUCT TYPE KEY

TRF 7 10 HS - Taro, Radial flow, Four inch, 7 series, 10 Stages, (High head, S - Single phase) SF007 - Single phase, Four inch motor (007 Power code)



## PERFORMANCE CHART

### TARO "TRF 10 SERIES" - THREE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 10 series at 415 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY											FL Current (A)	
			kW	HP			Gpm	0.0	6.6	7.9	9.2	10.6	11.9	13.2	15.8	17.2	18.5		19.8
Pump	Motor						l/m	0.0	30	36	42	48	54	60	72	78	84	90	
							M <sup>3</sup> /hr	0.0	1.8	2.2	2.5	2.9	3.2	3.6	4.3	4.7	5.0	5.4	
								l/s	0.0	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.4	1.5
TRF 1030 ▲	TF 022	DOL	2.2	3	30	30	HEAD VALUES IN METRES	168.0	150.5	146.1	141.8	137.0	131.8	126.0	111.2	102.1	91.8	80.3	6.5

### TARO "TRF 10 SERIES" - SINGLE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 10 series at 200 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY											FL Current (A)	
			kW	HP			Gpm	0.0	6.6	7.9	9.2	10.6	11.9	13.2	15.8	17.2	18.5		19.8
Pump	Motor						l/m	0.0	30	36.0	42.0	48.0	54.0	60.0	72.0	78.0	84.0	90.0	
							M <sup>3</sup> /hr	0.0	1.8	2.2	2.5	2.9	3.2	3.6	4.3	4.7	5.0	5.4	
								l/s	0.0	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.4	1.5
TRF 1010 S <b>RR</b> ▲	SF 007	-	0.75	1	10	30 ↑ HEAD VALUES IN METRES ↓	56.0	50.2	48.7	47.3	45.7	43.9	42.0	37.1	34.0	30.6	26.8	7.0	
TRF 1015 S ▲ ☒	SF 011	-	1.1	1.5	15		84.0	75.3	73.1	70.9	68.5	65.9	63.0	55.6	51.0	45.9	40.2	9.5	
TRF 1015 S <b>RR</b>	SF 011	-	1.1	1.5	15		84.0	75.3	73.1	70.9	68.5	65.9	63.0	55.6	51.0	45.9	40.2	9.5	
TRF 1020 S ▲ ☒	SF 015	-	1.5	2	20		112.0	100.3	97.4	94.5	91.4	87.9	84.0	74.1	68.1	61.2	53.5	12.0	
TRF 1020 S <b>RR</b>	SF 015	-	1.5	2	20		112.0	100.3	97.4	94.5	91.4	87.9	84.0	74.1	68.1	61.2	53.5	12.0	
TRF 1030 ▲	SF 022	-	2.2	3	30		168.0	150.5	146.1	141.8	137.0	131.8	126.0	111.2	102.1	91.8	80.3	18.0	

Performance conforming to IS : 8034 and 9283  
 'R' motors of 0.5, 0.75 & 1.0 hp are ISI marked

All motors (1 & 3 phase) are ISI marked  
 ☒ - Against batch order

Maximum outer diameter : 98 mm  
**RR** - 'R' series only available  
 ▲ - ISI marked sets

**PRODUCT TYPE KEY**

T R F 10 20 S - Taro, Radial flow, Four inch, 10 series, 20 Stages, Single phase

S F 015 - Single phase, Four inch motor (015 Power code)



# PERFORMANCE CHART

## TARO "TRF 15 - 20 SERIES" - THREE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 15-20 series at 415 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY													FL Current (A)		
			kW	HP			Gpm	0.0	11.9	13.2	15.8	17.2	19.8	21.1	23.8	27.7	30.4	33.0	35.6		39.6	
Pump	Motor						l/m	0.0	54	60	72	78	90	96	108	126	138	150	162	180		
							M <sup>3</sup> /hr	0.0	3.2	3.6	4.3	4.7	5.4	5.8	6.5	7.6	8.3	9.0	9.7	10.8		
							l/s	0.0	0.9	1.0	1.2	1.3	1.5	1.6	1.8	2.1	2.3	2.5	2.7	3.0		
TRF 1517	TF 015	DOL	1.5	2	17	40	98.6	86.7	84.8	80.6	78.3	73.1	70.1	63.4	50.8	40.8					4.5	
TRF 1525	TF 022	DOL	2.2	3	25		145.0	127.5	124.7	118.5	115.1	107.5	103.1	93.2	74.7	60.0						6.5
TRF 2010	TF 015	DOL	1.5	2	10		65.0			55.2	54.2	52.0	50.7	48.0	43.0	39.0	34.4	29.3	20.5		4.5	
TRF 2015	TF 022	DOL	2.2	3	15		97.5			82.9	81.3	78.0	76.1	72.0	64.5	58.5	51.7	43.9	30.7		6.5	
TRF 2017	TF 022	DOL	2.2	3	17		110.5			93.9	92.2	88.3	86.3	81.6	73.1	66.3	58.5	49.8	34.8		6.5	
TRF 2020	TF 030	DOL	3	4	20		130.0			110.5	108.4	103.9	101.5	96.0	86.0	78.0	68.9	58.6	40.9		8.5	
TRF 2025	TF 037	DOL	3.7	5	25		162.5			138.1	135.5	129.9	126.9	120.0	107.5	97.5	86.1	73.2	51.2		10	

## TARO "TRF 15 - 20 SERIES" - SINGLE PHASE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TRF 15-20 series at 200 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY													FL Current (A)		
			kW	HP			Gpm	0.0	11.9	13.2	15.8	17.2	19.8	21.1	23.8	27.7	30.4	33.0	35.6		39.6	
Pump	Motor						l/m	0.0	54	60	72	78	90	96	108	126	138	150	162	180		
							M <sup>3</sup> /hr	0.0	3.2	3.6	4.3	4.7	5.4	5.8	6.5	7.6	8.3	9.0	9.7	10.8		
							l/s	0.0	0.9	1.0	1.2	1.3	1.5	1.6	1.8	2.1	2.3	2.5	2.7	3.0		
TRF 1508 S	SF 007	-	0.75	1	8	40	46.4	40.8	39.8	37.9	36.8	34.4	33.0	29.8	23.8	19.2					7	
TRF 1512 S	SF 011	-	1.1	1.5	12		69.6	61.2	59.8	56.9	55.2	51.6	49.4	44.6	35.8	28.8						10.2
TRF 1517 S	SF 015	-	1.5	2	17		98.6	86.7	84.7	80.6	78.2	73.1	70.0	63.2	50.7	40.8						13
TRF 1517 S	SF 015	-	1.5	2	17		98.6	86.7	84.7	80.6	78.2	73.1	70.0	63.2	50.7	40.8						13
TRF 1525 S	SF 022	-	2.2	3	25		145.0	127.5	124.5	118.5	115.0	107.5	103.0	93.0	74.5	60.0						18
TRF 2010 S	SF 015	-	1.5	2	10		65.0			55.2	54.2	52.0	50.7	48.0	43.0	39.0	34.4	29.3	20.5		12	
TRF 2015 S	SF 022	-	2.2	3	15		97.5			82.9	81.3	78.0	76.1	72.0	64.5	58.5	51.7	43.9	30.7		18	
TRF 2017 FS	SF 022	-	2.2	3	17		110.5			93.9	92.2	88.3	86.3	81.6	73.1	66.3	58.5	49.8	34.8		18	
TRF 2025 FS	SF 037	-	3.7	5	25	162.5			138.1	135.5	129.9	126.9	120.0	107.5	97.5	86.1	73.2	51.2		28		

Performance conforming to IS : 8034 and 9283

⊖ - STF sets also available

★ - Star rated pump sets

⊠ - Against batch order

✱ - 'R' series only available

Maximum outer diameter : 98 mm

@ - 'F series' sets are also available in 50 mm delivery

▲ - ISI marked sets

### PRODUCT TYPE KEY

TRF 15 17 S - Taro, Radial flow, Four inch, 15 series, 17 Stages, Single phase

TRF 20 25 - Taro, Radial flow, Four inch, 20 series, 25 Stages

SF 015 - Single phase, Four inch motor (015 Power code)

TF 037 - Three phase, Four inch motor (037 Power code)



## PERFORMANCE CHART

### TARO "TMF 50 N" - THREE PHASE MIXED FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TMF 50 N series at 415 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)		
			kW	HP			Gpm	0.0	23.8	27.7	30.4	33.0	35.6	39.6	46.2	52.8		59.4	66.0
Pump	Motor						l/m	0.0	108	126	138	150	162	180	210	240	270	300	
							M <sup>3</sup> /hr	0.0	6.5	7.6	8.3	9.0	9.7	10.8	12.6	14.4	16.2	18.0	
							l/s	0.0	1.8	2.1	2.3	2.5	2.7	3.0	3.5	4.0	4.5	5.0	
TMF 5009 NF	TF 022	DOL	2.2	3	9	65	HEAD VALUES IN METRES	46.8	40.3	39.0	38.1	37.1	36.0	34.2	30.8	26.7	22.0	16.6	6.5
TMF 5015 NF	TF 037	DOL	3.7	5	15	65	HEAD VALUES IN METRES	78.0	67.2	65.0	63.5	61.8	60.0	57.0	51.3	44.5	36.6	27.7	10

### TARO "TMF 50 N" - SINGLE PHASE MIXED FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TMF 50 N series at 220 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)		
			kW	HP			Gpm	0.0	23.8	27.7	30.4	33.0	35.6	39.6	46.2	52.8		59.4	66.0
Pump	Motor						l/m	0.0	108	126	138	150	162	180	210	240	270	300	
							M <sup>3</sup> /hr	0.0	6.5	7.6	8.3	9.0	9.7	10.8	12.6	14.4	16.2	18.0	
							l/s	0.0	1.8	2.1	2.3	2.5	2.7	3.0	3.5	4.0	4.5	5.0	
TMF 5009 NFS	SF 022	-	2.2	3	9	65	HEAD VALUES IN METRES	46.8	40.3	39.0	38.1	37.1	36.0	34.2	30.8	26.7	22.0	16.6	18

### TARO "TMF 60 SERIES" - SINGLE PHASE MIXED FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TMF 60 series at 220 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)			
			kW	HP			Gpm	0.0	39.6	46.2	52.8	59.4	66.0	72.6	79.2	85.8		92.4	99.0	106.0
Pump	Motor						l/m	0.0	180	210	240	270	300	330	360	390	420	450	480	
							M <sup>3</sup> /hr	0.0	10.8	12.6	14.4	16.2	18.0	19.8	21.6	23.4	25.2	27.0	28.8	
							l/s	0.0	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	
TMF 6007 S	SF022	-	2.2	3	7	65	HEAD VALUES IN METRES	40.0	32.2	30.7	29.0	27.5	26.0	24.5	23.0	21.2	19.2	16.6	14.6	18

Performance conforming to IS : 8034 and 9283

DOL - Direct On Line

Maximum outer diameter : 98 mm

#### PRODUCT TYPE KEY

**TMF5009N** - Taro, Mixed flow, Four inch, 50 series, 09 Stages pump, New  
**TMF6007S** - Taro, Mixed flow, Four inch, 60 series, 07 Stages

**TF022** - Three phase, Four inch motor (022 Power code)  
**SF022** - Single phase, Four inch motor (022 Power code)



## 100 mm Box Type Borewell Submersibles (TBRF)



### PRODUCT FEATURES

- Light weight and easy to install.
- Improved hydraulic design with increased efficiency and reduced power consumption.
- Noise free operation.
- Modular construction and easily interchangeable parts.
- Radial flow impeller design in SS box type assembly.
- Impellers and diffusers of high quality engineering polymer.
- Stainless steel pump housing for corrosion resistance and LTB bushes for high wear resistance and longer life.
- Built in NRV with minimum friction.
- Easily rewindable Squirrel-cage motor of water-cooled, designed for 200 - 240 V / 350 - 440V, 50 Hz, AC power supply.
- High quality water-resistant polymer insulated wires for longer life even under adverse voltage conditions.
- Pressure diaphragm to compensate excess pressure due to heating up of filled water

### MATERIAL OF CONSTRUCTION

Part Name	Material	Part Name	Material
Impeller	Noryl	Motor body	AISI 304
Diffuser	Noryl	Bearing housing	CI - FG 200
Diffuser Housing	AISI 304	Motor shaft	AISI 410 / 431
Pump Shaft	AISI 410 / 431	Journal bush	Carbon
Bearing Bush	NBR	Thrust Bearing	AISI 420 - Carbon
Non return valve	AISI 304 / NBR	Winding wire	Poly wrapped copper

### APPLICATIONS


Domestic and community water supply | Water supply to high rise buildings, housing complexes, bungalows and industries | Cattle and poultry farms | Irrigation of farms | Dairies | Cooling water circulating systems | Fire fighting systems | Fountains



## PERFORMANCE CHART



### TARO "TBRF 10 SERIES" - THREE PHASE BOX TYPE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TBRF 10 series at 415 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY										FL Current (A)			
			kW	HP			Gpm	0.0	6.6	7.9	9.2	10.6	11.9	13.2	15.8	18.5		19.8		
Pump	Motor						l/m	0.0	30	36	42	48	54	60.0	72	84	90			
							M <sup>3</sup> /hr	0.0	1.8	2.2	2.5	2.9	3.2	3.6	4.3	5.0	5.4			
								l/s	0.0	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5		
TBRF 1050 	TF 037	DOL	3.7	5	50	30	HEAD VALUES IN METRES	300.0	265.0	257.6	249.4	240.4	230.7	220.0	194.7	163.6	145.7	10		
TBRF 1060	TF 045H	DOL	4.5	6	60			360.0	318.5	309.2	299.2	288.5	276.9	264.0	233.6	196.3	174.8	12		
TBRF 1075	TF 056H	DOL	5.5	7.5	75			450.0	398.1	386.4	374.0	360.7	346.1	330.0	292.0	245.3	218.6	14.5		

### TARO "TBRF 15/20 SERIES" - THREE PHASE BOX TYPE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TBRF 15 / 20 series at 415 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY													FL Current (A)			
			kW	HP			Gpm	0.0	11.9	13.2	15.8	18.5	19.8	21.1	23.8	26.4	29.0	31.7	34.3		37.0		
Pump	Motor						l/m	0.0	54	60	72	84	90	96	108	120	132	144	156	168			
							M <sup>3</sup> /hr	0.0	3.2	3.6	4.3	5.0	5.4	5.8	6.5	7.2	7.9	8.6	9.4	10.1			
								l/s	0.0	0.9	1.0	1.2	1.4	1.5	1.6	1.8	2.0	2.2	2.4	2.6	2.8		
TBRF 1537 	TF 037	DOL	3.7	5	37	40	HEAD VALUES IN METRES	222.0	189.5	185.3	175.9	165.2	159.1	152.4	137.1	118.7	97.1				10		
TBRF 1545	TF 045H	DOL	4.5	6	45			270.0	230.5	225.4	214.0	200.9	193.5	185.4	166.7	144.4	118.1				12		
TBRF 1556	TF 056H	DOL	5.5	7.5	56			336.0	286.9	280.4	266.3	250.0	240.8	230.7	207.4	179.7	146.9				14.5		
TBRF 2025 	TF 037	DOL	3.7	5	25			167.5			150.4	145.7	142.6	138.9	130.0	118.9	105.9	91.7	76.6	59.9	10		
TBRF 2030	TF 045H	DOL	4.5	6	30			201.0			180.5	174.9	171.2	166.6	156.0	142.7	127.0	110.1	91.9	71.9	12		
TBRF 2037	TF 056H	DOL	5.5	7.5	37			247.9			222.6	215.7	211.1	205.5	192.4	176.0	156.7	135.7	113.3	88.6	14.5		

### TARO "TBRF 15 SERIES" - SINGLE PHASE BOX TYPE RADIAL FLOW SUBMERSIBLE PUMPSETS FOR 100 mm (4") BOREWELLS

Approximate performance values of TBRF 15 series at 220 V (-15% to +6%), 2850 rpm, 50 Hz AC power supply

Model Name		Connection	Motor Rating		Stages	Pipe Size (mm)	CAPACITY													FL Current (A)			
			kW	HP			Gpm	0.0	11.9	13.2	15.8	18.5	19.8	21.1	23.8	26.4	29.0	31.7	34.3		37.0		
Pump	Motor						l/m	0.0	54	60	72	84	90	96	108	120	132	144	156	168			
							M <sup>3</sup> /hr	0.0	3.2	3.6	4.3	5.0	5.4	5.8	6.5	7.2	7.9	8.6	9.4	10.1			
								l/s	0.0	0.9	1.0	1.2	1.4	1.5	1.6	1.8	2.0	2.2	2.4	2.6	2.8		
TBRF 1537 S	SF037	-	3.7	5	37	40	HEAD VALUES IN METRES	222.0	189.5	185.3	175.9	165.2	159.1	152.4	137.1	118.7	97.1				28		

Performance conforming to IS : 8034 and 9283

All motors (1 & 3 phase) are ISI marked

Maximum outer diameter : 98 mm

 - Star rated pump sets

**PRODUCT TYPE KEY**

TBRF 10 50 - Taro, Box type Radial flow, Four inch, 10 series, 50 Stages

TF 037 - Three phase, Four inch motor (037 Power code)

TBRF 15 37 S - Taro, Box type Radial flow, Four inch, 15 series, 37 Stages, Single phase

SF 037 - Single phase, Four inch motor (037 Power code)





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