

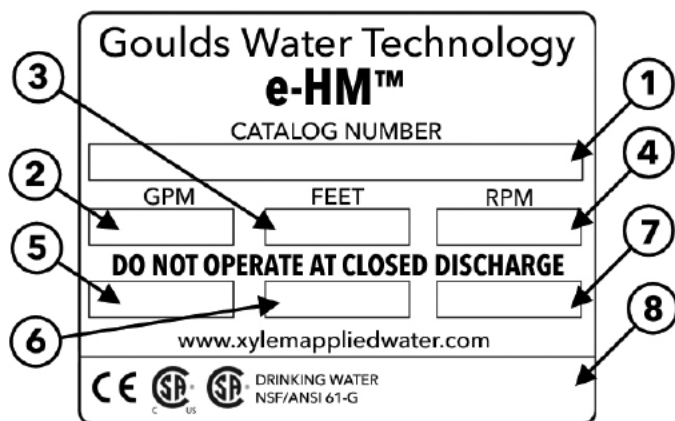
# e-HM<sup>TM</sup> 60 Hz TECHNICAL MANUAL

THREADED HORIZONTAL MULTISTAGE CENTRIFUGAL ELECTRIC PUMPS

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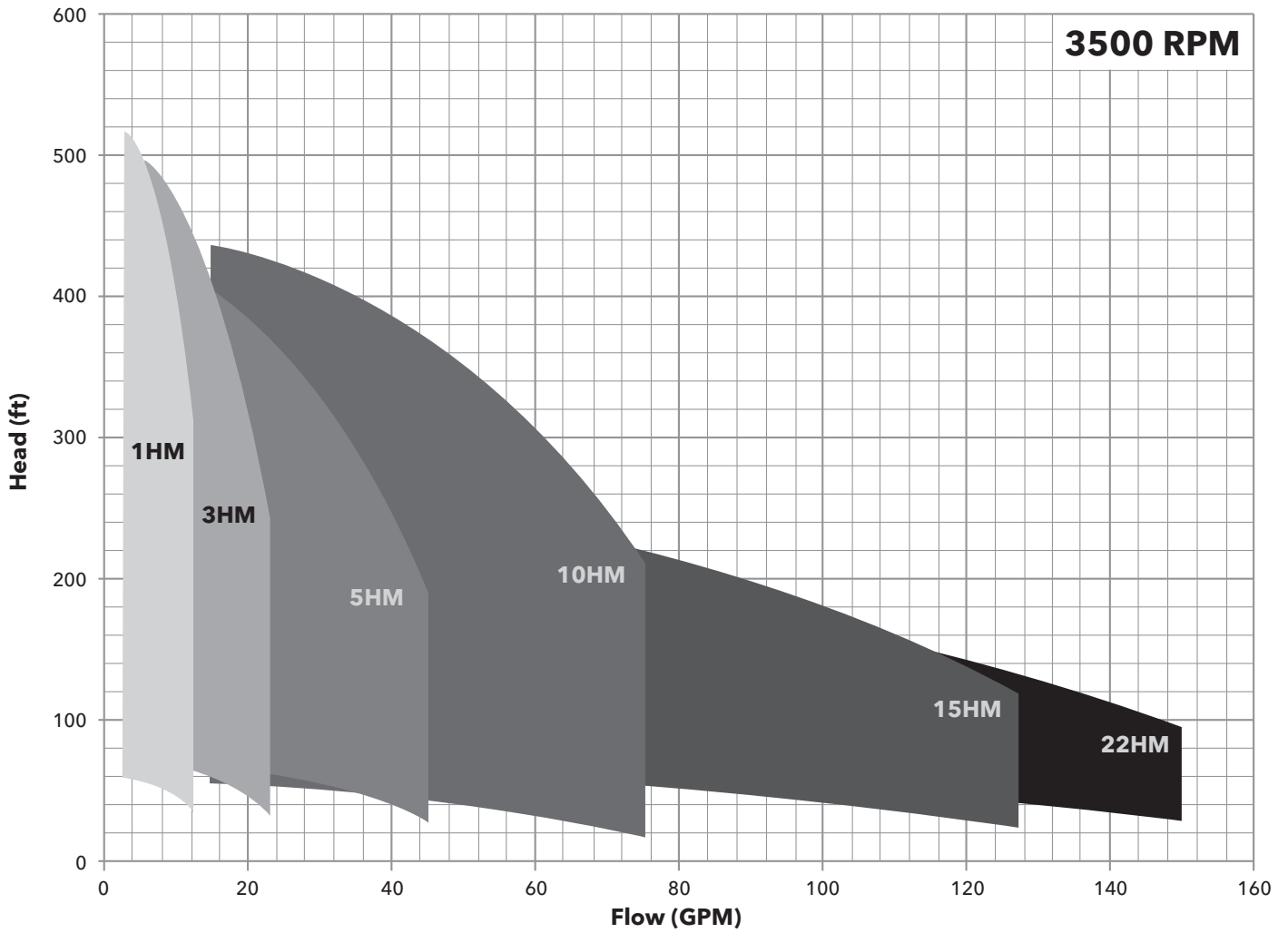
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### e-HM RATING PLATE



1	Goolds Water Technology Catalog Number
2	Capacity Range
3	TDH Range
4	Rated Speed
5	Rated Horsepower
6	Maximum Operating Pressure
7	Maximum Fluid Temperature
8	Pump Serial Number

### e-HM™ Series Hydraulic Coverage Curve



## Commercial Water

### e-HM™ SERIES GENERAL INTRODUCTION

Our customers are central to our business.

Xylem has recently developed the new e-HM series of energy-efficient horizontal, multi-stage pumps, to meet the needs of the industrial and building services markets.

#### Pump Design

The e-HM is a non-self-priming, end-suction, horizontal multi-stage high pressure centrifugal pump, with NPT threaded inlet and outlet connections. The pump is a close-coupled design, and is equipped with a high-efficiency motor. The pump incorporates an innovative, hydraulic design that provides the highest efficiency in the market today.

The e-HM™ are highly modular pumps that are fitted with an innovative hydraulic design that secures high efficiency performances and an increased Mean Time Between Failure.

The e-HM is available in two different configurations:

- “Compact” design - for sizes 1HM, 3HM, and 5HM up to a maximum of 6 stages.
- “Sleeve” design - for sizes 1HM, 3HM and 5HM starting at 7 stages and above; and all sizes of 10HM, 15HM, and 22HM sizes.

The “Compact” design is made of one single piece fabricated stainless steel pump body directly connected to the motor flange. The design only requires one O-ring to seal the casing.

The “Sleeve” design is made of an external stainless steel TIG welded sleeve, and incorporates a separate suction housing.

The e-HM™ is available in these material combinations:

- HM..S: full stainless steel (EN 1.4301/ AISI 304) - all models.
- HM..N: full stainless steel (EN 1.4401/ AISI 316) - al models.

The e-HM is available in all 316 stainless steel construction incorporating a 20% increase in the pump body thickness for enhanced durability and reliability.

#### Motor

The e-HM™ series can be equipped as well with Lowara variable speed drives such as the Hydrovar™.

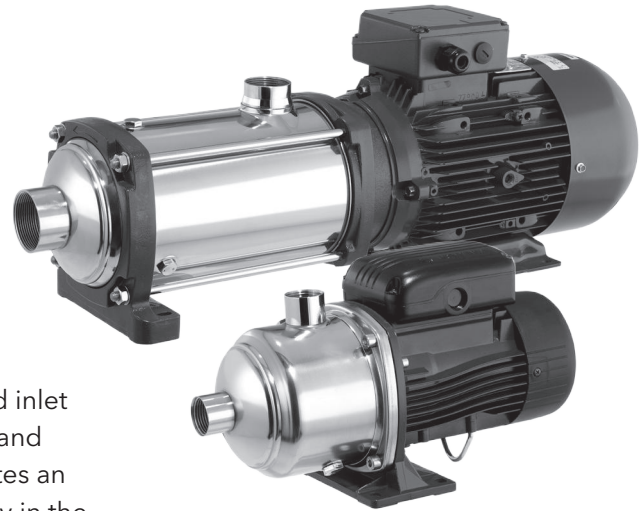
The e-HM series incorporates a Lowara IEC premium efficiency (IE3), inverter design motor for additional energy savings, and versatility. The standard motor enclosure is a TEFC (IP55) design.

Xylem conforms to the requirements of the Energy Independence and Security Act (EISA) of 2007. Under the Energy Independence and Security Act of 2007 (EISA), covered motors that are manufactured or imported for distribution in commerce in the United States on or after December 19, 2010, must comply with the applicable EISA energy conservation standards. EISA-covered motors include general purpose electric motors (subtype I), general purpose electric motors (subtype II), fire pump motors, and NEMA Design B general purpose electric motors, which are manufactured alone or as a component of another piece of equipment. The standards are found in sections 431.25(c)-(f) of Title 10 of the Code of Federal Regulations, Part 431 (10 CFR Part 431).

#### Range declination

The e-HM™ series are available as:

- Fix speed electric pump
- Variable speed system with Hydrovar



## Commercial Water

### e-HM™ SERIES APPLICATIONS, BENEFITS – INDUSTRY

The e-HM™ series and the different available configurations and standard options have been designed to cover a wide range of applications in industry from washing and cleaning machines, to cooling and heating applications, thru water treatment and filtration processes.

#### Applications

The e-HM series could be installed either in machines where compactness and high performances are a must or within industrial processes where the user looks for a reliable modular design with a restricted vertical footprint.

The e-HM series offers as well a wide range of standard options to fit every single requirement coming from the industry. The different material and configuration available allow e-HM series working with a wide range of liquid temperature starting -30°C to +120°C.

#### Benefits

**Reliability:** The e-HM series have been designed to withstand heavy-duty applications in Industry. For instance, e-HM balanced impeller helps decreasing the axial thrust withstand by the motor bearing extending its lifetime; pump body thickness has been increased by 20% to support heavy duty operation.

**Versatility:** The e-HM series have been designed to be modular, offering two different mechanical configurations (very compact or highly efficient design), AISI 304 pump body to full AISI 316 execution, and surface treatment options (electropolishing and and passivation). Multiple standard options make e-HM fitting in many different applications.

**Performances:** The e-HM series provide best-in class efficiency up to 72% that means 30% energy saving in average compare to similar pump design from the market. The e-HM series will be clearly your preferred choice to meet any efficiency requirements or simply to save money in your installation and processes.

**A global platform:** the e-HM series are assembled in different factories across the world to make e-HM always closer to our customers. Beyond our commitment to reduce the carbon footprint of e-HM, this global platform secure that the same design is available everywhere with the same quality processes.

#### Features

- Wide range of performances with 6 sizes, flow up to 29 m<sup>3</sup>/h, pressure up to 159 meters.
- Nominal pressure up to 10 bars with Noryl™ impellers and 16 bars with stainless steel impellers
- More than 85% of the range has the same suction height (90mm) for easy installation or system upgrade.
- Wide range of temperatures for pumped liquid: -30°C to +120°C (with stainless steel impellers).
- Wide range of voltages for worldwide applications.
- Availability of UL (cURus) motor version for North American market (230/460V 60 Hz with 9 pins control box).
- "Essential O-ring design" that highly reduces the sealing weaknesses (1 O-Ring for Compact, 2 for Sleeve).
- IE3 Lowara motors: high performances and silent operations.



### e-HM™ SERIES GENERAL CHARACTERISTICS

1HM, 3HM			
2-6 Stages		7+ stages	
t (F)	psi	t (F)	psi
-20	147	-20	235
248	147	248	235
248	147	248	235
248	147		
248	147	194	235
		194	235
194	147		

5HM			
2-5 Stages		7+ stages	
t (F)	psi	t (F)	psi
-20	147	-20	235
248	147	248	235
248	147	248	235
248	147		
248	147	194	235
		194	235
194	147		

10HM, 15HM, 22HM	
All Stages	
t (F)	psi
-20	235
248	235
248	235
194	235
194	235
194	0

### ELECTRIC PUMP NOISE

POWER	NOISE
HP	LpA dB
0.75	55
1	55
1.5	60
2	60
3	60
4	60
5.5	60
7.5	60

The table shows the mean sound pressure (Lp) measured as per Curve A (Standard ISO 1680). Noise values were measured with the 50 Hz motor running idle with a tolerance of 3 dB (A).

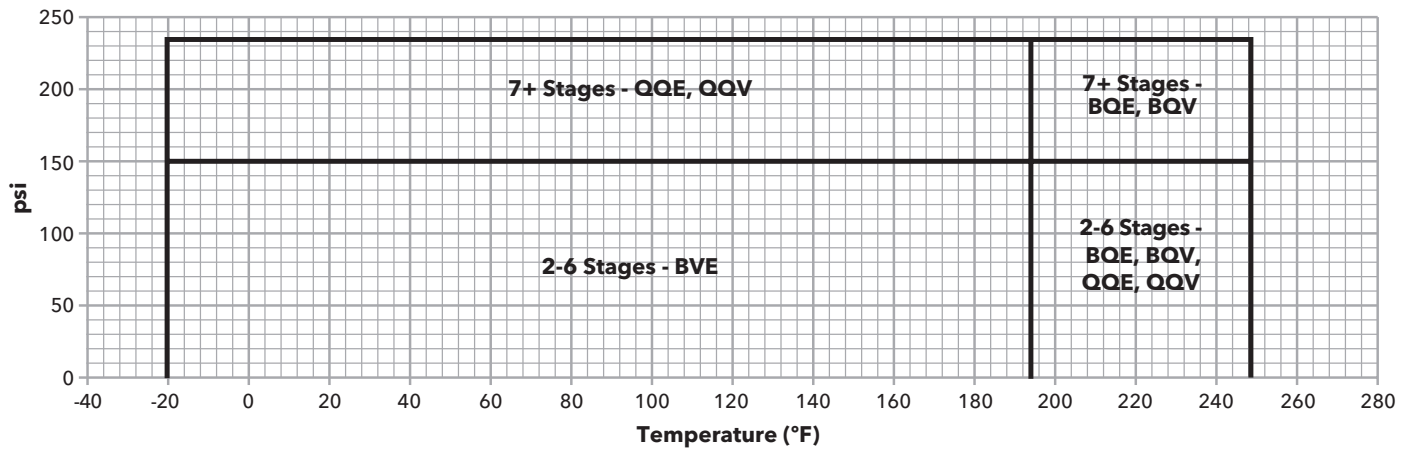
### STORAGE AND TRANSPORT TEMPERATURE

-40°C to +60°C

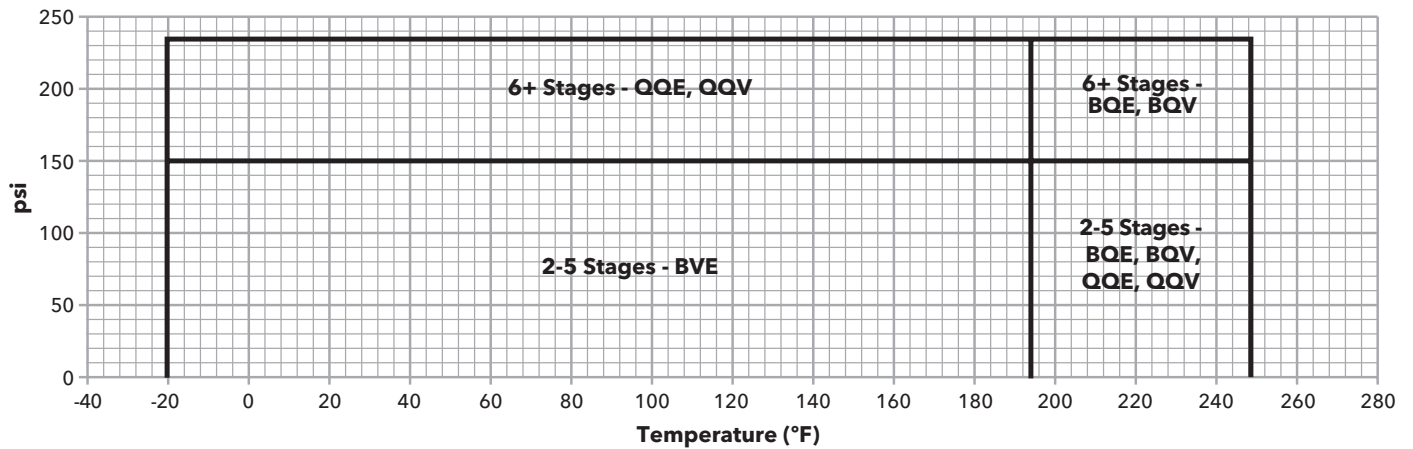
### NEMA MG-1 TABLE 12-12 FL EFFICIENCIES FOR 60 HZ NEMA PREMIUM

HP	2-POLE	Lowara	2-POLE
1	77	Lowara SM IE3	83.4
1½	84		85.6
2	85.5		87.2
3	86.5		87.7
5	88.5		91.0
7½	89.5		90.5
10	90.2	Lowara PLM IE3	90.8
15	91		92.4
20	91		93.4
25	91.7		93.5
30	91.7		93.4
40	92.4		

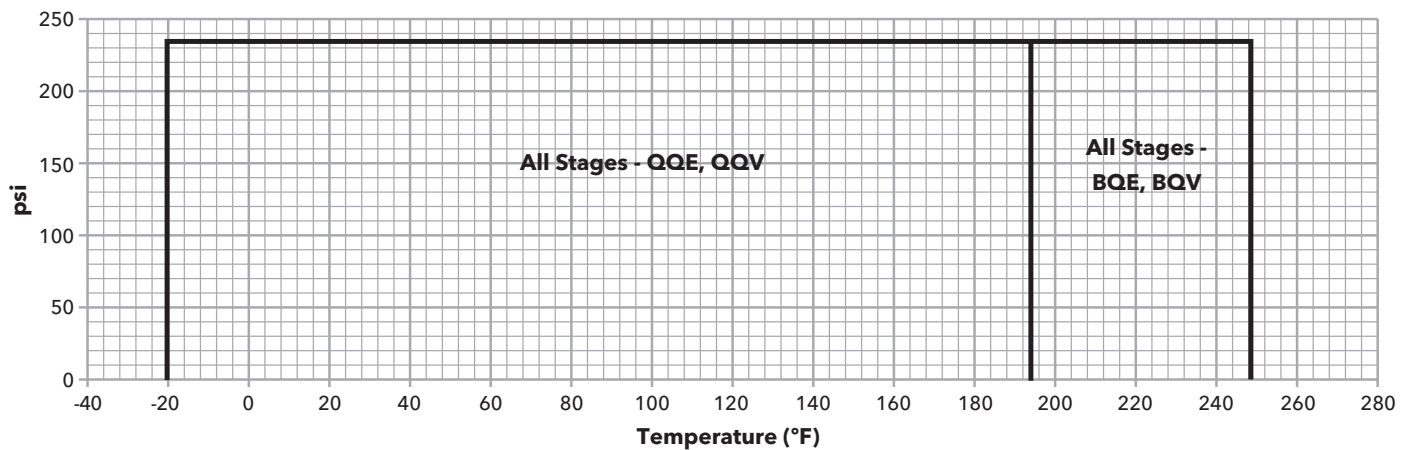
### 1HM, 3HM PRESSURE AND TEMPERATURE LIMITS



### 5HM PRESSURE AND TEMPERATURE LIMITS



### 10HM, 15HM, 22HM PRESSURE AND TEMPERATURE LIMITS



### e-HM™ SERIES

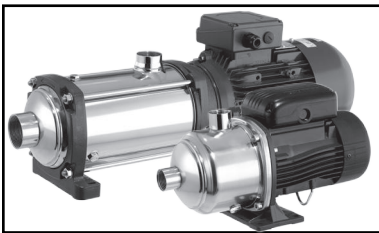
**High efficiency  
horizontal  
multistage pump**

### MARKETS

BUILDING SERVICES.  
INDUSTRY.

### APPLICATIONS

Pressure boosting and water supply systems.  
Washing and cleaning industry including vehicles washing.  
Circulation of hot and cold liquids (like water, water and glycol) for heating, cooling and conditioning systems.  
Water treatment applications.  
Handling of moderately aggressive liquids.  
Food & beverage industries.



### SPECIFICATIONS

#### Pump

- Flow rate: up to 127 GPM
- Heads: up to 525 ft ( 227 psi )
- Designs:
  - Compact - one piece pump body
    - 1HM and 3HM, sizes up to 6 stages
    - 5HM, sizes up to 5 stages
  - Sleeve - Sleeve and separate suction housing
    - 1HM and 3HM, 7 stages and above
    - 5 HM, 6 stages and above
    - All 10HM, 15HM, and 22HM sizes
- Connections: NPT threaded suction and discharge
- Temperature of the pumped liquid: -20°F to 248°F ( -30°C to 120°C )
- Maximum operating pressure:
  - Compact pump designs - 147 PSI
  - Sleeve pump designs - 235 PSI

#### Motor

- Premium Efficiency class IE3
- TEFC (IP 55) design
- 3500 RPM
- Class F insulation, 40°C (104°F) ambient
- Standard voltage:
  - Single-phase: 115 or 230V, 60 Hz.- built in auto reset overload protection
  - Three-phase: 208-230/460V or 575V, 60 Hz



## Commercial Water

### e-HM™ SERIES GENERAL CHARACTERISTICS



**Compact**



**Sleeve**

HM Series	1HM	3HM	5HM	10HM	15HM	22HM
Nominal Flow ( GPM )	10	16	33	56	90	100
Flow Range ( GPM )	3 - 12	5-23	10 - 45	15 - 75	25 - 127	30 - 150
Number of Stages	2 - 18	2 - 14	2 - 12	1 - 8	1 - 4	1 - 3
Maximum Head ( Ft )	520	500	430	450	275	217
Maximum Working Pressure	147 psi - Compact pumps 235 psi - Sleeve pumps					
Temperature Range ( °F )	-20 F to 248 F ( 30C to 120 C )					
Maximum Pump Efficiency ( % )	51	60	70	70	70	68
HP Range	3/4 - 2	3/4 - 3	3/4 - 4	1 - 7 1/2	2 - 7 1/2	3 - 7 1/2
Piping Connections (NPT)	1" x 1"	1" x 1"	1 1/4" x 1"	1 1/2" x 1 1/4"	2" x 1 1/2"	2" x 1 1/2"

### OPTIONAL FEATURES:

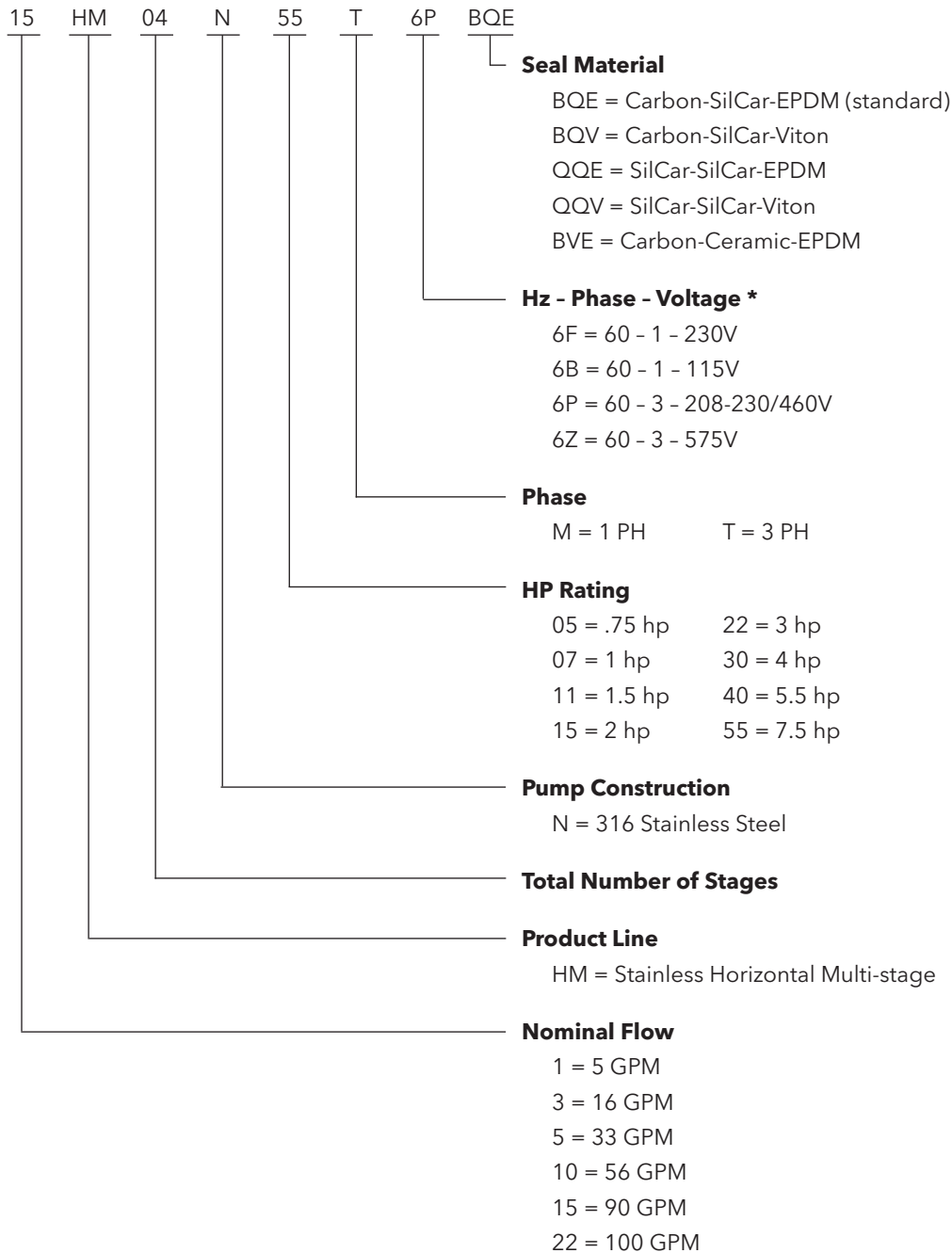
- Special Voltages
- 50 Hz Frequency
- Suitable for use with VFDs (ABII, SPD, Hydrovar, CPC and IPC)

### e-HM PRODUCT LINE NUMBERING SYSTEM FOR 1 - 22HM PUMPS

The various versions of the e-HM line are identified by a product code number on the pump label. This number is also the catalog number for the pump. The meaning of each digit in the product code number is shown below.

Note: Not all combinations are possible.

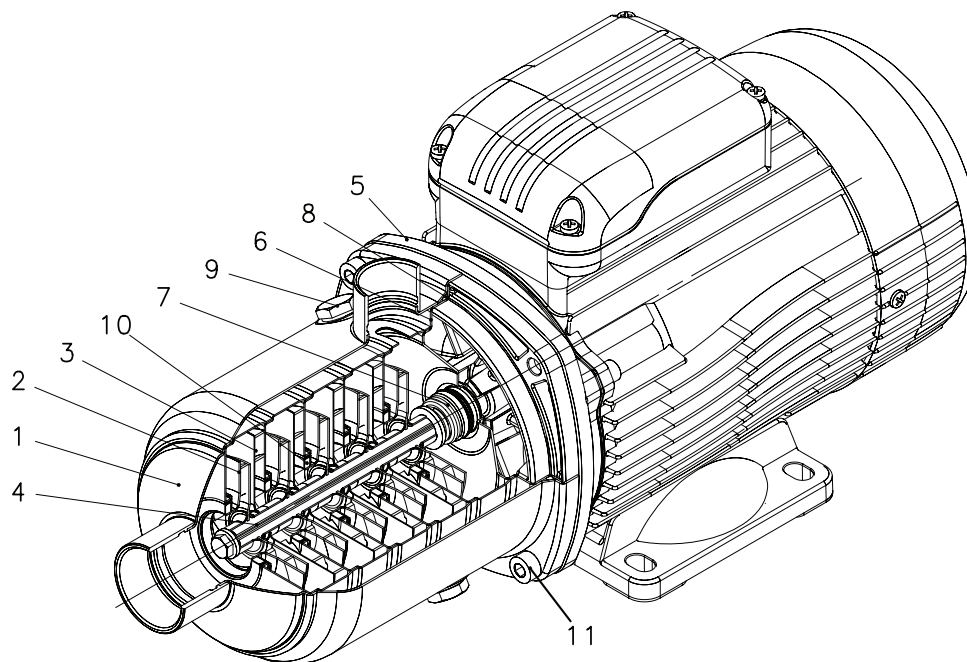
#### Example Product Code



\* 50 Hz and dual rated coming soon

### MODEL 1, 3, 5 HM..N SERIES - MAJOR COMPONENTS

#### (COMPACT DESIGN)

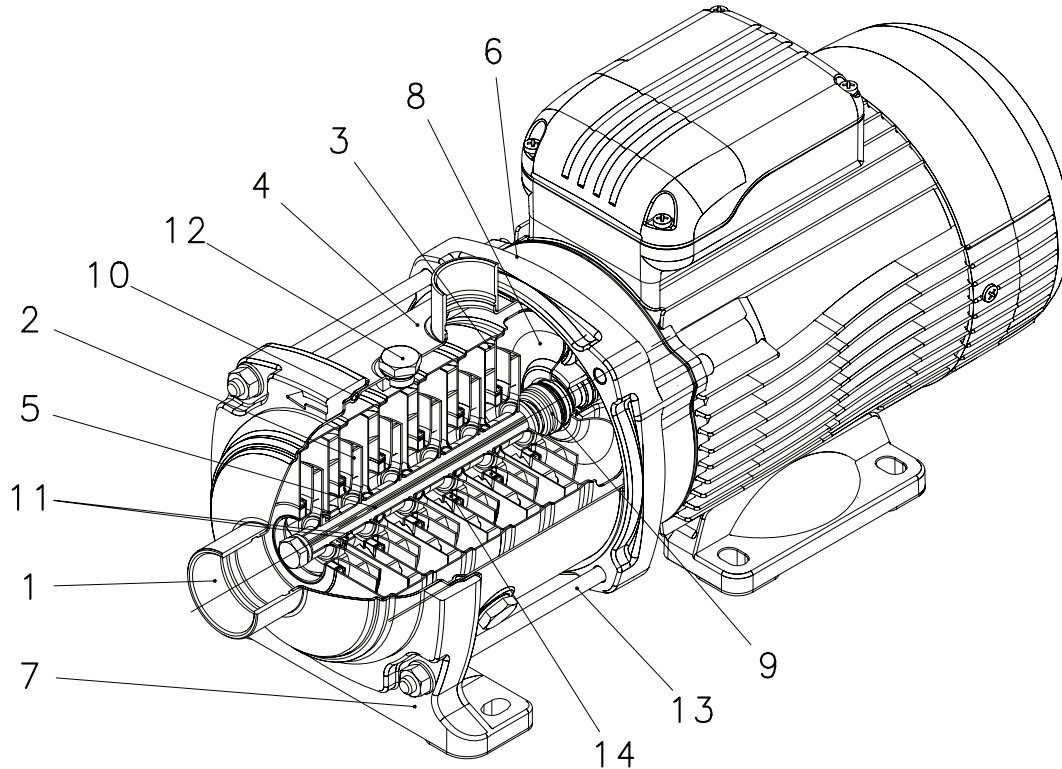


#### TABLE OF MATERIALS HM..N SERIES

REFERENCE NUMBER	NAME	MATERIAL	REFERENCE STANDARDS	
			USA	EUROPE
1	Pump body	Stainless steel	AISI 316L	EN 10088-1-X2CrNiMo17-12-2 (1.4404)
2	Impeller	Stainless steel	AISI 316L	EN 10088-1-X2CrNiMo17-12-2 (1.4404)
3	Diffuser	Stainless steel	AISI 316L	EN 10088-1-X2CrNiMo17-12-2 (1.4404)
4	Shaft	Stainless steel	AISI 316	EN 10088-1-X5CrNiMo17-12-2 (1.4401)
5	Adapter	Aluminium	-	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)
6	Seal housing	Stainless steel	AISI 316L	EN 10088-1-X2CrNiMo17-12-2 (1.4404)
7	Mechanical seal	Ceramic / Carbon / EPDM		
8	Elastomers	EPDM		
9	Fill / drain plugs	Stainless steel	AISI 316	EN 10088-1-X5CrNiMo17-12-2 (1.4401)
10	Wear ring	Technopolymer (PPS)		
11	Bolts and screws	Stainless steel	AISI 304	EN 10088-1-X5CrNi18-10 (1.4301)

### MODEL 1, 3, 5, 10, 15, 22 HM..N SERIES - MAJOR COMPONENTS

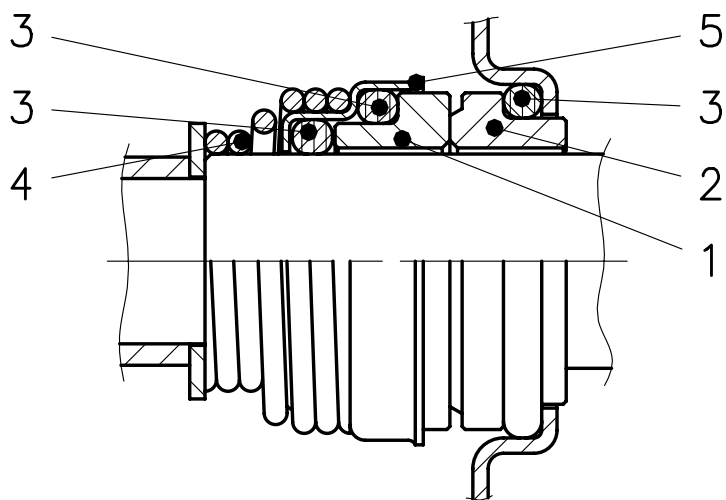
#### (SLEEVE DESIGN)



#### TABLE OF MATERIALS HM..N SERIES

REFERENCE NUMBER	NAME	MATERIAL	REFERENCE STANDARDS	
			USA	EUROPE
1	Head	Stainless steel	AISI 316L	EN 10088-1-X2CrNiMo17-12-2 (1.4404)
2	Impeller	Stainless steel	AISI 316L	EN 10088-1-X2CrNiMo17-12-2 (1.4404)
3	Diffuser and upper spacer	Stainless steel	AISI 316L	EN 10088-1-X2CrNiMo17-12-2 (1.4404)
4	Outer sleeve	Stainless steel	AISI 316L	EN 10088-1-X2CrNiMo17-12-2 (1.4404)
5	Shaft	Stainless steel	AISI 316	EN 10088-1-X5CrNiMo17-12-2 (1.4401)
6	Adapter	Aluminium	-	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)
7	Ring with foot	Aluminium	-	EN 1706-AC-AISI11Cu2 (Fe) (AC46100)
8	Seal housing	Stainless steel	AISI 316L	EN 10088-1-X2CrNiMo17-12-2 (1.4404)
9	Mechanical seal	Ceramic / Carbon / EPDM (PN10) - Silicon Carbide/Carbon/EPDM (PN16)		
10	Elastomers	EPDM		
11	Shaft sleeve and bushing	Tungsten carbide		
12	Fill / drain plugs	Stainless steel	AISI 316L	EN 10088-1-X5CrNiMo17-12-2 (1.4401)
13	Tie rods	Stainless steel	AISI 431	EN 10088-1-X17CrNi16-2 (1.4057)
14	Wear ring	Technopolymer (PPS)		

### e-HM™ SERIES MECHANICAL SEALS



### LIST OF MATERIALS

Components	Part Number			
	1	2	3	4 and 5
	Rotory Face	Stationary Face	Elastomers	Hardware
Materials	B - Carbon		E - EPDM (EPR)	All 316 SS
	Q - Sil Carbide		V - Viton	
	V - Ceramic			

### PRESSURE AND TEMPERATURES LIMITS

Seal Code	1HM, 3HM		5HM		10HM, 15HM, 22HM
	2-6 Stages	7+ Stages	2-5 Stages	6+ Stages	All Stages
BQE	147PSI at 248F	235PSI at 248F	147PSI at 248F	235PSI at 248F	235PSI at 248F
BQV	147PSI at 248F	235PSI at 248F	147PSI at 248F	235PSI at 248F	235PSI at 248F
QQE	147PSI at 248F	235PSI at 194F	147PSI at 248F	235PSI at 194F	235PSI at 194F
QQV	147PSI at 248F	235PSI at 194F	147PSI at 248F	235PSI at 194F	235PSI at 194F
BVE	147PSI at 194F	Not Available	147PSI at 194F	Not Available	Not Available

### MOTOR DATA

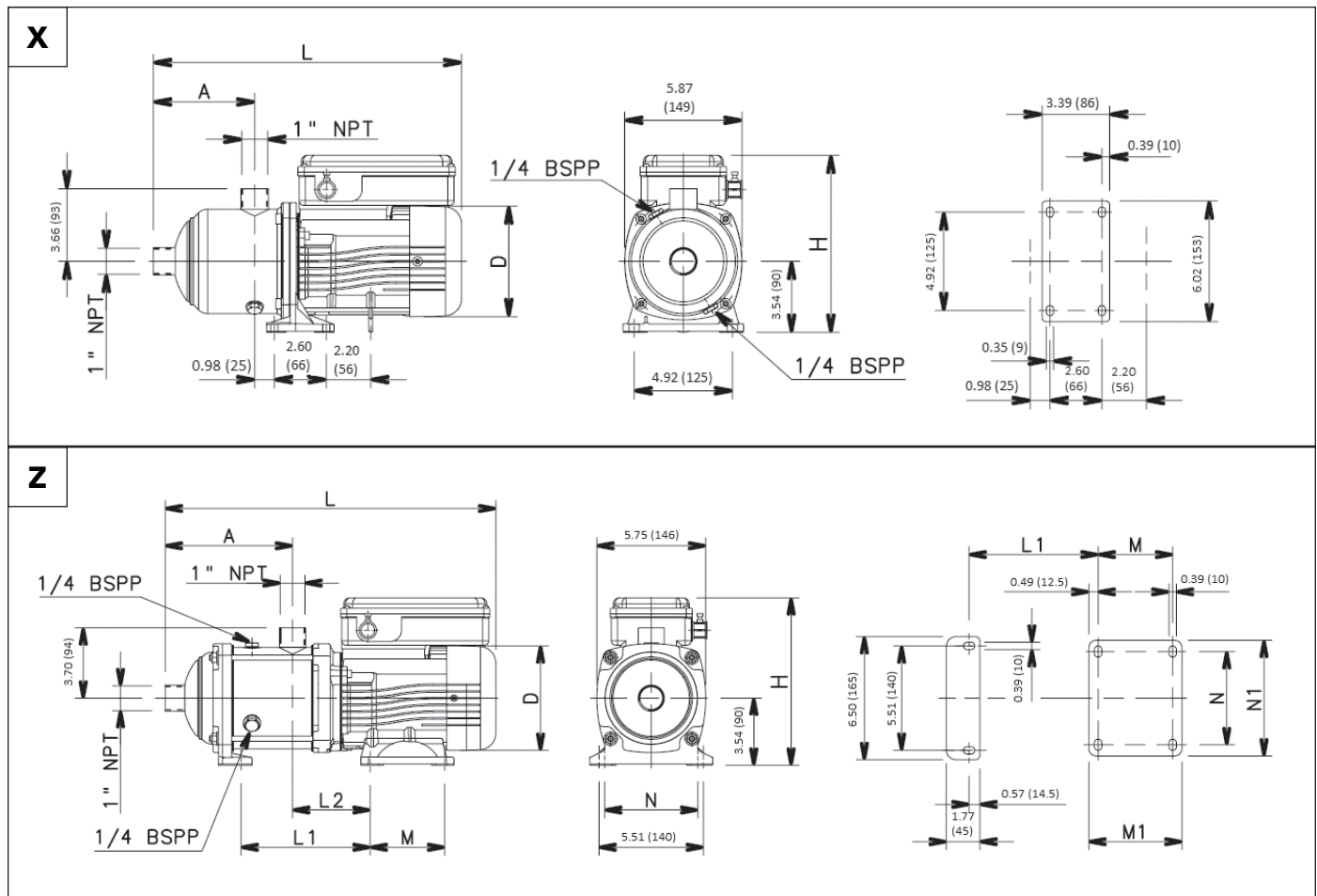
#### 3500 RPM, 60Hz, Lowara Motors

HP	Ph	Volts	Enclosure	SF	FL Amps	SF Amps	Frame Size	Motor Flange Type	GWT P/N
3/4	1	115	TEFC / IP55	1.0	8.07	N/A	71	COMPACT 1-3-5 EHM	107236000
1.0	1	115	TEFC / IP55	1.0	10.3	N/A	71	COMPACT 1-3-5 EHM	107236040
								SLEEVE 1-3-5 EHM	107236050
3/4	1	230	TEFC / IP55	1.0	3.69	N/A	71	COMPACT 1-3-5 EHM	107236010
1.0	1	230	TEFC / IP55	1.0	4.84	N/A	71	COMPACT 1-3-5 EHM	107236060
								SLEEVE 1-3-5 EHM	107236070
1.5	1	230	TEFC / IP55	1.0	6.85	N/A	80	SLEEVE 10-15-22 EHM	107236100
								COMPACT 1-3-5 EHM	107236110
								SLEEVE 1-3-5 EHM	107236120
2.0	1	230	TEFC / IP55	1.0	9.22	N/A	80	SLEEVE 10-15-22 EHM	107236130
								SLEEVE 1-3-5 EHM	107236160
3/4	3	208-230/460	TEFC / IP55	1.15	2.61-2.64/1.32	2.87	71	COMPACT 1-3-5 EHM	107236170
1.0	3	208-230/460	TEFC / IP55	1.15	3.09-3.02/1.51	3.46	80	COMPACT 1-3-5 EHM	107236020
								SLEEVE 1-3-5 EHM	107236180
1.5	3	208-230/460	TEFC / IP55	1.15	4.35-4.24/2.12	4.89	80	SLEEVE 10-15-22 EHM	107236190
								COMPACT 1-3-5 EHM	107236200
2.0	3	208-230/460	TEFC / IP55	1.15	5.77-5.58/2.79	6.51	80	SLEEVE 1-3-5 EHM	107236240
								SLEEVE 10-15-22 EHM	107236250
3.0	3	208-230/460	TEFC / IP55	1.15	8.23-7.98/3.99	9.33	90	COMPACT 1-3-5 EHM	107236280
								SLEEVE 1-3-5 EHM	107236290
4.0	3	208-230/460	TEFC / IP55	1.15	11.3-10.9/5.45	12.8	90	SLEEVE 10-15-22 EHM	107236300
								SLEEVE 1-3-5 EHM	50A01R300H
5.5	3	208-230/460	TEFC / IP55	1.15	14.1-13.4/6.7	16	100	SLEEVE 10-15-22 EHM	50A01R500H
7.5	3	208-230/460	TEFC / IP55	1.15	18.7-17.8/8.91	21.4	112	SLEEVE 1-3-5 EHM	50A02R300H
3/4	3	575	TEFC / IP55	1.15	1.04	1.12	71	SLEEVE 10-15-22 EHM	50A02R500H
1.0	3	575	TEFC / IP55	1.15	1.20	1.31	80	COMPACT 1-3-5 EHM	107236030
								SLEEVE 1-3-5 EHM	107236210
1.5	3	575	TEFC / IP55	1.15	1.69	1.87	80	SLEEVE 10-15-22 EHM	107236220
								COMPACT 1-3-5 EHM	107236230
2.0	3	575	TEFC / IP55	1.15	2.2	2.44	80	SLEEVE 1-3-5 EHM	107236260
								SLEEVE 10-15-22 EHM	107236270
3.0	3	575	TEFC / IP55	1.15	3.18	3.53	90	COMPACT 1-3-5 EHM	107236310
								SLEEVE 1-3-5 EHM	107236320
4.0	3	575	TEFC / IP55	1.15	4.36	4.86	90	SLEEVE 10-15-22 EHM	107236330
								SLEEVE 1-3-5 EHM	50A01T300H
5.5	3	575	TEFC / IP55	1.15	5.26	5.92	100	SLEEVE 10-15-22 EHM	50A01T500H
7.5	3	575	TEFC / IP55	1.15	7.2	8.07	112	SLEEVE 1-3-5 EHM	50A02T300H
								SLEEVE 10-15-22 EHM	50A02T500H
								SLEEVE 10-15-22 EHM	50A08T500H
								SLEEVE 10-15-22 EHM	50A13T500H

Above data is for Lowara™ Motors. Specifications are subject to change.

## Commercial Water

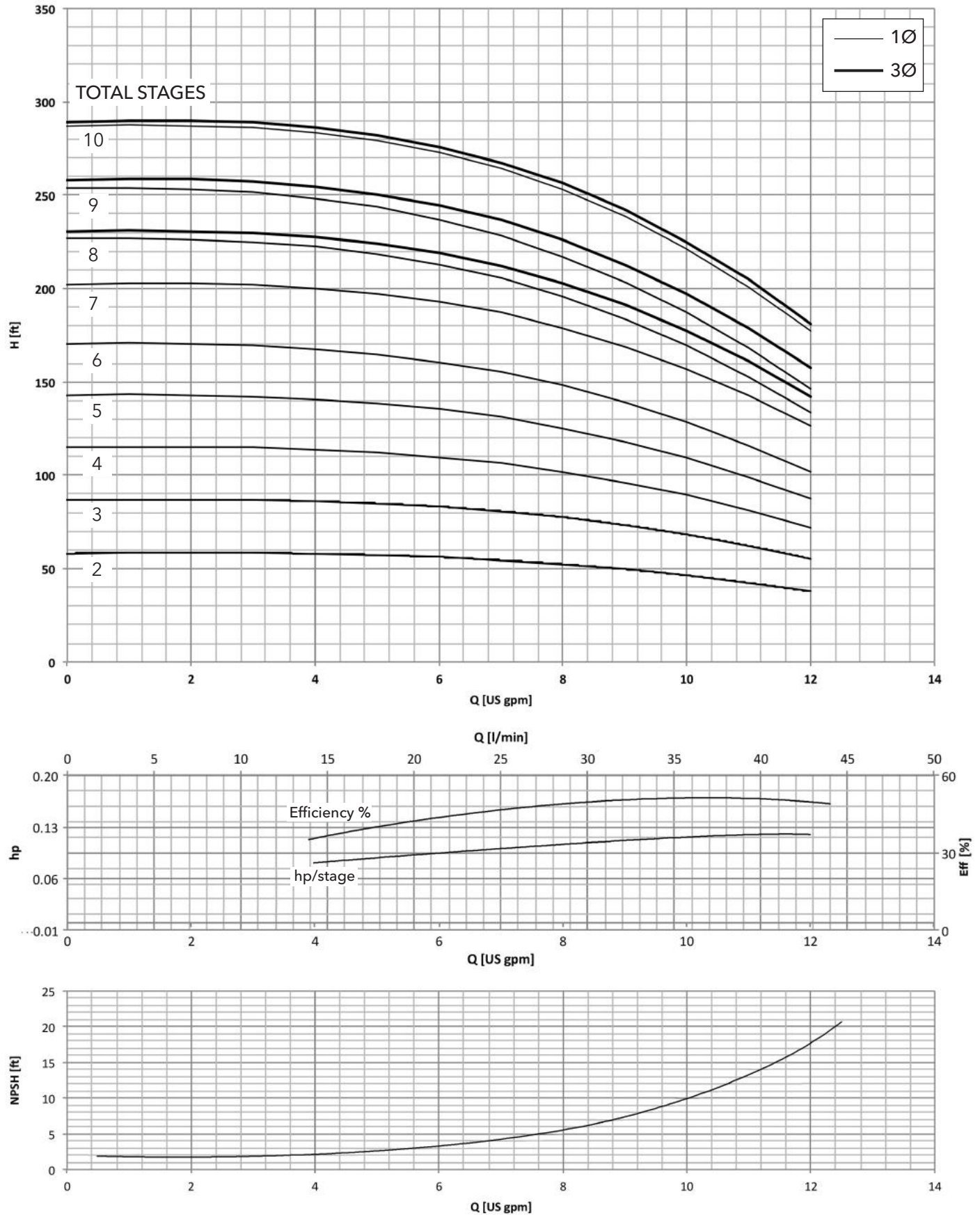
### 1HM..N SERIES, (2 TO 10 STAGES) DIMENSIONS AND WEIGHTS AT 60 HZ, 3500 RPM



Pump Size Stages	Phase	DWG No.	Motor		Dimensions (in)										Max. Working Pressure (PSI)	Weight (lbs)
			HP	Frame Size	A	D	H	L	L1	L2	M	M1	N	N1		
1HM02	SINGLE PHASE	X	0.75	71	3.43	5.51	8.86	13.78	-	-	-	-	-	-	147	18
1HM03			0.75	71	3.43	5.51	8.86	13.78	-	-	-	-	-	-	147	18
1HM04			0.75	71	4.21	5.51	8.86	14.57	-	-	-	-	-	-	147	20
1HM05			0.75	71	5.00	5.51	8.86	15.35	-	-	-	-	-	-	147	20
1HM06			0.75	71	5.79	5.51	8.86	16.14	-	-	-	-	-	-	147	20
1HM07	SINGLE PHASE	Z	1	71	5.94	5.51	8.86	16.69	6.02	4.09	3.94	4.92	4.92	6.10	235	24
1HM08			1	71	6.73	5.51	8.86	17.48	6.81	4.09	3.94	4.92	4.92	6.10	235	26
1HM09			1	71	7.52	5.51	8.86	18.27	7.60	4.09	3.94	4.92	4.92	6.10	235	26
1HM10			1.5	80	8.31	6.10	9.13	20.79	8.39	4.09	3.94	4.92	4.92	6.10	235	35

1HM02	THREE PHASE	X	0.75	71	3.43	5.51	8.86	13.78	-	-	-	-	-	-	147	18
1HM03			0.75	71	3.43	5.51	8.86	13.78	-	-	-	-	-	-	147	18
1HM04			0.75	71	4.21	5.51	8.86	14.57	-	-	-	-	-	-	147	20
1HM05			0.75	71	5.00	5.51	8.86	15.35	-	-	-	-	-	-	147	20
1HM06			0.75	71	5.79	5.51	8.86	16.14	-	-	-	-	-	-	147	20
1HM07	THREE PHASE	Z	1	71	5.94	6.10	9.13	18.43	6.02	4.09	3.94	4.92	4.92	6.10	235	31
1HM08			1	71	6.73	6.10	9.13	19.21	6.81	4.09	3.94	4.92	4.92	6.10	235	33
1HM09			1	71	7.52	6.10	9.13	20.00	7.60	4.09	3.94	4.92	4.92	6.10	235	33
1HM10			1.5	80	8.31	6.10	9.13	20.79	8.39	4.09	3.94	4.92	4.92	6.10	235	35

### 1HM..N SERIES, (2 TO 10 STAGES) OPERATING CHARACTERISTICS AT 60 HZ, 3500 RPM

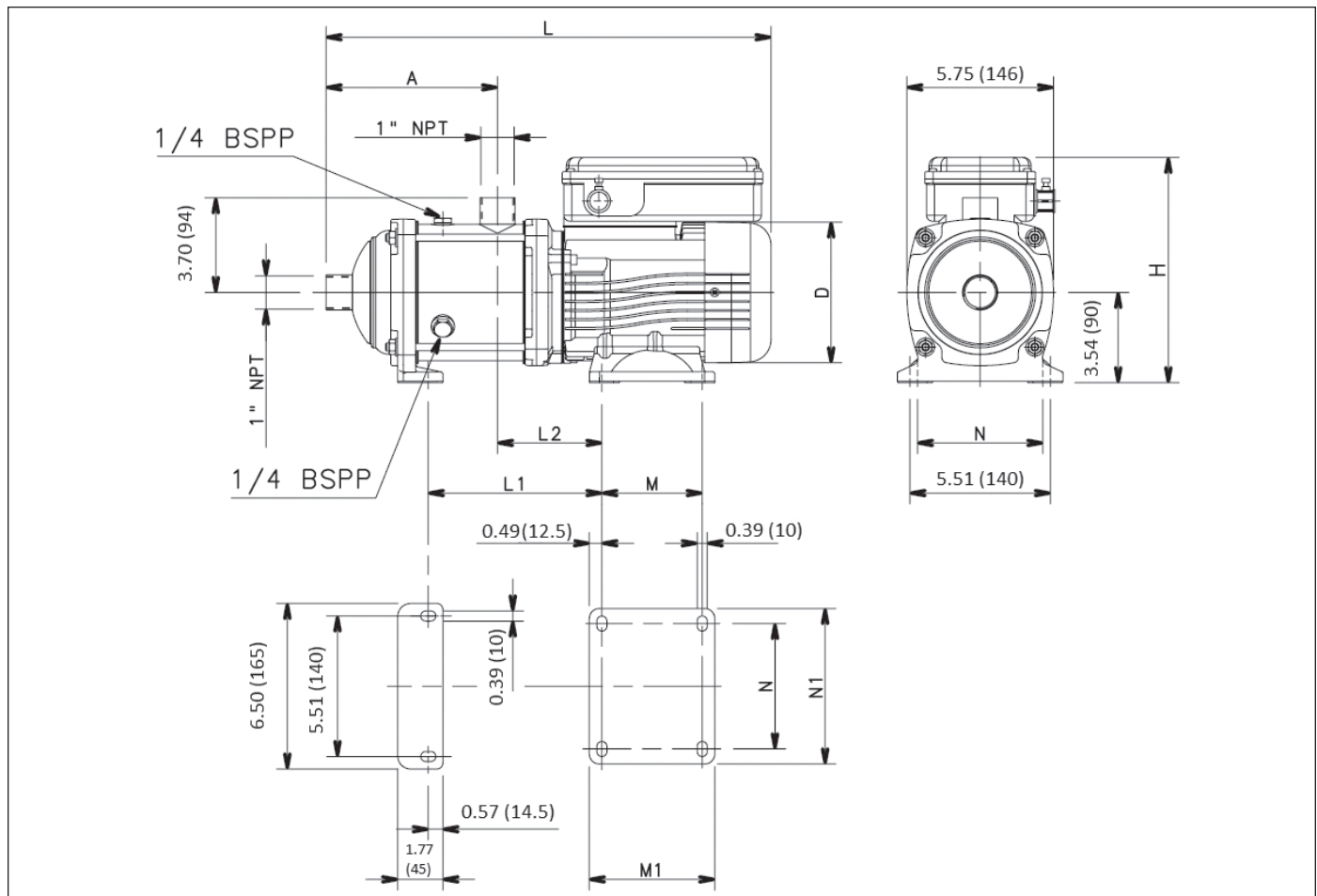


MINIMUM FLOW RATE: 3 GPM



## Commercial Water

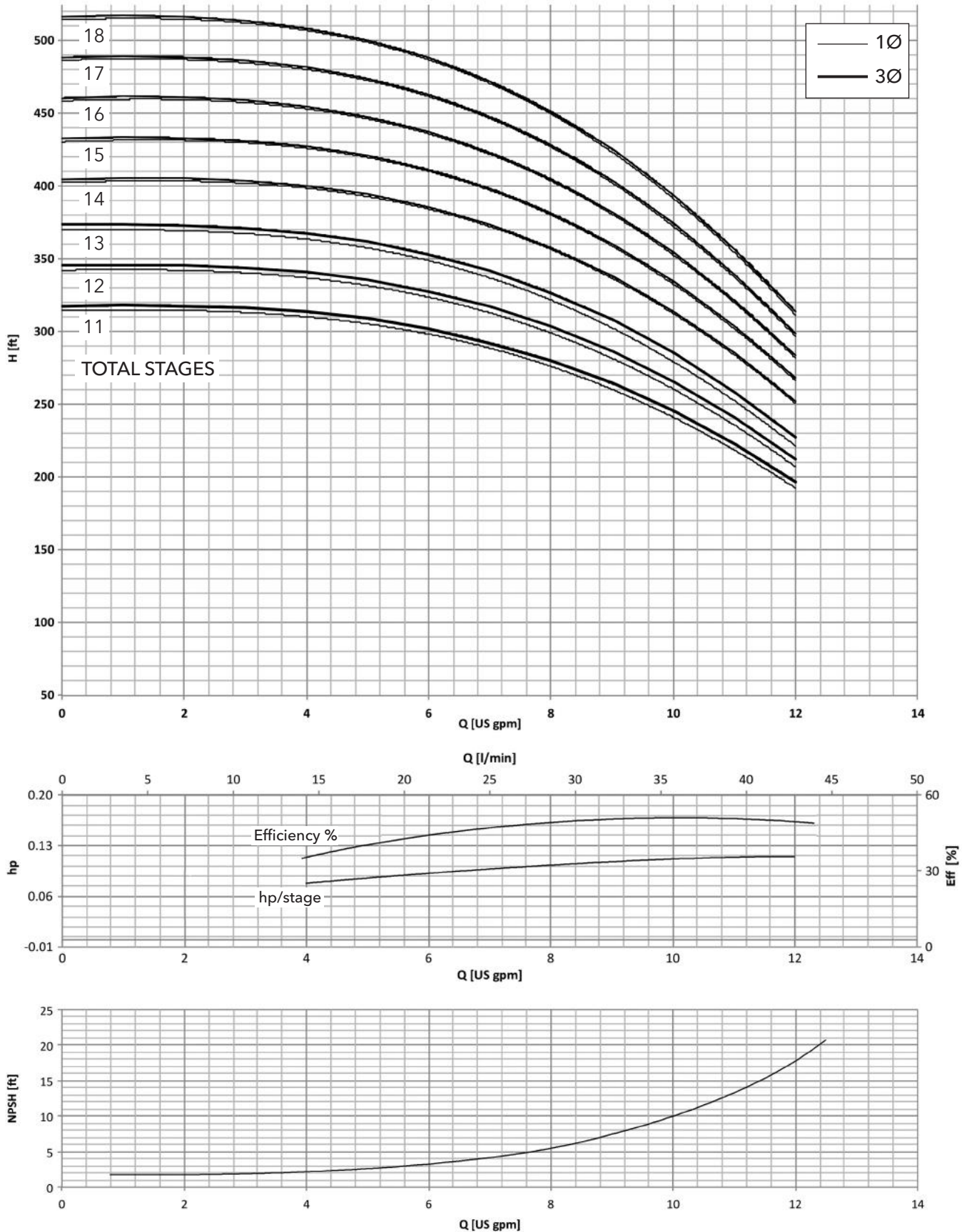
### 1HM..N SERIES, (11 TO 18 STAGES) DIMENSIONS AND WEIGHTS AT 60 HZ, 3500 RPM



Pump Size Stages	Phase	Motor		Dimensions (in)										Max. Working Pressure (PSI)	Weight (lbs)
		HP	Frame Size	A	D	H	L	L1	L2	M	M1	N	N1		
1HM11	SINGLE PHASE	1.5	80	9.09	6.10	9.13	21.57	9.17	4.09	3.94	4.92	4.92	6.10	235	37
1HM12		1.5	80	9.88	6.10	9.13	22.36	9.96	4.09	3.94	4.92	4.92	6.10	235	37
1HM13		1.5	80	10.67	6.10	9.13	23.15	10.75	4.09	3.94	4.92	4.92	6.10	235	37
1HM14		2	80	11.46	6.10	9.13	23.94	11.54	4.09	3.94	4.92	4.92	6.10	235	42
1HM15		2	80	12.24	6.10	9.13	24.72	12.32	4.09	3.94	4.92	4.92	6.10	235	42
1HM16		2	80	13.03	6.10	9.13	25.51	13.11	4.09	3.94	4.92	4.92	6.10	235	42
1HM17		2	80	13.82	6.10	9.13	26.30	13.90	4.09	3.94	4.92	4.92	6.10	235	44
1HM18		2	80	14.61	6.10	9.13	27.09	14.69	4.09	3.94	4.92	4.92	6.10	235	44

1HM11	THREE PHASE	1.5	80	9.09	6.10	9.13	21.57	9.17	4.09	3.94	4.92	4.92	6.10	235	37
1HM12		1.5	80	9.88	6.10	9.13	22.36	9.96	4.09	3.94	4.92	4.92	6.10	235	37
1HM13		1.5	80	10.67	6.10	9.13	23.15	10.75	4.09	3.94	4.92	4.92	6.10	235	37
1HM14		2	80	11.46	6.10	9.13	23.94	11.54	4.09	3.94	4.92	4.92	6.10	235	42
1HM15		2	80	12.24	6.10	9.13	24.72	12.32	4.09	3.94	4.92	4.92	6.10	235	42
1HM16		2	80	13.03	6.10	9.13	25.51	13.11	4.09	3.94	4.92	4.92	6.10	235	42
1HM17		2	80	13.82	6.10	9.13	26.30	13.90	4.09	3.94	4.92	4.92	6.10	235	44
1HM18		2	80	14.61	6.10	9.13	27.09	14.69	4.09	3.94	4.92	4.92	6.10	235	44

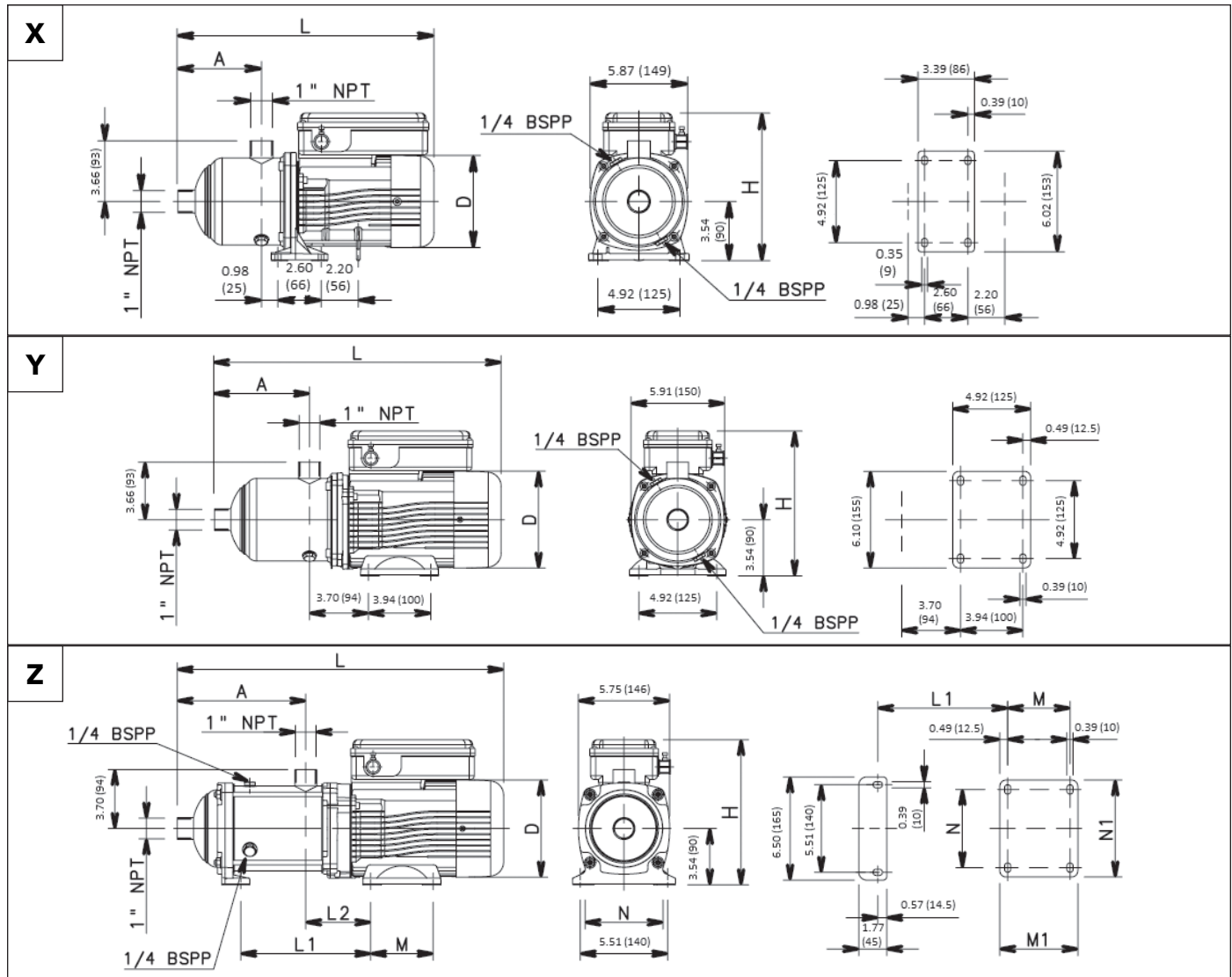
### 1HM..N SERIES, (11 TO 18 STAGES) OPERATING CHARACTERISTICS AT 60 HZ, 3500 RPM



MINIMUM FLOW RATE: 3 GPM

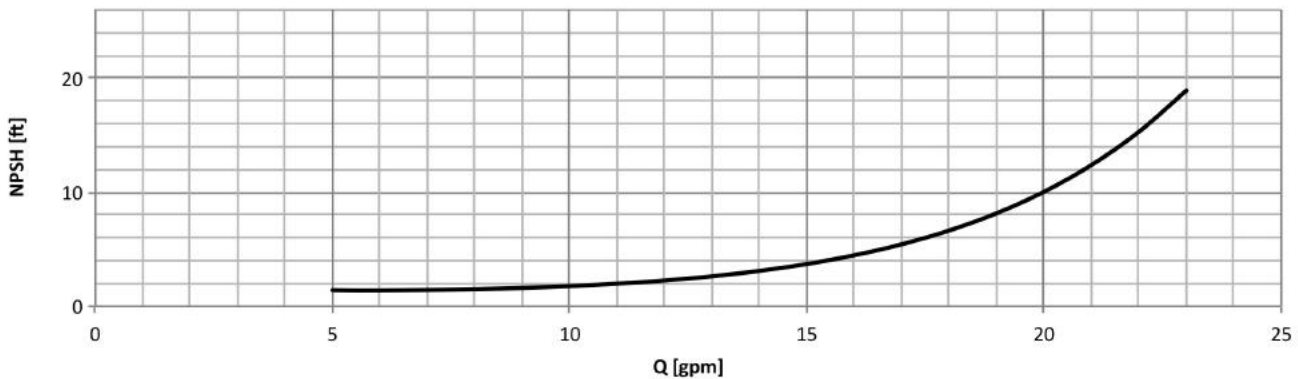
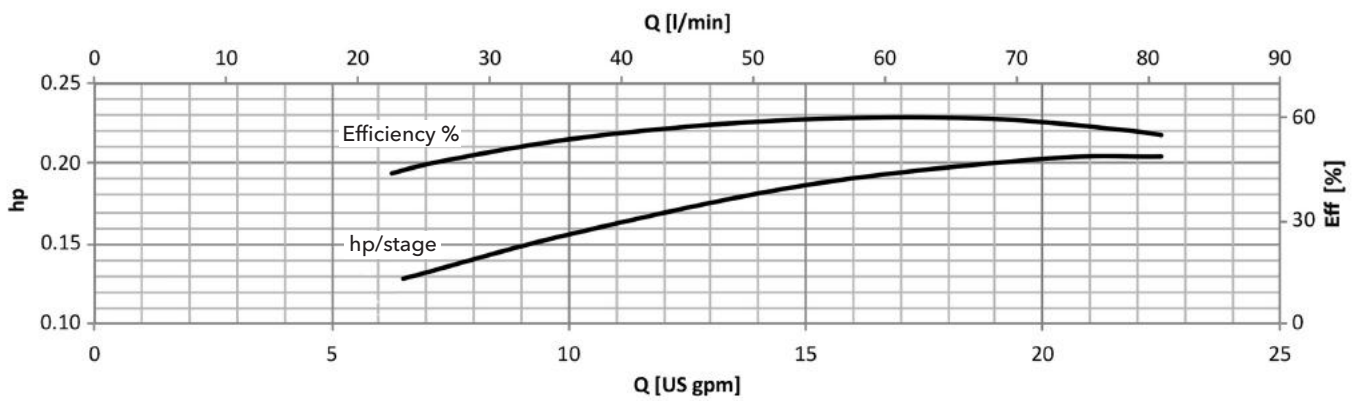
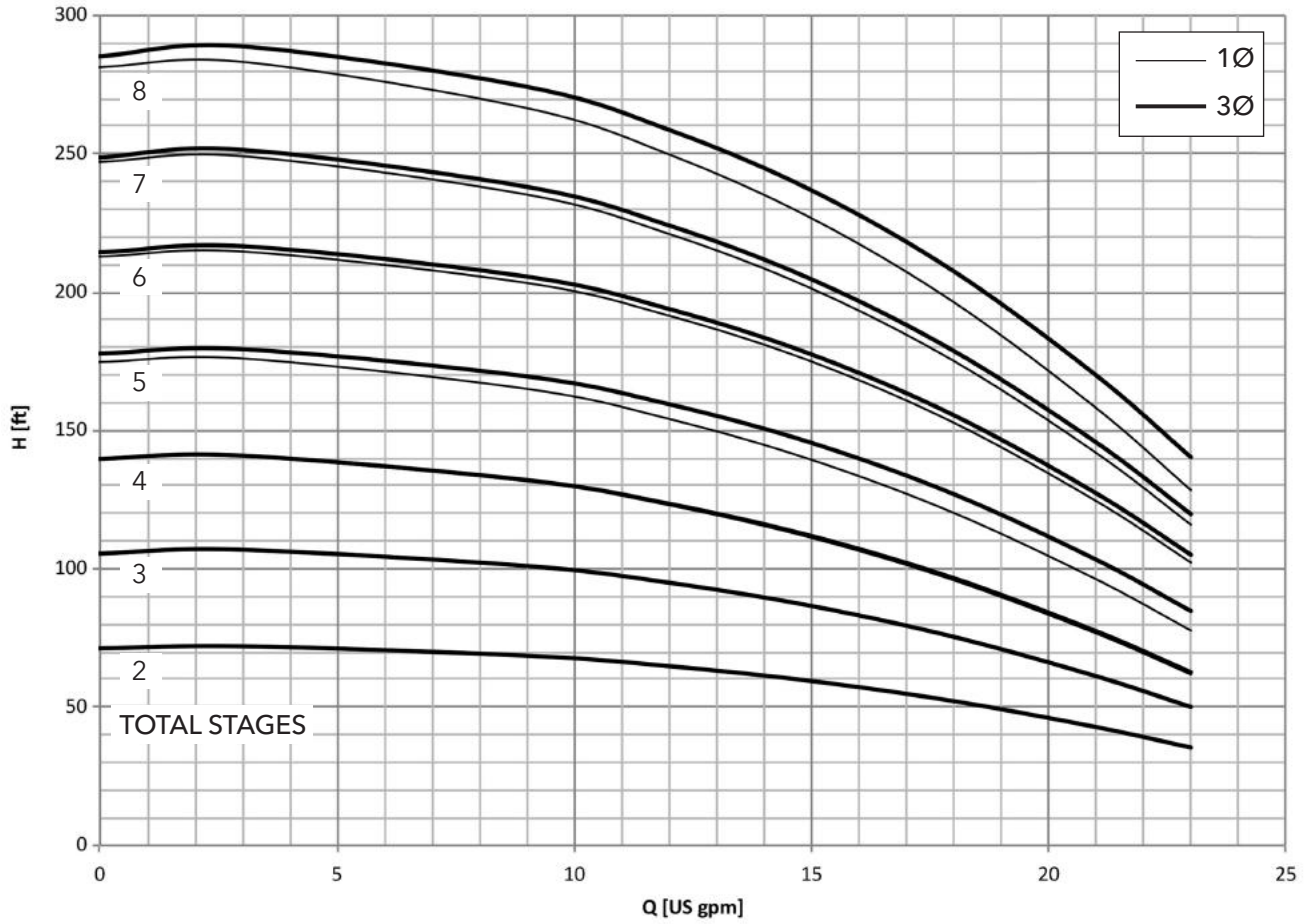
## Commercial Water

### 3HM..N SERIES, (2 TO 8 STAGES) DIMENSIONS AND WEIGHTS AT 60 HZ, 3500 RPM



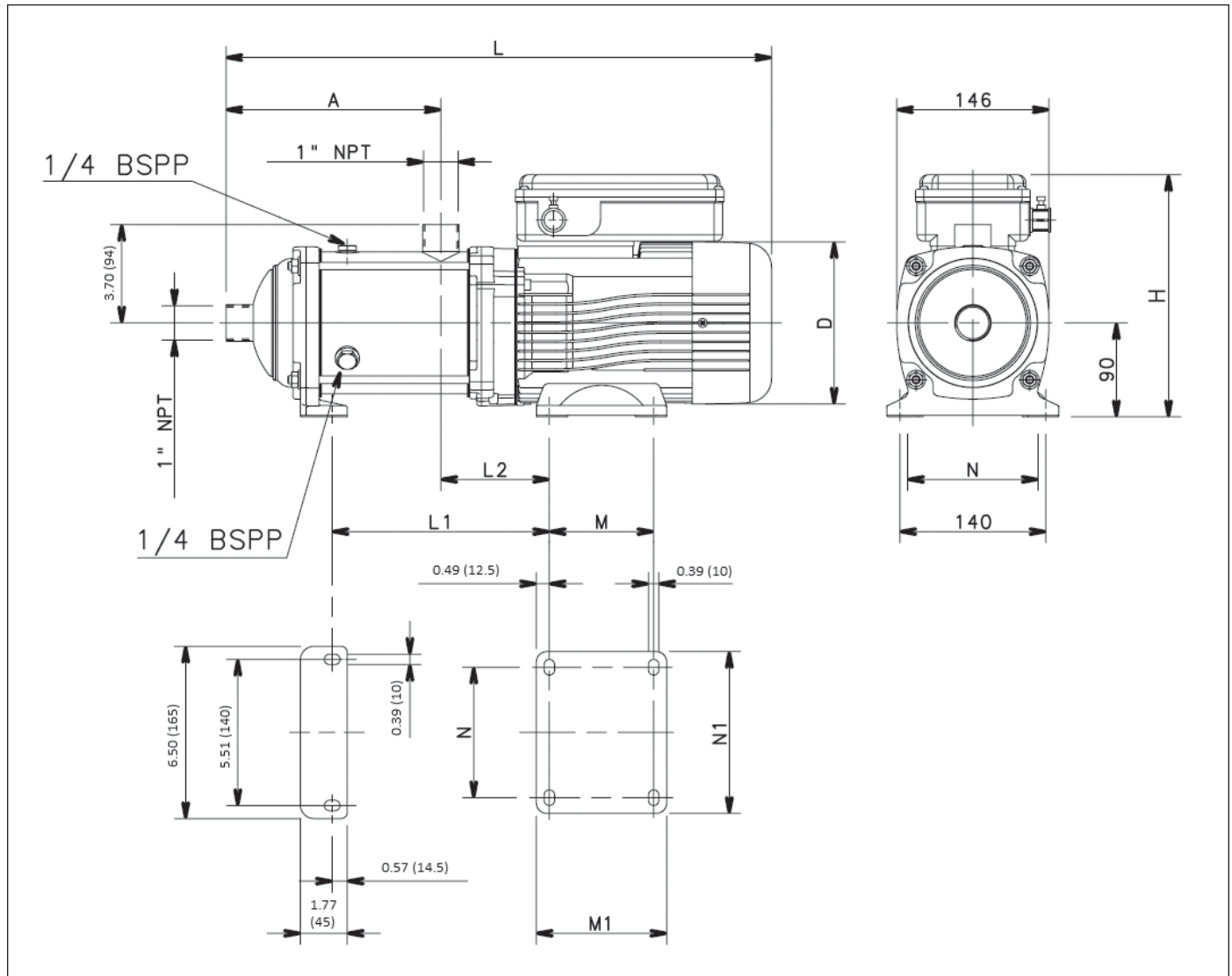
Pump Size Stages	Phase	DWG No.	Motor		Dimensions (in)										Max. Working Pressure (PSI)	Weight (lbs)
			HP	Frame Size	A	D	H	L	L1	L2	M	M1	N	N1		
3HM02	SINGLE PHASE	X	0.75	71	3.43	5.51	8.86	13.78	-	-	-	-	-	-	147	18
3HM03			0.75	71	3.43	5.51	8.86	13.78	-	-	-	-	-	-	147	18
3HM04			0.75	71	4.21	5.51	8.86	14.57	-	-	-	-	-	-	147	20
3HM05			1	71	5.00	5.51	9.13	16.85	-	-	-	-	-	-	147	22
3HM06		Y	1.5	80	5.79	5.94	9.13	17.64	-	-	-	-	-	-	147	31
3HM07		Z	1.5	80	5.94	5.94	9.13	18.43	6.02	4.09	3.94	4.92	4.92	6.10	235	33
3HM08			1.5	80	6.73	5.94	9.13	19.21	6.81	4.09	3.94	4.92	4.92	6.10	235	35
3HM02		THREE PHASE	X	0.75	71	3.43	5.51	8.86	13.78	-	-	-	-	-	-	147
3HM03	0.75			71	3.43	5.51	8.86	13.78	-	-	-	-	-	-	147	18
3HM04	0.75			71	4.21	5.51	8.86	14.57	-	-	-	-	-	-	147	20
3HM05	1			80	5.00	5.51	9.13	16.85	-	-	-	-	-	-	147	29
3HM06	Y		1.5	80	5.79	5.94	9.13	17.64	-	-	-	-	-	-	147	31
3HM07	Z		1.5	80	5.94	5.94	9.13	18.43	6.02	4.09	3.94	4.92	4.92	6.10	235	33
3HM08			2	80	6.73	5.94	9.13	19.21	6.81	4.09	3.94	4.92	4.92	6.10	235	37

### 3HM..N SERIES, (2 TO 8 STAGES) OPERATING CHARACTERISTICS AT 60 HZ, 3500 RPM



MINIMUM FLOW RATE: 5 GPM

### 3HM..N SERIES, (9 TO 14 STAGES) DIMENSIONS AND WEIGHTS AT 60 HZ, 3500 RPM

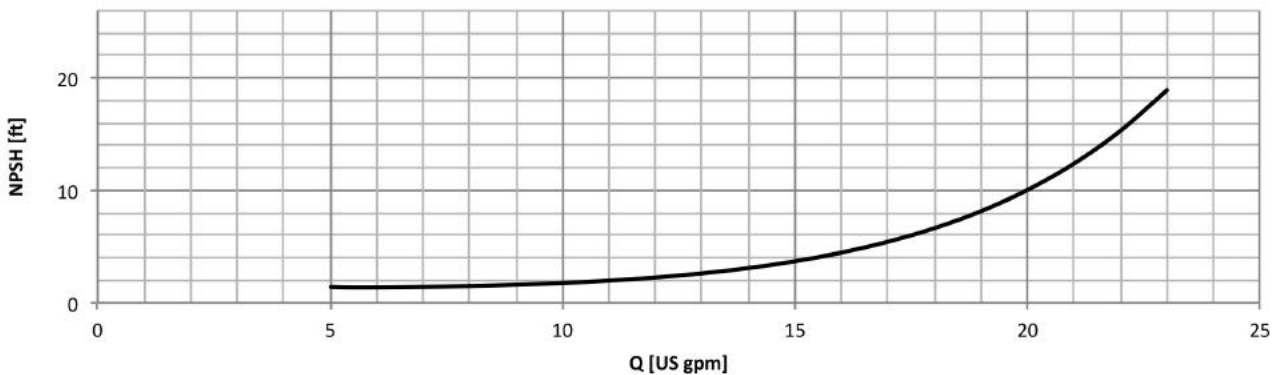
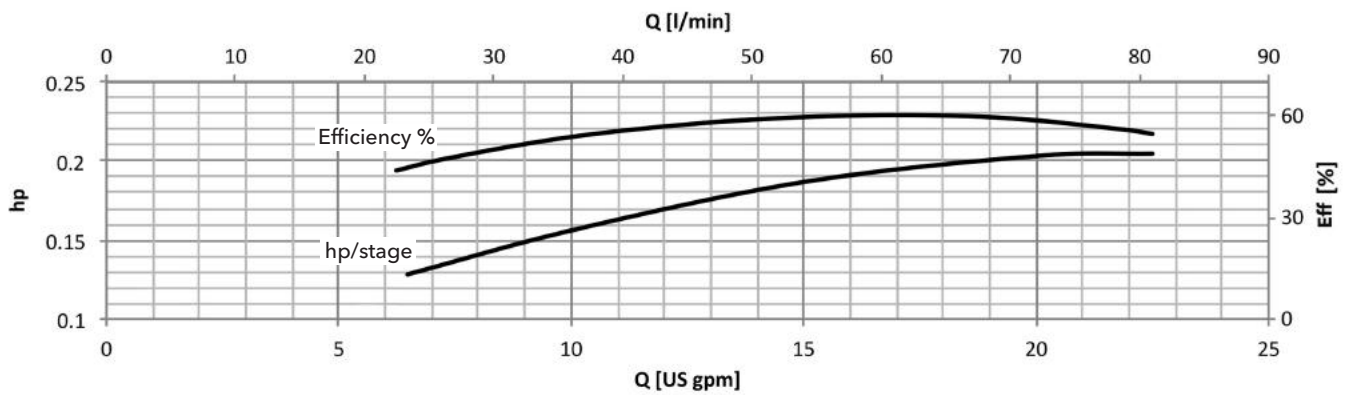
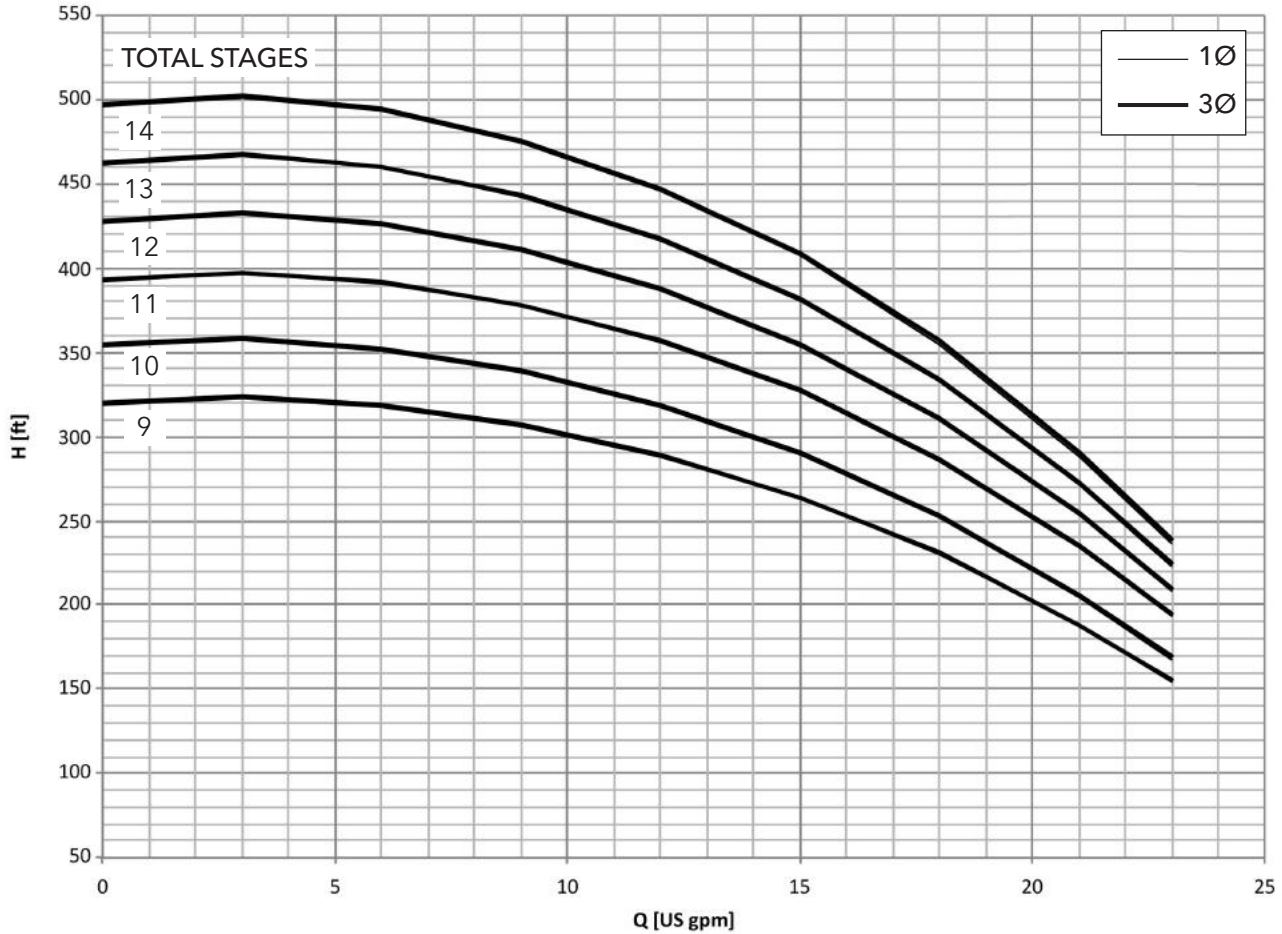


Pump Size Stages	Phase	Motor		Dimensions (in)										Max. Working Pressure (PSI)	Weight (lbs)
		HP	Frame Size	A	D	H	L	L1	L2	M	M1	N	N1		
3HM09	SINGLE PHASE	2	80	7.52	6.10	9.13	20.00	7.60	4.09	3.94	4.92	4.92	6.10	235	37
3HM10		2	80	8.31	6.10	9.13	20.79	8.39	4.09	3.94	4.92	4.92	6.10	235	37

3HM09	THREE PHASE	2	80	7.52	6.10	9.13	20.00	7.60	4.09	3.94	4.92	4.92	6.10	235	37
3HM10		2	80	8.31	6.10	9.13	20.79	8.39	4.09	3.94	4.92	4.92	6.10	235	37
3HM11		3	90	9.09	6.85	9.13	23.58	10.08	5.00	4.92	5.91	5.51	6.46	235	51
3HM12		3	90	9.88	6.85	9.13	24.37	10.87	5.00	4.92	5.91	5.51	6.46	235	51
3HM13		3	90	10.67	6.85	9.13	25.16	11.65	5.00	4.92	5.91	5.51	6.46	235	51
3HM14		3	90	11.46	6.85	9.13	25.94	12.44	5.00	4.92	5.91	5.51	6.46	235	53



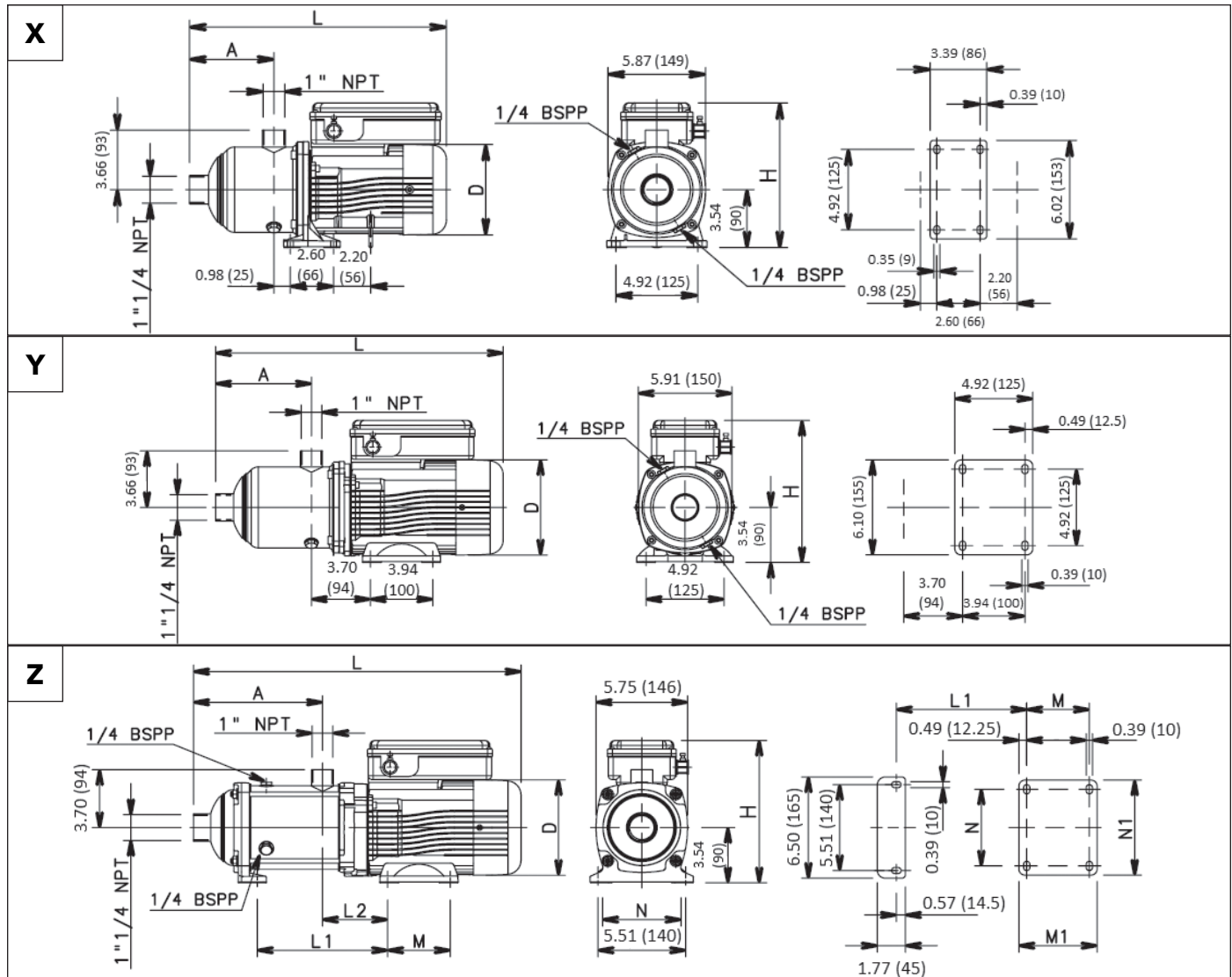
### 3HM..N SERIES, (9 TO 14 STAGES) OPERATING CHARACTERISTICS AT 60 HZ, 3500 RPM



MINIMUM FLOW RATE: 5 GPM

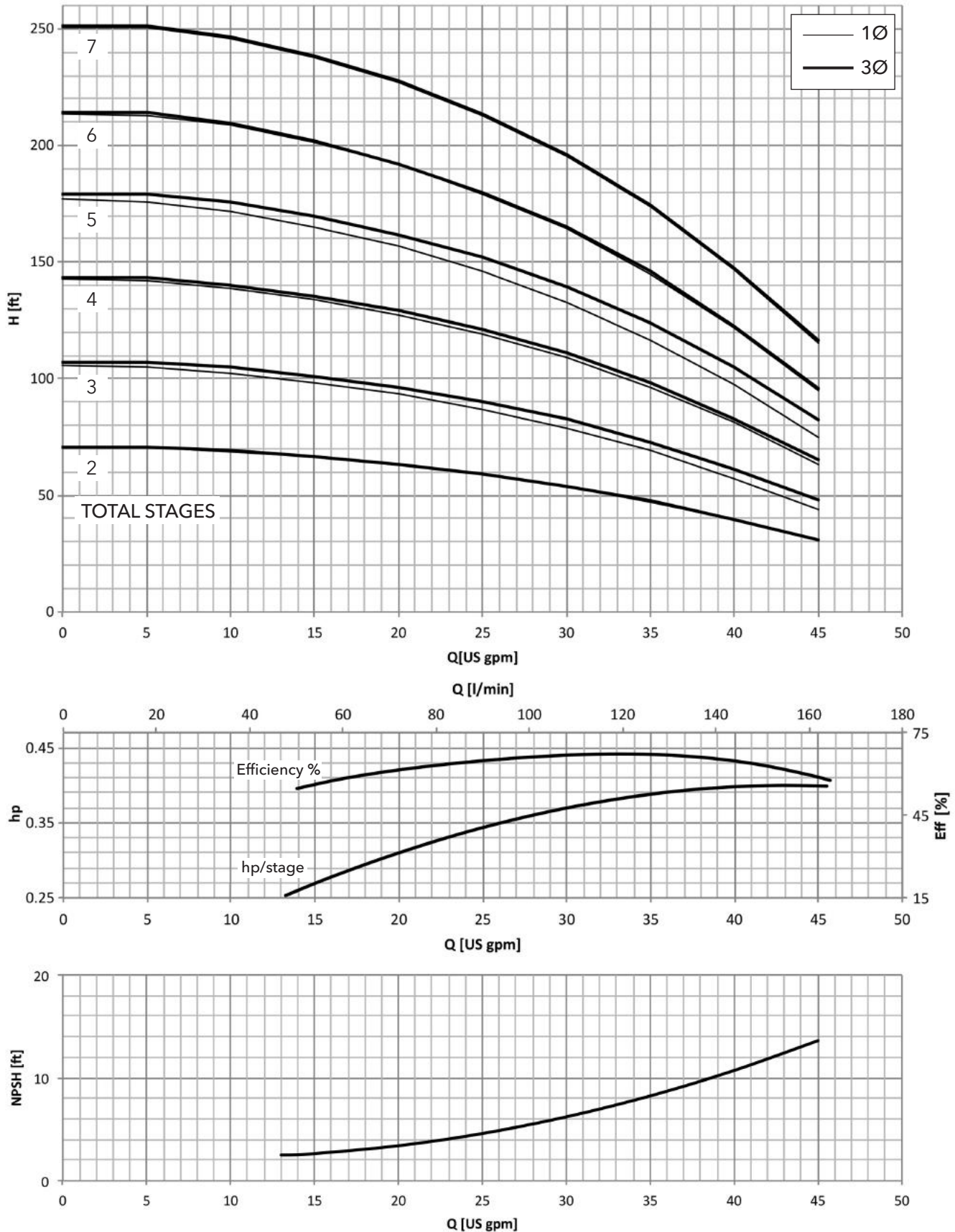
## Commercial Water

### 5HM..N SERIES, (2 TO 7 STAGES) DIMENSIONS AND WEIGHTS AT 60 HZ, 3500 RPM



Pump Size Stages	Phase	DWG No.	Motor		Dimensions (in)										Max. Working Pressure (PSI)	Weight (lbs)	
			HP	Frame Size	A	D	H	L	L1	L2	M	M1	N	N1			
5HM02	SINGLE PHASE	X	0.75	71	4.09	5.51	8.86	14.45	-	-	-	-	-	-	-	147	18
5HM03			1	71	4.09	5.51	8.86	14.45	-	-	-	-	-	-	-	147	20
5HM04		Y	1.5	80	5.08	6.10	9.13	16.93	-	-	-	-	-	-	-	147	31
5HM05			1.5	80	6.06	6.10	9.13	17.91	-	-	-	-	-	-	-	147	31
5HM06		Z	2	80	6.22	6.10	9.13	18.70	6.22	4.09	3.94	4.92	4.92	6.10	235	36	
5HM02		THREE PHASE	X	0.75	71	4.09	5.51	8.86	14.45	-	-	-	-	-	-	147	18
5HM03	1			80	4.09	6.10	9.13	15.94	-	-	-	-	-	-	147	27	
5HM04	Y		1.5	80	5.08	6.10	9.13	16.93	-	-	-	-	-	-	147	31	
5HM05			2	80	6.06	6.10	9.13	17.91	-	-	-	-	-	-	147	34	
5HM06	Z		2	80	6.22	6.10	9.13	18.70	6.22	4.09	3.94	4.92	4.92	6.10	235	36	
5HM07			3	90	7.20	6.85	9.13	21.89	8.11	5.00	4.92	5.91	5.51	6.46	235	49	

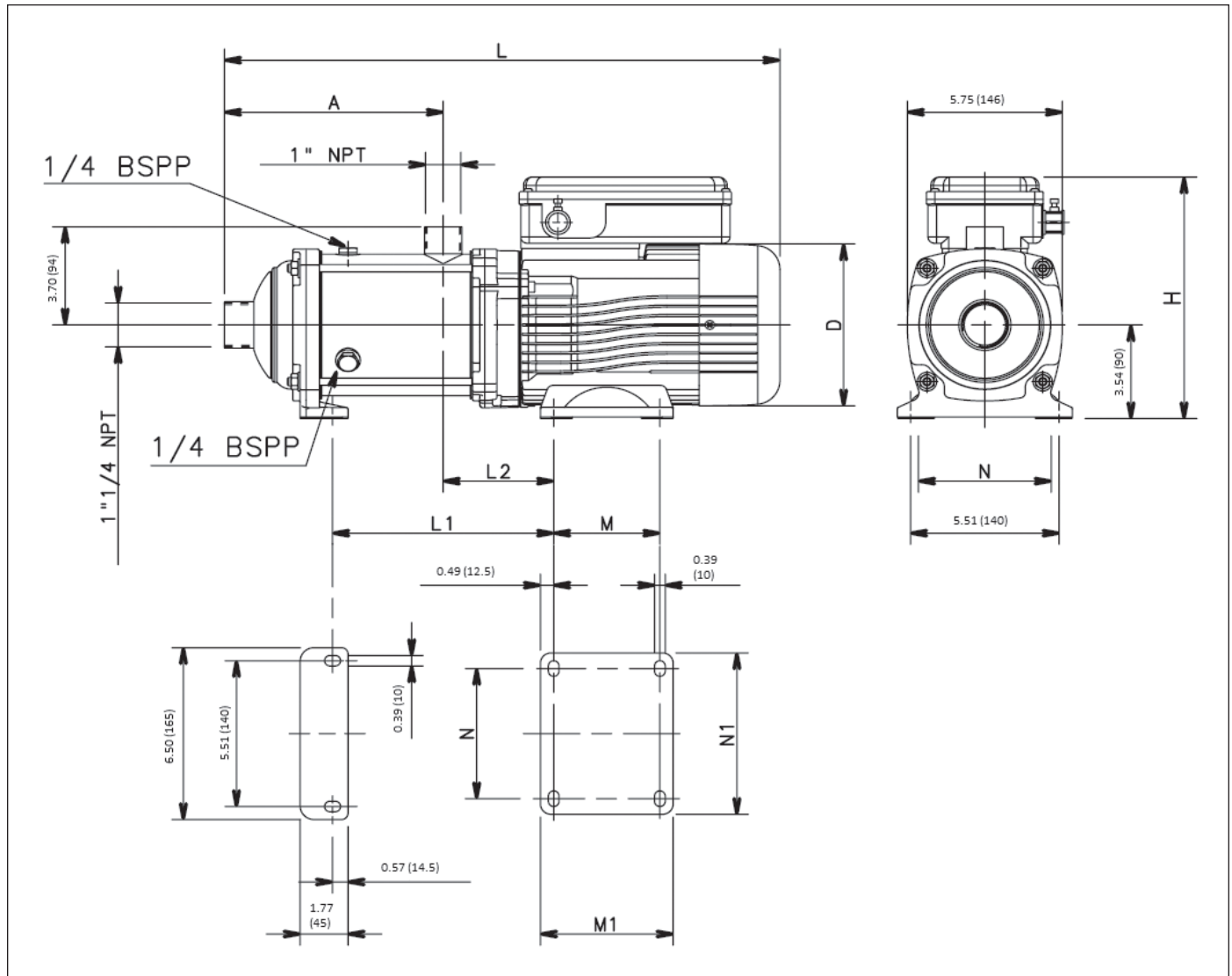
### 5HM..N SERIES, (2 TO 7 STAGES) OPERATING CHARACTERISTICS AT 60 HZ, 3500 RPM



MINIMUM FLOW RATE: 10 GPM

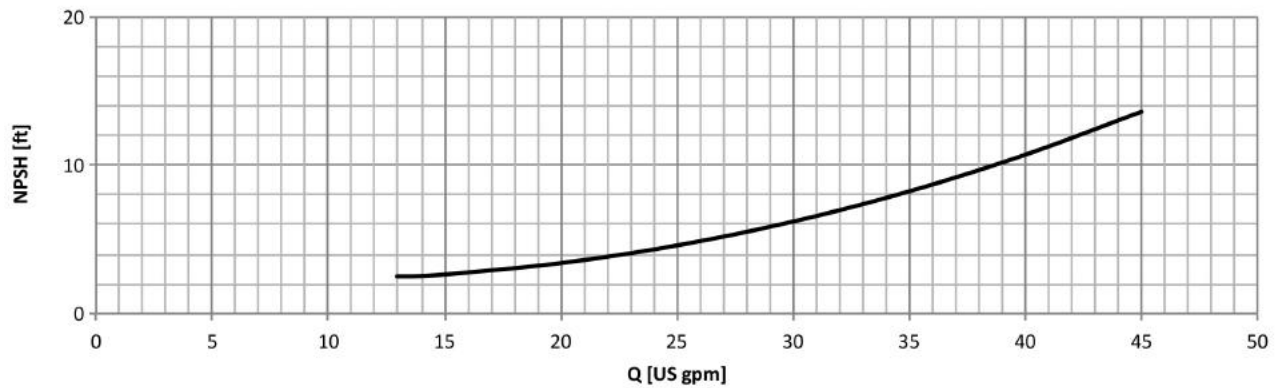
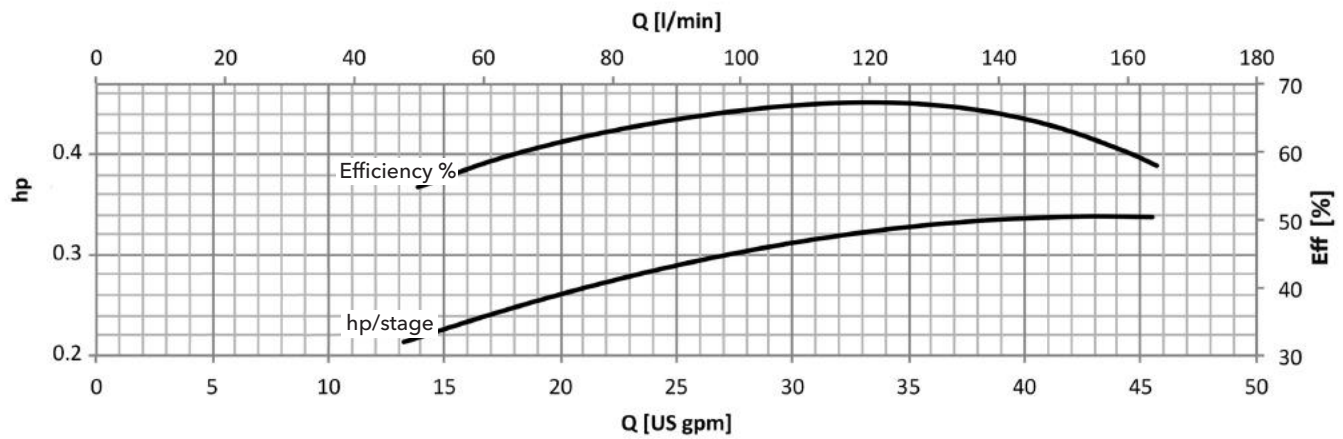
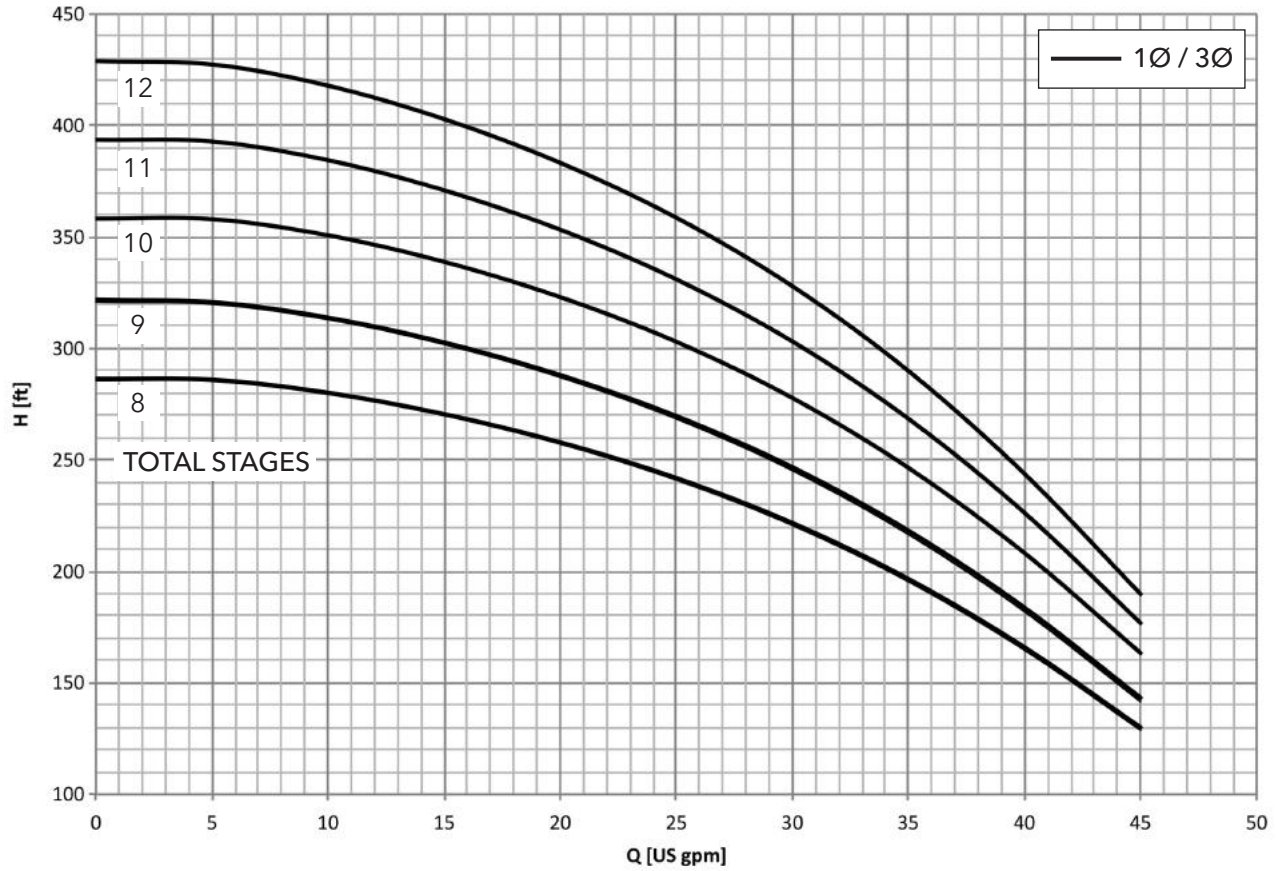


### 5HM..N SERIES, (8 TO 12 STAGES) DIMENSIONS AND WEIGHTS AT 60 HZ, 3500 RPM



Pump Size Stages	Phase	Motor		Dimensions (in)										Max. Working Pressure (PSI)	Weight (lbs)
		HP	Frame Size	A	D	H	L	L1	L2	M	M1	N	N1		
5HM08	THREE PHASE	3	90	8.19	6.85	9.13	22.87	9.09	5.00	4.92	5.91	5.51	6.46	235	49
5HM09		3	90	9.17	6.85	9.13	23.86	10.08	5.00	4.92	5.91	5.51	6.46	235	51
5HM10		4	90	10.16	6.85	9.13	24.84	11.06	5.00	4.92	5.91	5.51	6.46	235	58
5HM11		4	90	11.14	6.85	9.13	25.83	12.05	5.00	4.92	5.91	5.51	6.46	235	60
5HM12		4	90	12.13	6.85	9.13	26.81	13.03	5.00	4.92	5.91	5.51	6.46	235	60

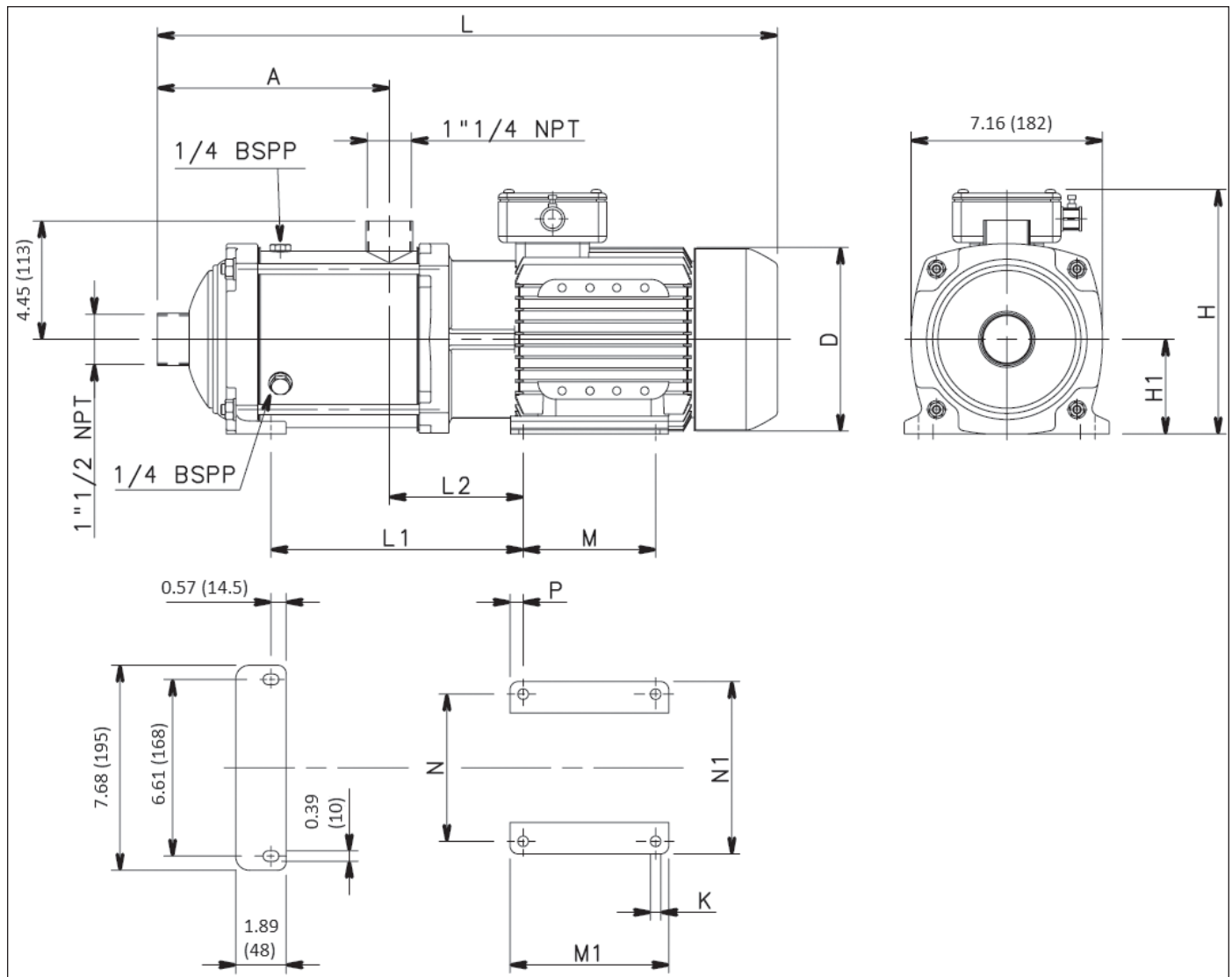
### 5HM..N SERIES, (8 TO 12 STAGES) OPERATING CHARACTERISTICS AT 60 HZ, 3500 RPM



MINIMUM FLOW RATE: 10 GPM

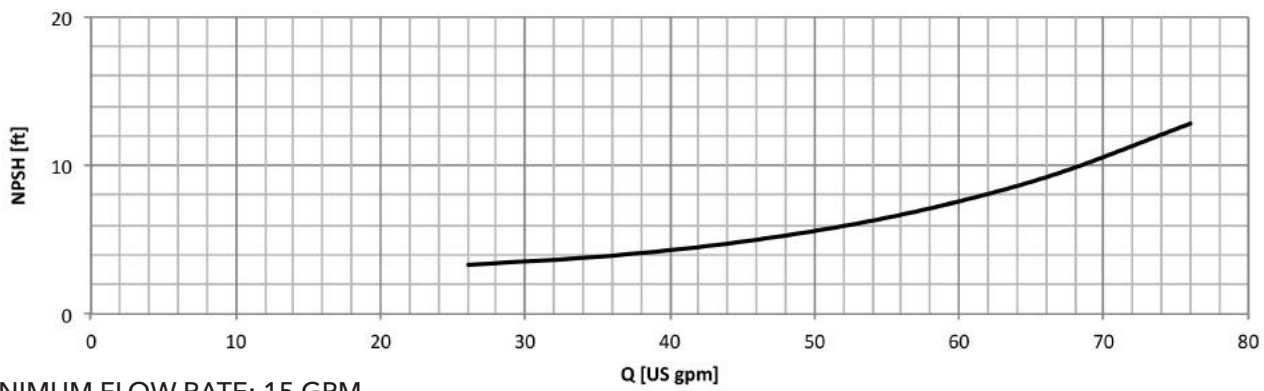
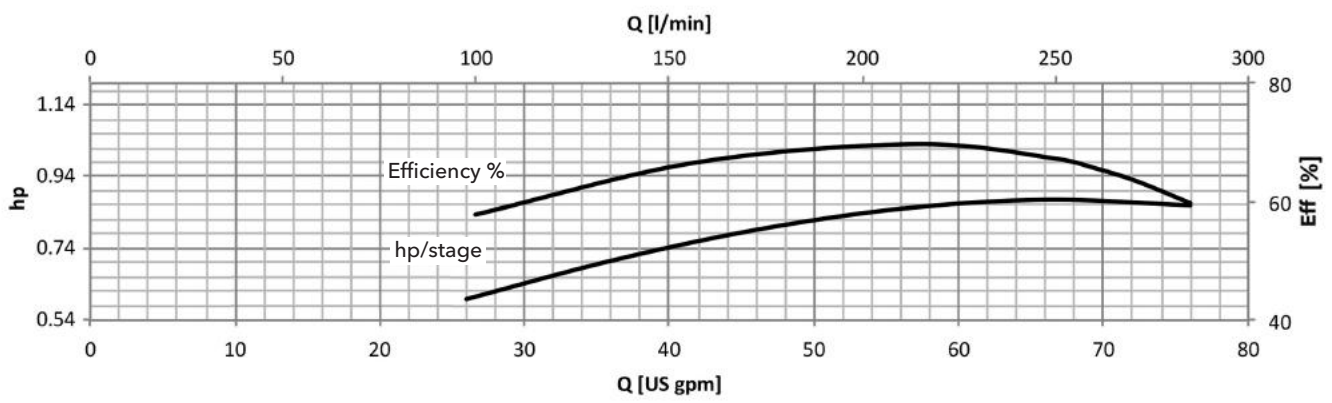
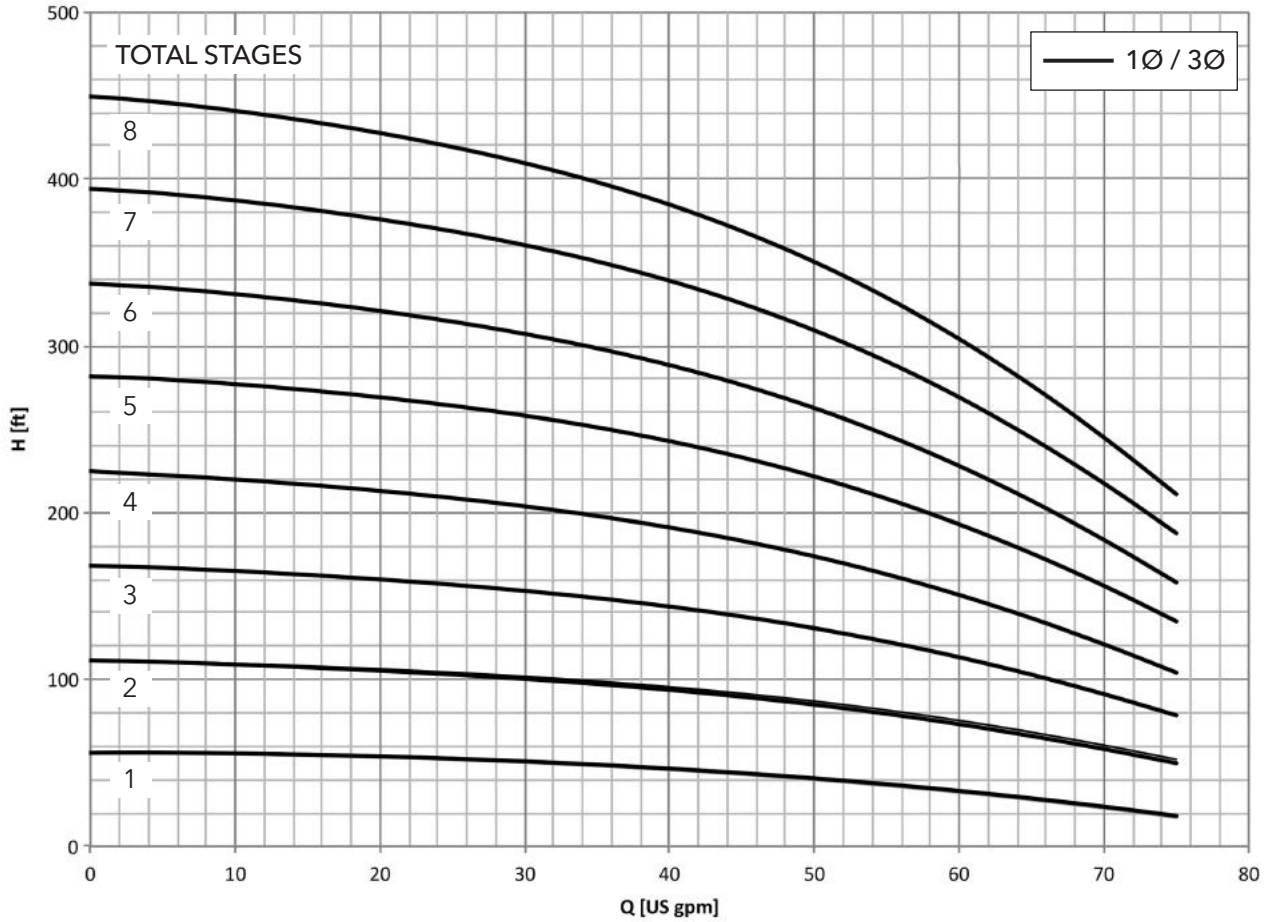
## Commercial Water

### 10HM..N SERIES, (1 TO 8 STAGES) DIMENSIONS AND WEIGHTS AT 60 HZ, 3500 RPM



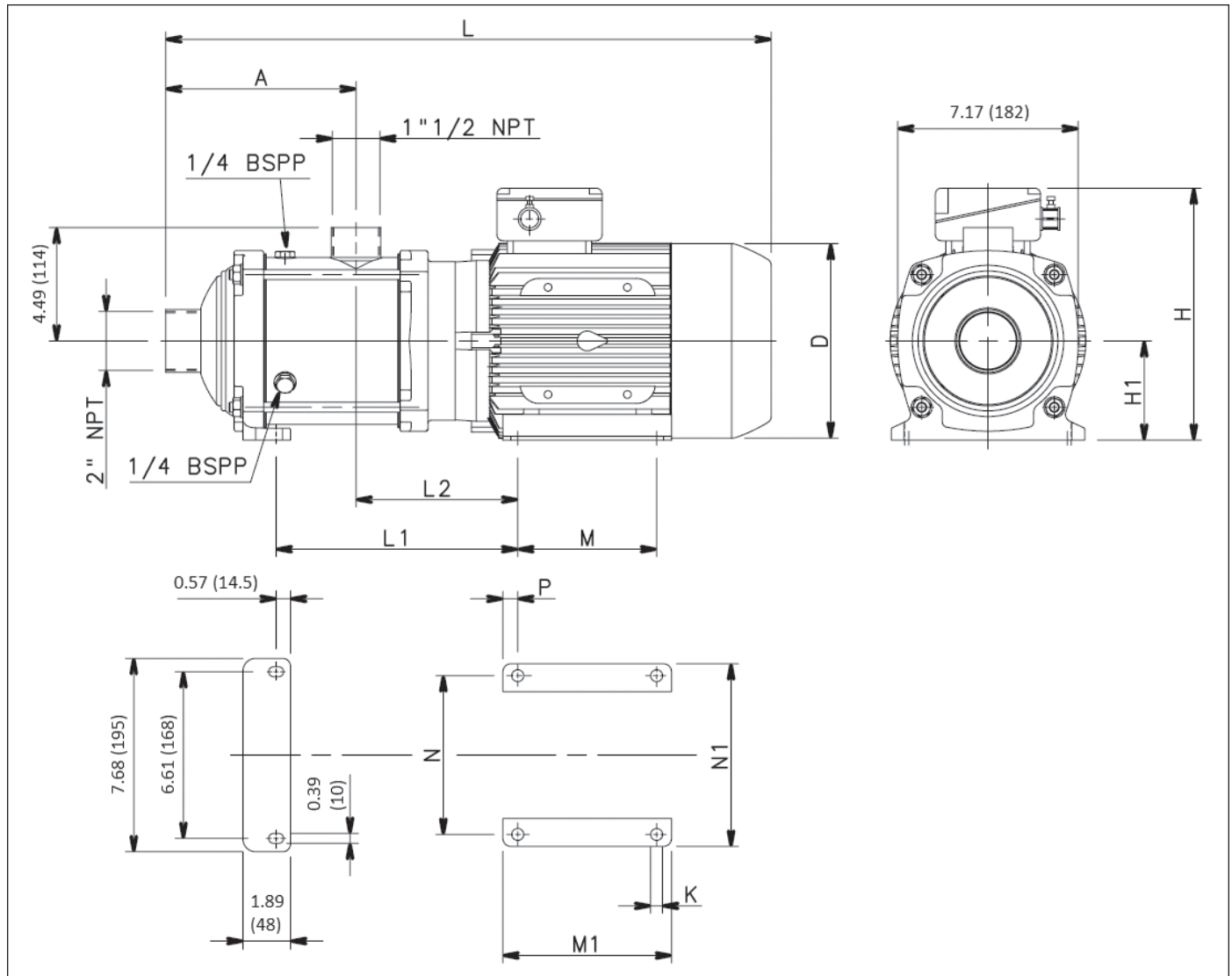
Pump Size Stages	Phase	Motor		Dimensions (in)													Max. Working Pressure (PSI)	Weight (lbs)
		HP	Frame Size	A	D	H	H1	L	L1	L2	M	M1	N	N1	P	K		
10HM01	SINGLE PHASE	1.5	80	4.92	6.1	9.13	3.54	17.44	4.8	4.13	3.94	4.92	4.92	6.1	0.49	0.39	235	36
10HM02		2	80	4.92	6.1	9.13	3.54	17.44	4.8	4.13	3.94	4.92	4.92	6.1	0.49	0.39	235	38
10HM01	THREE PHASE	1	80	4.92	6.1	9.13	3.54	17.44	4.8	4.13	3.94	4.92	4.92	6.1	0.49	0.39	235	34
10HM02		2	80	4.92	6.1	9.13	3.54	17.4	4.8	4.13	3.94	4.92	4.92	6.1	0.49	0.39	235	38
10HM03		3	90	4.92	6.85	9.13	3.54	19.45	5.67	5.04	4.92	5.91	5.51	6.46	0.49	0.39	235	51
10HM04		4	90	6.18	6.85	9.13	3.54	20.71	6.93	5.04	4.92	5.91	5.51	6.46	0.49	0.39	235	60
10HM05		5.5	100	7.44	7.76	10	3.94	23.31	8.98	5.79	5.51	6.69	6.3	7.24	0.59	0.47	235	75
10HM06		5.5	100	8.7	7.76	10	3.94	24.57	10.24	5.79	5.51	6.69	6.3	7.24	0.59	0.47	235	78
10HM07		7.5	112	9.96	8.43	11.02	4.41	27.17	11.77	6.06	5.51	6.69	7.48	8.62	0.59	0.47	235	95
10HM08		7.5	112	11.22	8.43	11.02	4.41	28.43	13.03	6.06	5.51	6.69	7.48	8.62	0.59	0.47	235	98

### 10HM..N SERIES, (1 TO 8 STAGES) OPERATING CHARACTERISTICS AT 60 HZ, 3500 RPM



MINIMUM FLOW RATE: 15 GPM

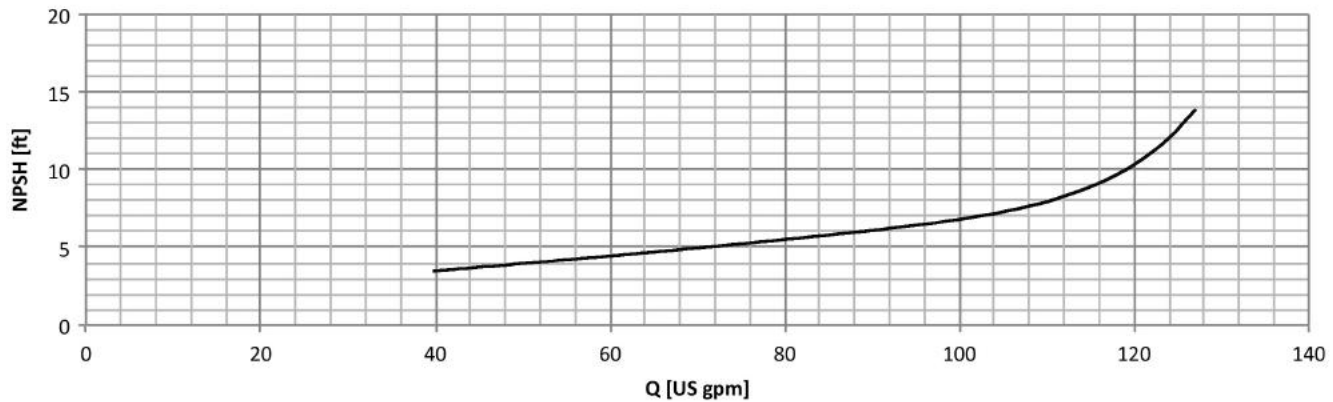
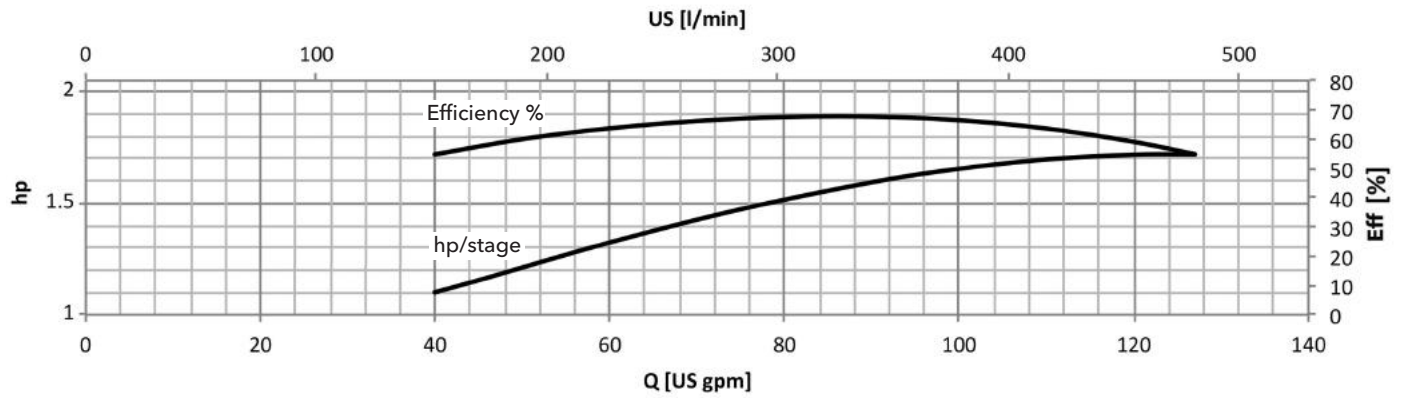
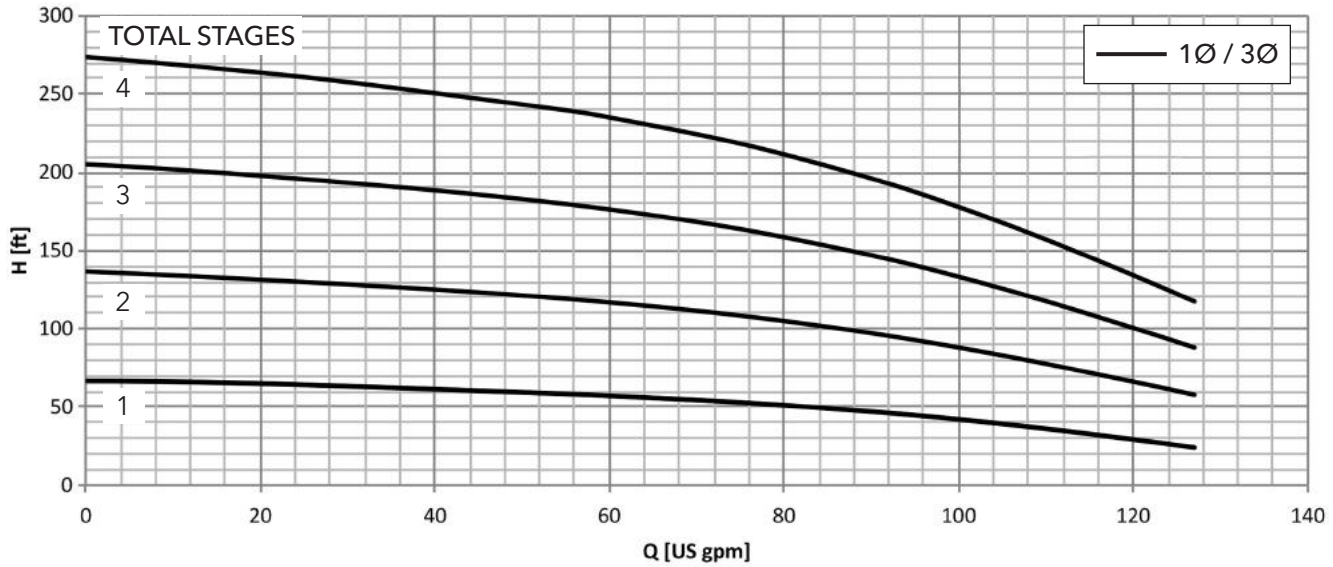
### 15HM..N SERIES, (1 TO 4 STAGES) DIMENSIONS AND WEIGHTS AT 60 HZ, 3500 RPM



Pump Size Stages	Phase	Motor		Dimensions (in)														Max. Working Pressure (PSI)	Weight (lbs)
		HP	Frame Size	A	D	H	H1	L	L1	L2	M	M1	N	N1	P	K			
15HM01	SINGLE PHASE	2	80	5.67	6.10	9.13	3.54	18.82	6.06	4.76	3.94	4.92	4.92	6.10	0.49	0.39	235	38	

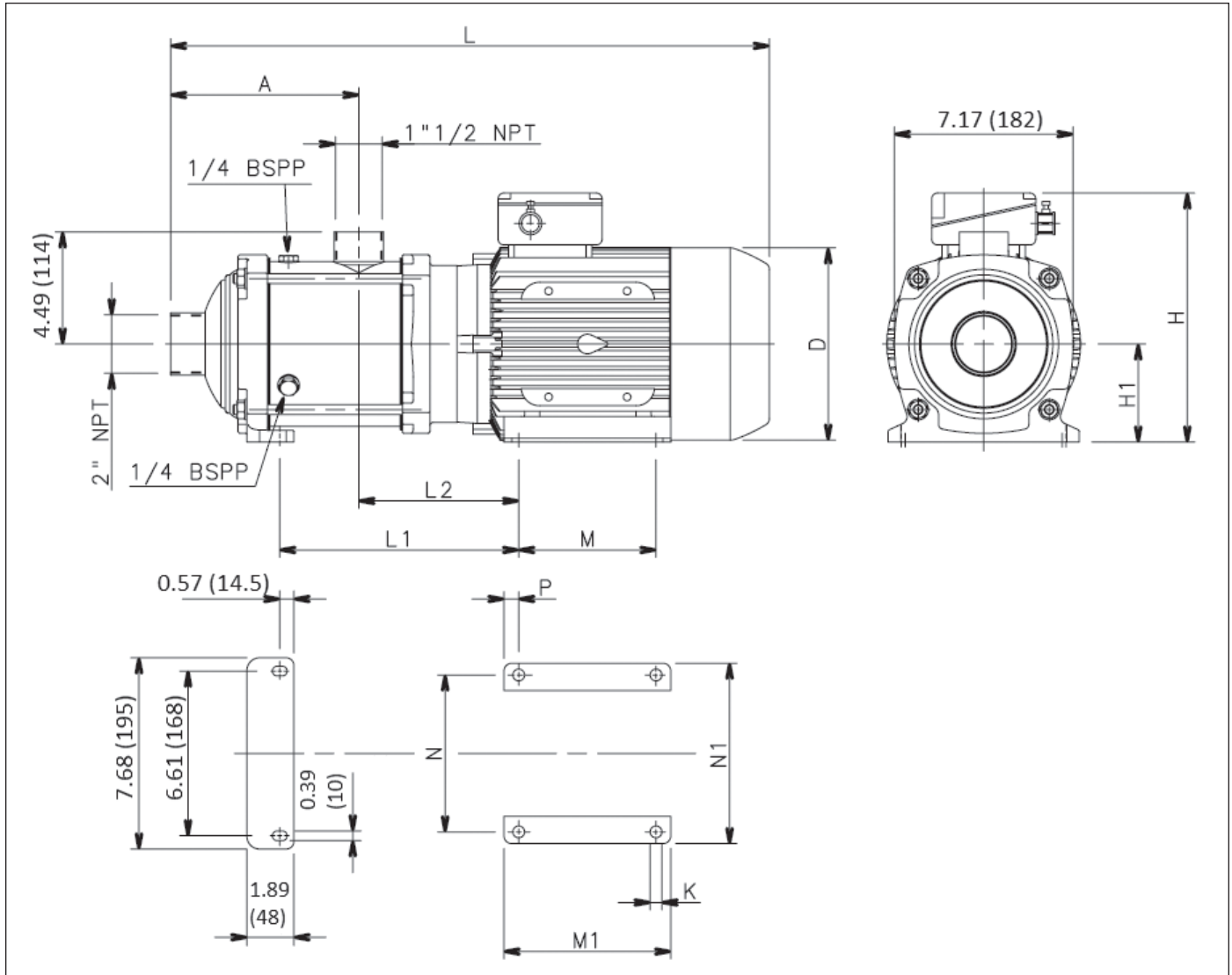
15HM01	THREE PHASE	2	80	5.67	6.10	9.13	3.54	18.82	6.06	4.76	3.94	4.92	4.92	6.10	0.49	0.39	235	38
15HM02		4	90	5.67	6.85	9.13	3.54	20.87	6.93	5.67	4.92	5.91	5.51	6.46	0.49	0.39	235	58
15HM03		5.5	100	5.67	7.76	10.00	3.94	22.17	7.72	6.42	5.51	6.69	6.30	7.24	0.59	0.47	235	71
15HM04		7.5	112	7.56	8.43	11.02	4.41	25.39	9.88	6.69	5.51	6.69	7.48	8.62	0.59	0.47	235	89

### 15HM..N SERIES, (1 TO 4 STAGES) OPERATING CHARACTERISTICS AT 60 HZ, 3500 RPM



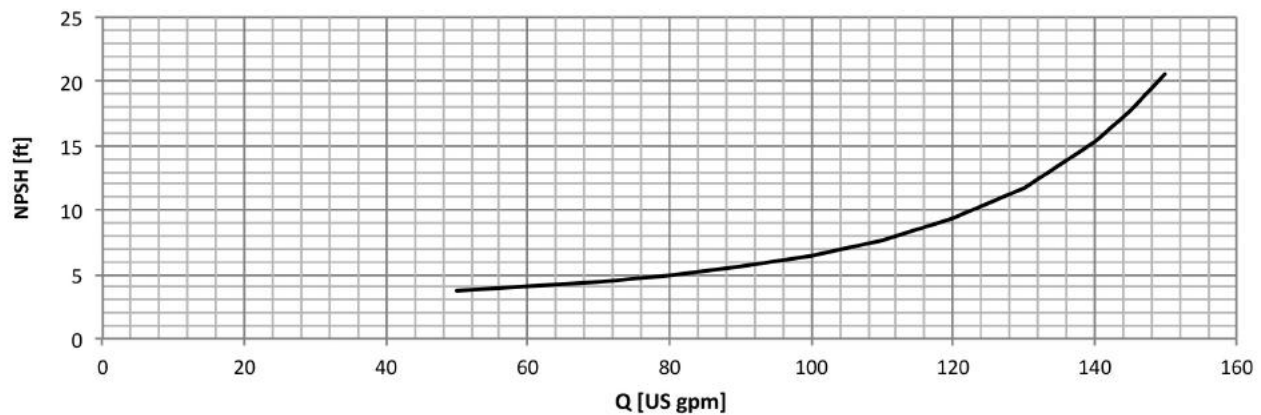
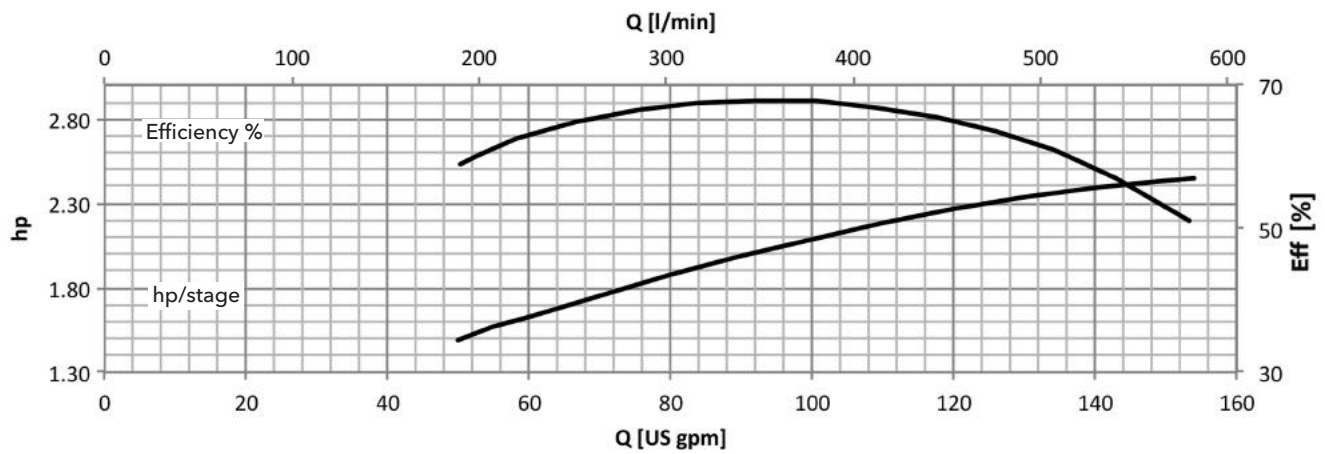
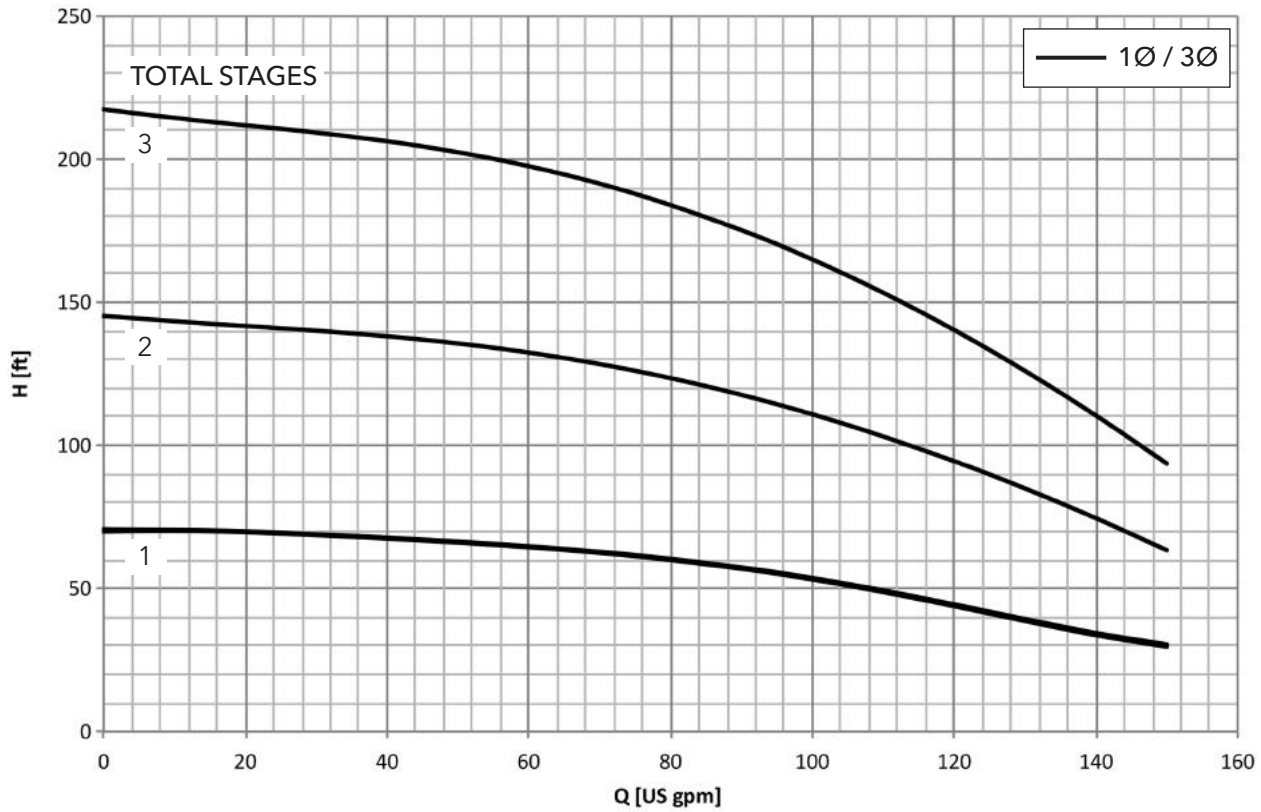


### 22HM..N SERIES, (1 TO 3 STAGES) DIMENSIONS AND WEIGHTS AT 60 HZ, 3500 RPM



Pump Size Stages	Phase	Motor		Dimensions (in)													Max. Working Pressure (PSI)	Weight (lbs)
		HP	Frame Size	A	D	H	H1	L	L1	L2	M	M1	N	N1	P	K		
22HM01	THREE PHASE	3	90	5.67	6.85	9.13	3.54	20.83	6.93	5.67	4.92	5.91	5.51	6.46	0.49	0.39	235	49
22HM02		5.5	100	5.67	7.76	10.00	3.94	22.17	7.72	6.42	5.51	6.69	6.30	7.24	0.59	0.47	235	71
22HM03		7.5	112	5.67	8.43	11.02	4.41	23.50	7.99	6.69	5.51	6.69	7.48	8.62	0.59	0.47	235	86

### 22HM..N SERIES, (1 TO 3 STAGES) OPERATING CHARACTERISTICS AT 60 HZ, 3500 RPM



MINIMUM FLOW RATE: 30 GPM



### TECHNICAL DATA - WATER PROPERTY CHART

Temp °F	Temp °C	Specific Volume (Cubic ft/lb)	Specific Gravity			Weight (lb/cubic ft)	Vapor Pressure (psi Abs)
			@ 39.2°F	@ 60°F	@ 68°F		
32	0.0	0.01602	1.000	1.001	1.002	62.42	0.088
35	1.7	0.01602	1.000	1.001	1.002	62.42	0.100
40	4.4	0.01602	1.000	1.001	1.002	62.42	0.122
50	10.0	0.01603	0.999	1.001	1.002	62.38	0.178
60	15.6	0.01604	0.999	1.000	1.001	62.34	0.256
70	21.1	0.01606	0.998	0.999	1.000	62.27	0.363
80	26.7	0.01608	0.996	0.998	0.999	62.19	0.507
90	32.2	0.0161	0.995	0.996	0.997	62.11	0.698
100	37.8	0.01613	0.993	0.994	0.995	62.00	0.949
120	48.9	0.0162	0.989	0.990	0.991	61.73	1.692
140	60.0	0.01629	0.983	0.985	0.986	61.39	2.889
160	71.1	0.01639	0.977	0.979	0.979	61.01	4.741
180	82.2	0.01651	0.970	0.972	0.973	60.57	7.510
200	93.3	0.01663	0.963	0.964	0.966	60.13	11.526
212	100.0	0.01672	0.958	0.959	0.960	59.81	14.696
220	104.4	0.01677	0.955	0.956	0.957	59.63	17.186
240	115.6	0.01692	0.947	0.948	0.949	59.10	24.97
260	126.7	0.01709	0.938	0.939	0.940	58.51	35.43
280	137.8	0.01726	0.928	0.929	0.930	58.00	49.20
300	148.9	0.01745	0.918	0.919	0.920	57.31	67.01
320	160.0	0.01756	0.908	0.909	0.910	56.66	89.66
340	171.1	0.01787	0.896	0.898	0.899	55.96	118.01
360	182.2	0.01811	0.885	0.886	0.887	55.22	153.04
380	193.3	0.01836	0.873	0.874	0.875	54.47	195.77
400	204.4	0.01864	0.859	0.860	0.862	53.65	247.31
420	215.6	0.01894	0.846	0.847	0.848	52.80	308.83
440	226.7	0.01926	0.832	0.833	0.834	51.92	381.59
460	237.8	0.0196	0.817	0.818	0.819	51.02	466.9
480	248.9	0.02	0.801	0.802	0.803	50.00	566.1
500	260.0	0.0204	0.785	0.786	0.787	49.02	680.8
520	271.1	0.0209	0.765	0.766	0.767	47.85	812.4
540	282.2	0.0215	0.746	0.747	0.748	46.51	962.5
560	293.3	0.0221	0.726	0.727	0.728	45.30	1133.1
580	304.4	0.0228	0.703	0.704	0.704	43.90	1325.8
600	315.6	0.0236	0.678	0.679	0.680	42.30	1542.9
620	326.7	0.0247	0.649	0.650	0.650	40.50	1786.6
640	337.8	0.026	0.617	0.618	0.618	38.50	2059.7
660	348.9	0.0278	0.577	0.577	0.578	36.00	2365.4
680	360.0	0.0305	0.525	0.526	0.527	32.80	2708.1
700	371.1	0.0369	0.434	0.435	0.435	27.10	3093.7

### TECHNICAL DATA - NPSH

#### NPSH

The minimum operating values that can be reached at the pump suction end are limited by the onset of cavitation.

Cavitation is the formation of vapor-filled cavities within liquids where the pressure is locally reduced to a critical value, or where the local pressure is equal to, or just below the vapor pressure of the liquid.

The vapor-filled cavities flow with the current and when they reach a higher pressure area the vapor contained in the cavities condenses. The cavities collide, generating pressure waves that are transmitted to the walls. These, being subjected to stress cycles, gradually become deformed and yield due to fatigue. This phenomenon, characterized by a metallic noise produced by the hammering on the pipe walls, is called incipient cavitation.

The damage caused by cavitation may be magnified by electrochemical corrosion and a local rise in temperature due to the plastic deformation of the walls. The materials that offer the highest resistance to heat and corrosion are alloy steels, especially austenitic steel. The conditions that trigger cavitation may be assessed by calculating the total net suction head, referred to in technical literature with the acronym NPSH (Net Positive Suction Head).

The NPSH represents the total energy (expressed in feet) of the liquid measured at suction under conditions of incipient cavitation, excluding the vapor pressure (expressed in feet) that the liquid has at the pump inlet.

To find the static height ( $h_z$ ) at which to install the machine under safe conditions, the following formula must be verified:

$$h_p + h_z \geq (\text{NPSHr} + 2 \text{ ft}) + h_f + h_{pv}$$

where:

- $h_p$**  is the absolute pressure applied to the free liquid surface in the suction tank, expressed in feet of liquid;  $h_p$  is the quotient between the barometric pressure and the specific weight of the liquid.
- $h_z$**  is the suction lift between the pump axis and the free liquid surface in the suction tank, expressed in feet;  $h_z$  is negative when the liquid level is lower than the pump axis.
- $h_f$**  is the flow resistance in the suction line and its accessories, such as: fittings, foot valve, gate valve, elbows, etc.
- $h_{pv}$**  is the vapor pressure of the liquid at the operating temperature, expressed in feet of the liquid.  $h_{pv}$  is the quotient between the Pv vapor pressure and the liquid's specific weight.

**0.5** is the safety factor.

The maximum possible suction head for installation depends on the value of the atmospheric pressure (i.e. the elevation above sea level at which the pump is installed) and the temperature of the liquid.

To help the user, with reference to water temperature (40°F) and to the elevation above sea level, the following tables show the drop in hydraulic pressure head in relation to the elevation above sea level, and the suction loss in relation to temperature.

<b>Water Temperature (°F)</b>	68	104	140	176	194	230	248
<b>Suction Loss (ft)</b>	-.7	2.3	6.6	16.4	24.3	50.5	70.5

<b>Elevation Above Sea Level (ft)</b>	1600	3300	4900	6500	8200	9800
<b>Suction Loss (ft)</b>	1.8	3.6	5.4	7.2	9.0	10.8

To reduce it to a minimum, especially in cases of high suction head (over 13 - 16 feet) or within the operating limits with high flow rates, we recommend using a suction line having a larger diameter than that of the pump's suction port. It is always a good idea to position the pump as close as possible to the liquid to be pumped.

### TECHNICAL DATA - COMPATABILITY CHART FOR MATERIALS IN CONTACT WITH MOST COMMONLY USED LIQUIDS

Liquid	Concentration (%)	Temperature Min/Max °F	Specific Weight (lb/in <sup>3</sup> )	1HM - 22HM	Recommended Seal	Elastomers
				316		
Water	100	23/248		•	QBEGG	E
Deionized, demineralized	100	-13/230		•	QBEGG	E
Water and oil emulsion	any	23/194		•	QBVGG	V
Acetic acid (•)	80	14/158	.038	•	QBEGG	E
Citric acid	5	14/158	.056	•	QBEGG	E
Hydrochloric acid	2	23/77	.043	•	QQVGG	V
Phosphoric acid	10	23/86	.048	•	QBEGG	E
Nitric acid (•)	50	23/86	.053	•	QQVGG	V
Sulphuric acid (•)	2	14/77	.066	•	QBVGG	V
Tannic acid	20	32/122		•	QBEGG	E
Tartaric acid	50	14/77	.063	•	QQVGG	V
Uric acid	80	14/176	.068	•	QBEGG	E
Benzoic acid	70	32/158	.047	•	QBVGG	V
Boric acid	Saturated	14/194	.052	•	QQVGG	V
Formic acid (•)	5	5/77	.044	•	QBEGG	E
Ethyl alcohol (•)	100	23/104	.029	•	QBEGG	E
Methyl alcohol (•)	100	23/104	.029	•	QBEGG	E
Propyl alcohol (•)	100	23/176	.029	•	QBEGG	E
Butyl alcohol	100	23/176	.030	•	QBVGG	V
Denatured alcohol (•)	100	23/158	.030	•	QBEGG	E
Ammonia in water (•)	25	-4/122	.038	•	QBEGG	E
Chloroform		14/86	.053	•	QBVGG	V
Caustic soda	25	32/158	.077	•	QQEGG	E
Water, detergents, Cleaning products		23/176		•	QQVGG	V
		23/212		•	QQVGG	V
Diesel oil (•)	100	32/176	.033	•	QBVGG	V
Kerosene (•)	100	32/176		•	QBVGG	V
Fuel oil (•)		32/194	.027	•	QBVGG	V
Glycerine	100	68/194	.046	•	QBEGG	E
Sodium Hypochlorite	1	14/77		•	QQVGG	V
Phosphates/polyphosphates		23/194		•	QQVGG	V
Sodium nitrate	Saturated	14/176	.081	•	QBEGG	E
Cutting fluid	100	23/230	.033	•	QBVGG	V
Peanut oil (•)	100	23/230	.034	•	QBEGG	E
Colza oil (•)	100	23/230	.034	•	QBEGG	E
Linseed oil (•)	100	23/230	.034	•	QBEGG	E
Coconut oil (•)	100	-4/194	.033	•	QBEGG	E
Soybean oil (•)	100	32/194		•	QBEGG	E
Diathermic oil	100	23/230	.033	•	QBVGG	V
Hydraulic oil	100	23/230		•	QBVGG	V
Mineral oil	100	23/230	.034	•	QBVGG	V
Sodium sulfate	15	14/104	.094	•	QQEGG	E
Aluminum sulfate	30	23/122	.097	•	QQEGG	E
Ammonium sulfate	10	14/140	.064	•	QQEGG	E
Iron sulfate	10	23/86	.076	•	QBEGG	E
Copper sulfate	20	32/86	.082	•	QQVGG	V
Trichloroethylene		14/104	.053	•	QBVGG	V
Perchloroethylene		14/86	.057	•	QBVGG	V

#### Legend

Q = Silicon carbide B = Carbon E = EPDM V = Viton G = AISI 316 (spring, metal components)

(•) A special version may be necessary for this fluid. For additional information, please contact our sales network.

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- 2) a leading global water technology company.

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