C.R.I. FLUID SYSTEMS
Pumping trust. Worldwide.

PRESSURE BOOSTING SYSTEM
MVHS & MHBS SERIES

An ISO 9001, ISO 14001 & OHSAS 18001 Company

CE

C.R.I. FLUID SYSTEMS
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THE BEGINNING

of C.R.I., way back in 1961, was a resolute attempt to produce a few irrigation equipments using the limited facilities of an in-house foundry. Eventually the founder's dream was coming true as the small production unit he started kept growing rapidly. Now, after more than five eventful decades, it is an enormous, widely reputed organization, which produces more than 2300 varieties of perfectly engineered pumps and motors and sells its products in numerous countries spread across 6 continents.

C.R.I. IS ONE AMONG

the few pioneers in the world to produce 100% stainless steel submersible pumps. Having achieved a record production capacity of over 2 million pumps per annum, today C.R.I. is rubbing its shoulders with the best brands in the world, with advanced technology and safety standards as its hallmarks.

THE INFRASTRUCTURE

of C.R.I. is pretty comprehensive with state-of-the-art machineries and high potential in-house R&D recognised by the ministry of science and technology, Govt. of India - all within its own covered area of 300,000 square metres. The production environment is accredited with ISO 9001, ISO 14001 & OHSAS 18001 certifications and the products are CE, UR/UL, IEC, TSE & ISI certified. The R&D team always stays in tune with the changing scenario and seldom fails in coming up with outstanding solutions every time.

NEEDLESS TO SAY,

behind this legendary growth lies the untiring, innovative, enthusiastic and dedicated team work. and, of course, a flawlessly maintained value system too. The name C.R.I. itself encapsulates the company's ethos: " Commitment, Reliability, Innovation".

C.R.I. FLUID SYSTEMS
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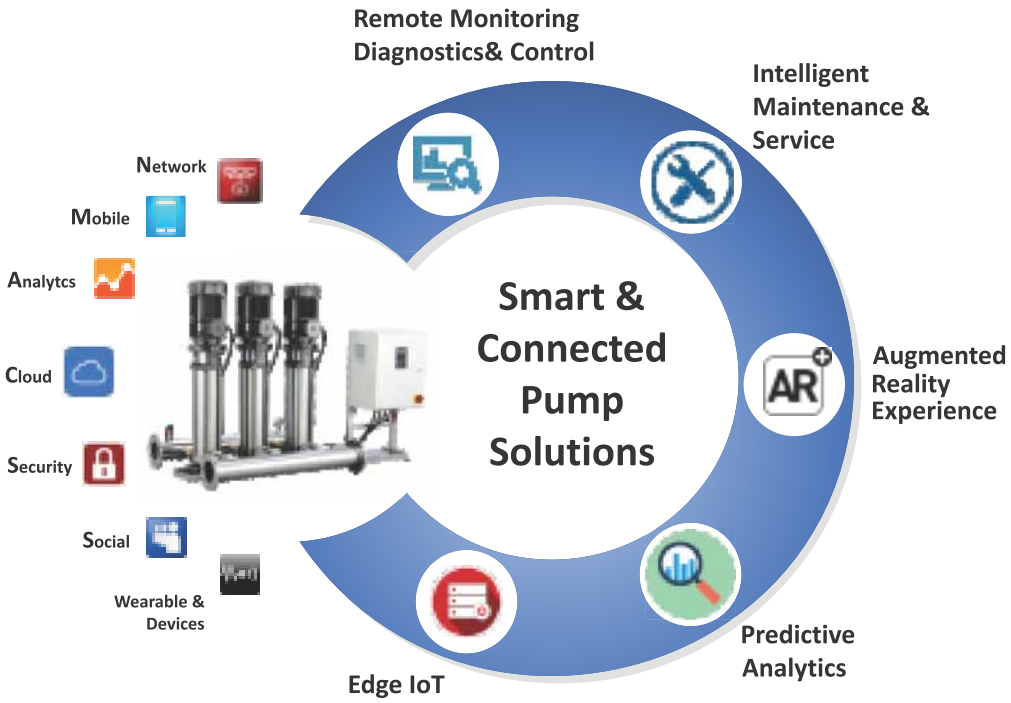
Vision, Mission and Values

To be the industry leader providing best - in - class fluid management solutions to individual and institutional customers and societies in our chosen markets.

We will achieve this through our dedicated efforts to enhance the welfare of all our stakeholders and by living by our values of **commitment, reliability** and **innovation.**

INTELLIGENT PUMPING SOLUTIONS



Remote Monitoring Diagnostics & Control

Connect control panel with RS 485 GSM gateway, controller with cloud based analytics software with secured web/mobile apps

- Frequency
- Pressure
- Current
- Voltage
- Pump Status
- Pump Diagnostics

Augmented Reality Experience

HoloLens/Real wear/Tablet based AR experience to know more on Pump Assembly, Pump Analytics, Pump Real Time values and Digital – Real world integration

Edge IoT Control

Edge level controller to check alerts and diagnostics and control the pump at edge level instead of server or cloud

Intelligent Maintenance & Service

Mobile and QR code based application for Preventive maintenance, customer service and break down service

- Preventive Checklist
- Email notification
- Ticketing System
- Mobile app notification

Predictive Analytics

- Predictive alerts based on critical parameters correlations and machine learning
- Recommend actions for the conditions & alerts for faster decision making & control

G E N E R A L

C.R.I's Pressure Booster Systems are built with care using advanced technology and controlling devices/equipments that ensure efficient operation and energy saving. Nowadays pressure booster system becomes an essential part of all buildings including individual houses. C.R.I's pressure booster systems are designed to meet wide range of applications and are customized to meet customer's requirements.

These pressure booster systems are built with all stainless steel C.R.I. vertical/ horizontal multistage pumps powered by C.R.I.'s IE - CLASS MOTORS. The control system is made with PLC / Micro controller / VFD for constant pressure, energy saving and fail-safe automatic operation. These systems are supplied as complete package including, manifold,pressure vessel, control panel with VFD/PLC/Micro controller, check/gate valves, pressure gauge, transmitters etc.

Much importance is given to reduce the noise level to ensure trouble free and quiet operation and intense care is taken to ensure lesser space occupation and make the system affordable across the world. It also serves as a best alternative for traditional over head tank system and thereby reduces water pollution and constructional cost etc.,

Simply saying C.R.I's pressure booster systems are highly reliable, more efficient, silent in operation, affordable, smart and are customized to suit any requirements.

MODEL IDENTIFICATION CODE (MVHS Series)

XX HS - X/XXXX - X - X - X - X - X - X - X - X - X

- **XX** — Series Name: MV/MH
- **HS** — Hydro System
- **X/XXXX** — Pump Model
- **X** — No of Pumps

1	4
2	5
3	6

- **X** — M. Seal Combinations

SSV	Sic/Sic/FKM
TCV	TC/Car/FKM
SCE	Sic/Car/EPDM

- **X** — Pump MOC

C	CI Version
S	SS 304 Version
N	SS 316 Version

- **X** — Control Panel Type / Design

P	Smart Controller (One VFD + PT +RS 485)
P+	Smart Controller (One VFD + PT +RS 485) + DV-DT Choke/Sine Wave
P-Smart	Smart Controller (One VFD + PT +RS 485) + Remote monitoring
E	Smart Controller Constant Speed + PS + BMS Alert
E+	Smart Controller Constant Speed + PS + RS 485
M	Multi Master (Individual VFD + HMI + PLC +PT + RS 485) (Without Bypass)
M+	Multi Master (Individual VFD + HMI + PLC +PT + RS 485) (With Bypass)
I	Multi Master (Motor mounted VFD + HMI + Panel mounted PLC + PT + RS 485

- **X** — Manifold MOC

1	MS - GI Hot Dipped Galvanized
2	SS 304
3	SS 316

- **X** — Customized Design

CX	Customized Design in Control Panel
MX	Customized Design in Manifold
OX	Customized Design in Other than Above

- **X** — Pressure Tank: This digit is applicable for with supply only. (T - Pressure Tank, 453 - Tank Capacity)
- **X** — Motor IE Class

MVHS Series

Applications:

These kind of booster sets are used for boosting water supply applications in the following facilities :

- Hotels
- Offices
- Public and Private healthcare system
- Industries
- Public buildings
- Theaters
- Other commercial buildings

Booster sets components and materials:

Vertical Multistage Pumps	CRI - MVC / MVS / MVN Series Pumps
Control Panel	CRI - Fixed / Variable Speed Control Panel
Isolating Valves	Threaded Ball Valve / Butterfly Valve
NRV	Threaded NRV / Wafer Type / Dual Plate Checkvalve
Pressure Feedbacks	Pressure Switch / Pressure Transmitter
Pressure Gauge	3/8' BSP Threaded / NPT
Suction and Delivery Manifold	MS With GI Hot Dipped Galvanized / SS
Base Frame	MS With GI Hot Dipped Galvanized / SS

Pump Specifications - 50 Hz

Max. Flow	1200 m^3/hr
Max. Head	320 m
Max. Power	110 kW
Liquid Temperature ranges	-10°C to 90°C

Pump Specifications - 60 Hz

Max. Flow	3170 gpm / 720 m^3/hr
Max. Head	980 ft / 300 m
Max. Power	45 kW (60 hp)
Liquid Temperature ranges	14°F to 194°F (-10°C to 90°C)

Pumped Liquids:

- Clear water without abrasives
- Non-aggressive and Non-explosive water

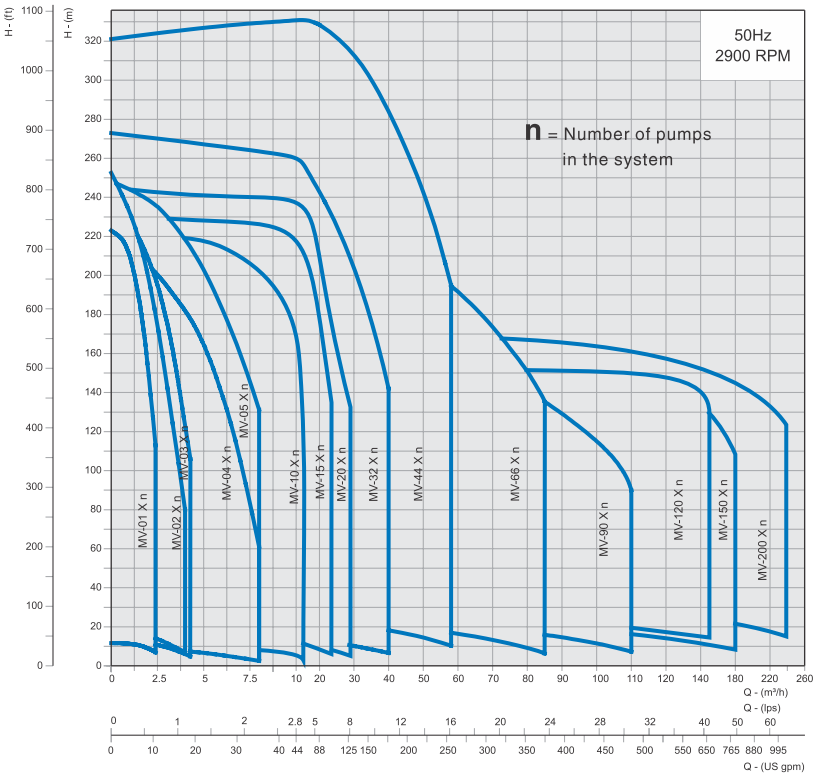
Advantages:

- Sophisticated water pressure throughout the building round the clock and ensures Efficient & Constant Water Pressure Management.
- No manual interference to operate the pumping system.
- Low noise & Vibration level, tough & reliable, low operating & maintenance cost
- Pressure comfort for modern bathroom gadgets.
- Due to multiple pumps operating in parallel, failure of single pump does not lead to complete system breakdown.
- Reliable automation.

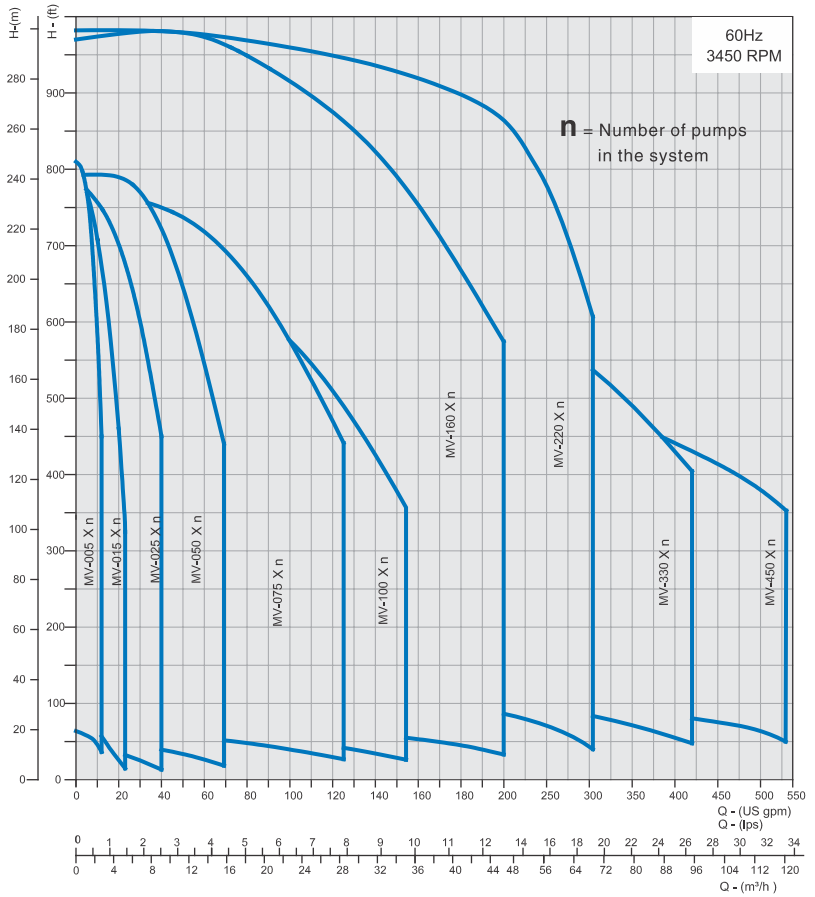
Key Features and Controls:

- **Pump Operational Features**: Floating Inventor – Cascading – Faulty Pump Isolation – Elapsed Running Hours – Maintenance call /Life Timer – Graphical Status indication – Manual Operation – Warm up - Soft Start
- **Pressure Feedback Features**: Actual pressure setting – Set Point setting – Calibration – Low & High pressure Cut Off
- **Protection Functions**: Pump dry Run (By Float & By CT) – Single phase prevention – Pump Overload – Emergency Off – Limit ON/OFF Frequency - Phase Sequence – Passwords – Phase reversal preventer – Current Transformer based Protection (Individual Motor) – Warm Up
- **Alarms – Visual / Audible**: Pump Dry Run (By Float & By CT) – Faulty Pump – Limit ON/OFF Frequency – Single phase prevention –Pump Overload – Emergency Off – Phase Sequence – VFD Fault - Phase Reversal Preventer.
- **Communications**: Modbus RS 485 (optional)
  (Optional: Ethernet)

Performance Curves - MVHS Series - 50 Hz



Performance Curves - MVHS Series - 60 Hz



MHBS Series

Key Features:

- Automatic cascade control of pumps by means of one / two pressure switches.
- Automatic change-over at any start / stop cycle
- Start & Stop delays to prevent simultaneous starting / stopping of the 2 pumps.
- Dry running protection by means of current sensing program.
- Automatic circuit breaker protecting the motor against short circuit and overload.
- Simple & Robust construction.

Applications:

- Residential
- Apartments
- Small Farms
- Washing System
- Gardening
- Hospitals
- Hotels
- Schools
- Small Industries
- Sprinkler System

Pump Specification - 50Hz

Max. Flow	28 m^3/hr
Max. Head	50 m
Max. Power	2.2 kW
Liquid Temperature ranges	0°C to 90°C

Pump Specification - 60Hz

Max. Flow	120 gpm / 28 m^3/hr
Max. Head	220 feet / 67m
Max. Power	3 kW (4 hp)
Liquid Temperature ranges	-32°F to 194°F (0°C to 90°C)

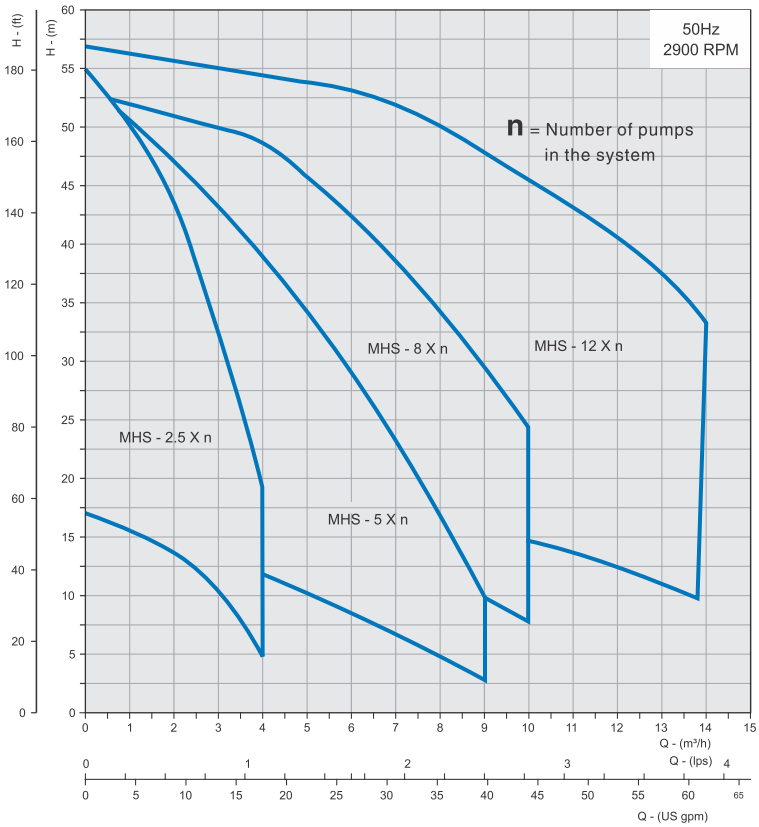
Pumped Liquids:

- Clear water without abrasives
- Non-aggressive and Non-explosive water

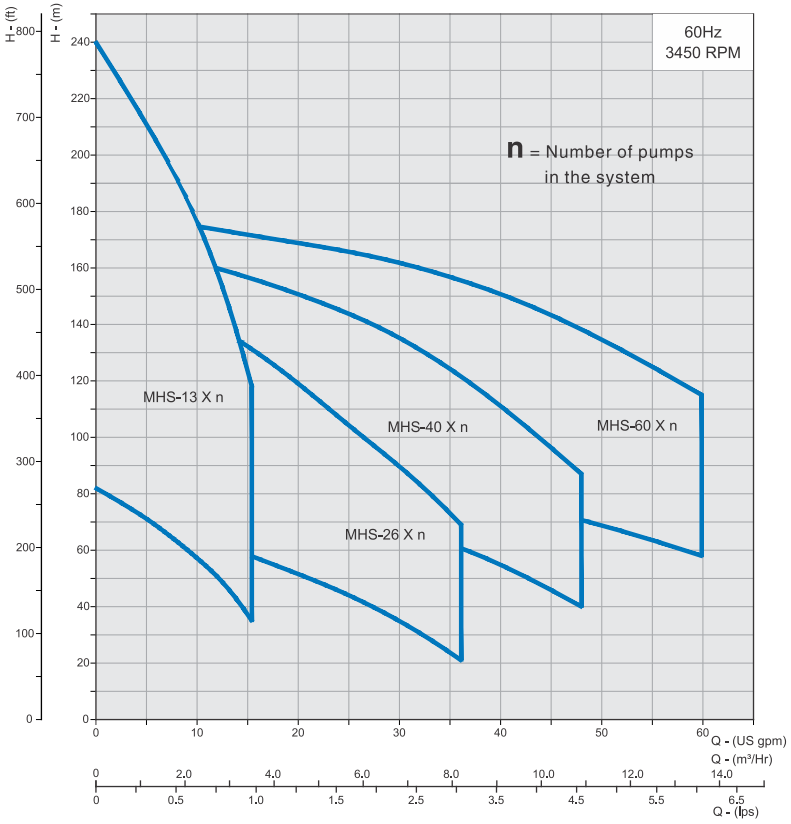
Booster sets components and materials:

Horizontal Multistage pumps	CRI - MHS Series Pumps
Control Panel	CRI - Fixed / Variable Speed Control Panel
Isolating Valves	Threaded Ball Valve / Butterfly Valve
NRV	Threaded NRV / Wafer Type / Dual Plate Checkvalve
Pressure feedbacks	Pressure Switch / Pressure Transmitter
Pressure Gauge	3/8' BSP Threaded
Suction and delivery Manifold	MS with GI Hot Dipped Galvanised / SS
Base frame	MS with GI Hot Dipped Galvanised / SS

Performance Curves - MHBS Series - 50 Hz



Performance Curves - MHBS Series - 60 Hz



Technical Information Features - MVHS & MHBS

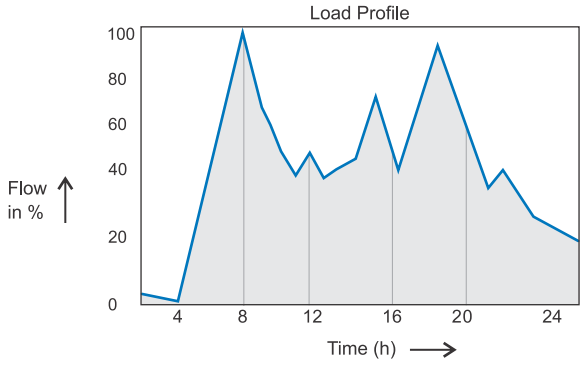
FEATURES	E Series	P Series	P-Smart Series	M Series	I Series
Controller Interface					
Ammeter & Voltmeter	✓	✓	✓	✓	✓
BMS Alert & Test Run	✓	✓	✓	✗	✗
Cascade	✓	✓	✓	✓	✓
Dry Run	CT	CT/Float	CT/Float	Float	Float
Emergency Off	✓	✓	✓	✓	✓
Error Log	✗	✓	✓	✓	✓
Remote Monitor / Access	✗	✗	✓	✗	✗
Fault Pump Isolation	✓	✓	✓	✓	✓
Float Switch Provision	✓	✓	✓	✓	✓
Floating Inverter	✗	✓	✓	✗	✗
Graphical Interface	✗	✓	✓	✓	✓
HMI	✗	✓	✓	✓	✓
Limit ON/OFF Frequency	✓	✓	✓	✗	✗
Maintanence Call	✗	✓	✓	✓	✓
Overload Protection	✓	✓	✓	✓	✓
Password Protection	✓	✓	✓	✓	✓
Pressure Lock	✗	✓	✓	✗	✗
Pressure Switch	✓	✗	✗	✗	✗
Pressure Transmitter	✗	✓	✓	✓	✓
RS 485 Modbus	✗	✓	✓	✓	✓
Single Phase Design	✓	✗	✗	✗	✗
Single Phase Preventer	✓	✓	✓	✓	✓
Phase Reversal	✓	✓	✓	✓	✓
Standby Pump Selection	✗	✓	✓	✗	✗
Warm Up	✗	✓	✓	✗	✗

Sizing the System Flow :

Below a few examples of how to calculate the right flow and examples of related load profile in graph.

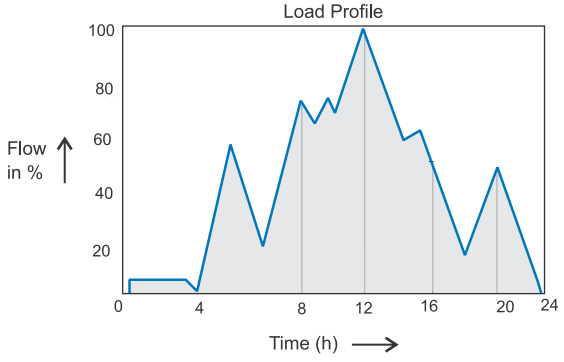
Residential Apartment

Calculation of Maximum Flow for system design	Example in m^3		Example in gallons	
Units	1 Flat	100 Flats	1 Flat	100 Flats
Total Consumption Per Flat / year	183 m^3	18300 m^3	48344 gallons	4834400 gallons
Consupmtion Period	365 day / year	(18300/365)	365 day / year	(4834400/365)
Average Consumption per day	0.5 m^3	50.14 m^3	132.45 gallons	13245 gallons
Factor for maximum Consumption	1.3	(50.14 x 1.3)	1.3	(13245 x 1.3)
Maximum Consumption per day for a period of 24 hrs	0.65 m^3	65.18 m^3	172.19 gallons	17219 gallons
Factors for peak flow (per hour of 24 hrs)	1.7	(65.18 x 1.7)/24	1.7	(17219*1.7)/24
Required flow per hour	0.046 m^3/hr	4.6 m^3/hr	12.18 gph (0.203 gpm)	1218 gph (20.3 gpm)



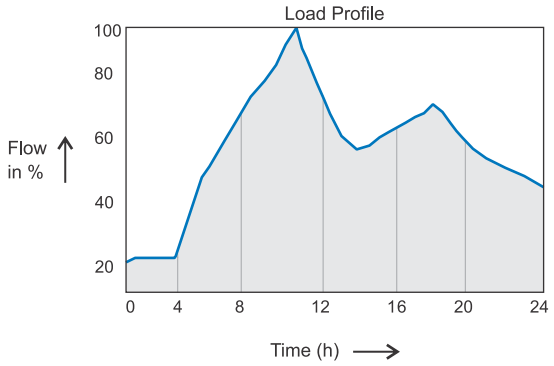
School / College / Education Institution

Calculation of Maximum Flow for system design	Example in m^3		Example in gallons	
Units	1 Student	800 Students	1 Student	800 Students
Total Consumption Per Student / year	8 m^3	6400 m^3	2113 gallons	1690400 gallons
Consupmtion Period	200 day / year	(6400/200)	200 day / year	(1690400/200)
Average Consumption per day	0.04m^3	32 m^3	10.57 gallons	8452 gallons
Factor for maximum Consumption	1.3	(32 x 1.3)	1.3	(8452 x 1.3)
Maximum Consumption per day for a period of 8 hrs	0.052 m^3	41.6 m^3	13.73 gallons	10988 gallons
Factors for peak flow (per hour of 8 hrs)	2.5	(41.6 x 2.5)/8	2.5	(183.14 x 2.5) /8
Required flow per hour	0.016 m^3/hr	12.8 m^3/hr	4.29 gph (0.072 gpm)	3432 gph (57 gpm)



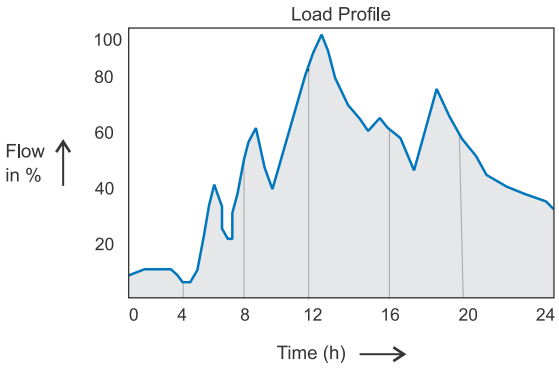
Hospital

Calculation of Maximum Flow for system design	Example in m^3		Example in gallons	
Units	1 Bed	200 Beds	1 Bed	200 Beds
Total Consumption Per Bed / year	300 m^3	60000 m^3	79252 gallons	15850400 gallons
Consupmtion Period	365 day/year	(60000/365)	365 day/year	15850400/365
Average Consumption per day	0.8 m^3	164.38m^3	217.12 gallons	43426 gallons
Factor for maximum Consumption	1.2	164.38 x 1.2	1.2	43426 x 1.2
Maximum Consumption per day for a period of 24 hrs	0.96	197.26 m^3	260.54 gallons	52111 gallons
Factors for peak flow (per hour of 24 hrs)	3	(197.26x3)/24	3	(52111 x 3)/24
Required flow per hour	0.12 m^3/hr	24.66 m^3/hr	32.5 gph (0.54 gpm)	6501 gph (108 .3 gpm)



Commercial Office

Calculation of Maximum Flow for system design	Example in m^3		Example in gallons	
Units	1 Person	400 Persons	1 Person	400 Persons
Total Consumption Per Person / year	10 m^3	4000 m^3	2642 gallons	1056800 gallons
Consupmtion Period	250 day/year	4000/250	250 day/year	(1056800/250)
Average Consumption per day	0.04 m^3	16 m^3	10.57 gallons	4227.2gallons
Factor for maximum Consumption	1.3	16 x 1.3	1.3	(4227.2 x 1.3)
Maximum Consumption per day for a period of 12 hrs	0.052 m^3	20.8 m^3	13.74 gallons	5495 gallons
Factors for peak flow (per hour of 12 hrs)	2.5	(20.8x2.5)/12	2.5	(5495 x 2.5)/12
Required flow per hour	0.011 m^3/hr	4.3 m^3/hr	2.86 gph (0.048 gpm)	1145 gph (19 gpm)



NOTES

W I N N I N G W A Y S

When you have a good thing going it is quite in the fitting of things that recognitions come our way. Several prestigious awards, which decorate our shelf, say it all. These rewards not only acknowledge our position as a leader in the water pump industry but also serve as reminders about what the customer expects from a winner. And we, as ever, have our ears perfectly tuned to customer expectations.

C.R.I. PUMPS (PVT) LIMITED

(International Division)
7/46-1, Keeranatham Road, Saravanampatty, Coimbatore - 641 035. **India.**
Phone : +91-422-3911610, 3911612. Fax : +91-422-3911600, e-mail : cri@crifluidsystems.com website : www.crifluidsystems.com

BOMBAS C.R.I. ESPAÑA, S.L.

Poligono Industrail El.Bony Calle 31, No. 137, 46470
Catarroja (Valencia) **Spain.**
Tel : +34-96 1842 974, Fax : +34-96 1842 977
e-mail : cri@bombascri.es website : www.bombascri.es

BOMBAS C.R.I. ESPAÑA S.L. UNIPERSONAL

Via Linara 8, 82030, Limatola-BENEVENTO-**Italy**
Tel :+39. 0823 586 904
e.mail : cri@bombascri.it website:www.crifluidsystems.com

C.R.I. BOMBAS HIDRÁULICAS LTDA

Av. Rodrigo Fernando Grillo, 457, Jd. Manacas,
CEP - 14.801-534, Araraquara - SP, **Brasil.**
Fone : +55-16-3331 1099, Fax : +55-16-3331 5344
e-mail : cri@cribombas.com.br website : www.cribombas.com.br
Filial : Jaboatão dos Guararapes-PE, Brasil.
Fone : (81) 3093-9620, Fax : (81) 3093-9600.

C.R.I. PUMPS S.A. (PTY) LIMITED

P.O. Box 6292, Halfway House, Midrand - 1685,
Johannesburg, **South Africa.**
Tel : +27-11-8058631 / 32, Fax : +27-11-8058630
e-mail : cri@cripumps.co.za website : www.cripumps.co.za
Branches : Capetown : + 27-21-9499122
Durban : + 27-31-7001814

C.R.I. POMPA SANAYi VE TiCARET LiMiTED ŞiRKETi

10032 Sk. No:12 A.O.S.B. 35620 Çiğli-İzmir-**Türkiye.**
Tel : +90-232-328-328 22 99, Fax : +90-232-328 23 33
e-mail : cri@cripompa.com website : www.cripompa.com

PT. C.R.I. FLUID SYSTEMS

Soho Capital @ Podomoro City 16th Floor, Suite SC - 1606A,
Jl. Letjen S. Parman, Kav. 28 Kel. Tanjung Duren Selatan
Kec. Grogol Petamburan Kota Adm.
West Jakarta Province DKI Jakarta. Website : www.crifluidsystems.com

C.R.I. FLUID SYSTEMS USA LLC

4655, Wright Rd, Stafford, Texas 77477, **USA**.
Tel : (470) 226 3393, Email : sales@crigroups.us
Website : www.crigroups.us

C.R.I. PUMPS (FZE)

P.O. Box 7988, A4-12 SAIF-Zone, **Sharjah,** U.A.E.
Tel : +971-6-5573041 (3 Lines), Fax : +971-6-5573042
e-mail : cripumps@eim.ae website : www.cripumps.ae

C.R.I. FLUID SYSTEMS INC.,

Polyland Industrial Subdivision, Warehouse #3, Block 4,
Kendex St., Bo. Iba, Meycauayan, Bulacan. **Philippines.** Zip-3020.
Phone : +63 44 762 8887 / +63 44 802 6199, Fax : +63 44 762 8883.
e-mail : sales.ph@crigroups.com Website : www.crifluidsystems.com

C.R.I. FLUID SYSTEMS (BD) LTD.,

Ground Floor, Unit-1 Holding No 212, Tejgaon Industrial Area,
Tejgaon - Gulshan Link Rd, Dhaka - 1208, **Bangladesh**
Website : www.crifluidsystems.com

C.R.I. PUMPS (Shanghai) Co., Ltd.

Room 902, Building No.7, 1855 Qixin Road,
Minhang District, **Shanghai** - 201101. China.
Tel : +86-21-54405082, Fax : +86-21-54405083
e-mail : cri@bombascri.com.cn
website : www.bombascri.com.cn

SUZHOU C.R.I. PUMPS CO., LTD.

579, Longqia Road, Wujiang District - 215200
Suzhou, China. Telephone : +86-512-634 33668
Fax : +86-512-634 33667, e-mail : cri@crisuzhou.com.cn

C.R.I. FLUID SYSTEMS AUSTRALIA PTY LIMITED

1198 Toorak Road Camberwell Victoria 3124, **Australia**
Phone : +61-3 9804 0888 FAX : +61 3 9804 0322
Website : www.crifluidsystems.com

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