



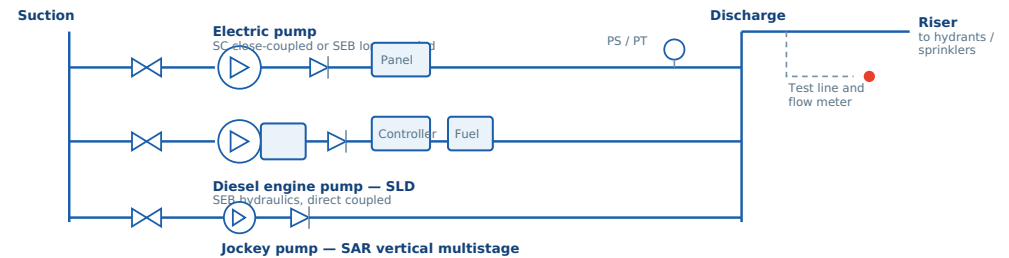
SEDJ fire set — diesel engine pump, common suction and discharge manifolds, gate and check valves, pressure gauges and test connection on a fabricated skid. Arrangement varies with the set size and the number of pumps.

Satte SEDJ fire sets are packaged pumping sets for fire hydrant and sprinkler water supplies, built around a duty electric pump, a diesel engine driven pump and a jockey pump on a common suction and discharge manifold.

Every duty in this issue has been selected from the published Satte pump curves and the head available at the duty point is tabulated alongside it, so the selection can be checked rather than taken on trust. For full pump data refer to the SC, SEB, SLD and SAR literature.

Typical Applications

- Fire hydrant water supply for urban and industrial sites
- Sprinkler system water supply in hotels, factories, hospitals and commercial buildings
- Schools, warehousing and logistics facilities
- Any site where the mains cannot supply the required flow and pressure



Set arrangement

Components

- **Electric pump** — SC close-coupled to EN 733, or SEB long-coupled end suction on a baseplate
- **Diesel pump** — SLD, the same SEB hydraulics with a diesel engine in place of the motor, so it meets the same duty
- **Jockey pump** — SAR vertical multistage, small flow, high head, to hold system pressure
- **Controllers** — separate electric and engine controllers, automatic start on pressure drop, manual stop
- **Accessories** — suction and discharge pipework with flanges, gate and check valves, flexible connectors, pressure switches, battery and charger, test line and flow meter

Operating Conditions

- Standard sets 50–500 US gpm (11.4–113.6 m³/h) at 6–10 bar
- Suction DN50–DN80, discharge DN32–DN65 on the standard sets
- Electric motors 7.5–55 kW, 400 V 3~, 50 Hz, 2900 rpm, IP55 class F

- Clean water –10 to +120 °C; ambient –10 to +50 °C
- Max. working pressure 16 bar (SC) / 20 bar (SEB, SLD)

Technical Data

Table 1 — Duty and electric pump selection. Head at duty is interpolated from the Satte published performance tables.

Model	Rated duty				Electric pump 1 — SC close-coupled						Electric pump 2 — SEB end suction			
	US gpm	m³/h	bar	m	Type	DN	kW	HP	H at duty m	FLC A	Type	kW	HP	H at duty m
SEDJ 50/6	50	11.4	6	61.2	SC 32-250/7.5	50×32	7.5	10	67.5	13.7	SEB 32-250/7.5	7.5	10	67.5
SEDJ 50/9	50	11.4	9	91.8	SC 40-315/22	65×40	22	30	106.0	38.5	SEB 32-250/15	15	20	93.6
SEDJ 100/7	100	22.7	7	71.4	SC 40-250/15	65×40	15	20	77.7	26.5	SEB 40-250/15	15	20	77.7
SEDJ 100/8	100	22.7	8	81.6	SC 40-250/18.5	65×40	18.5	25	83.4	32.5	SEB 40-250/18.5	18.5	25	83.4
SEDJ 100/9	100	22.7	9	91.8	SC 40-315/22	65×40	22	30	104.4	38.5	SEB 40-315/18.5	18.5	25	93.4
SEDJ 200/6	200	45.4	6	61.2	SC 50-250/15	65×50	15	20	62.2	26.5	SEB 50-250/15	15	20	62.2
SEDJ 250/7	250	56.8	7	71.4	SC 50-250/22	65×50	22	30	80.3	38.5	SEB 50-250/22	22	30	80.3
SEDJ 350/8	350	79.5	8	81.6	SC 65-250/37	80×65	37	50	87.6	64	SEB 65-250/37	37	50	87.6
SEDJ 500/7	500	113.6	7	71.4	SC 65-315/55	80×65	55	75	111.3	93.5	SEB 80-250/45	45	60	84.1
SEDJ 500/10	500	113.6	10	102.0	SC 65-315/55	80×65	55	75	111.3	93.5	SEB 65-315/55	55	75	111.3

1 m³/h = 4.403 US gpm; 1 bar = 10.2 m of water at 20 °C. Full-load current is the Satte published figure at 400 V; starting current direct-on-line is roughly 8 × FLC and about one third of that on star-delta. Use star-delta or soft start above 20 HP.

Table 2 — Diesel engine pump and jockey pump. Each SLD set is built on the same SEB hydraulics as the electric pump 2 in table 1, so both drives meet the same duty on the same curve.

Model	Diesel pump — SLD						Jockey pump — SARV / SAR vertical multistage					
	Type	Pump kW	H at duty m	Engine HP	Engine gross kW	Fuel tank L	Main pump churn m	Type	kW	HP	H at 1 m³/h	FLC A
SEDJ 50/6	SLD 32-250/7.5	7.5	67.5	15	11.2	60	69.5	SARV 1-15	0.75	1	84	5.0
SEDJ 50/9	SLD 32-250/15	15	93.6	27	20.1	110	106	SARV 1-21	1.1	1.5	117	7.2
SEDJ 100/7	SLD 40-250/15	15	77.7	27	20.1	110	84.5	SARV 1-17	1.1	1.5	95	7.2
SEDJ 100/8	SLD 40-250/18.5	18.5	83.4	32	23.9	130	90	SARV 1-17	1.1	1.5	95	7.2
SEDJ 100/9	SLD 40-315/18.5	18.5	93.4	32	23.9	130	106	SARV 1-21	1.1	1.5	117	7.2
SEDJ 200/6	SLD 50-250/15	15	62.2	27	20.1	110	68.5	SARV 1-15	0.75	1	84	5.0
SEDJ 250/7	SLD 50-250/22	22	80.3	40	29.8	160	89.5	SARV 1-17	1.1	1.5	95	7.2
SEDJ 350/8	SLD 65-250/37	37	87.6	75	55.9	300	92	SARV 1-19	1.1	1.5	106	7.2
SEDJ 500/7	SLD 80-250/45	45	84.1	80	59.7	320	92	SARV 1-19	1.1	1.5	106	7.2
SEDJ 500/10	SLD 65-315/55	55	111.3	100	74.6	400	122	SARV 1-23	1.1	1.5	128	7.2

Jockey. SARV is the firefighting build of the SAR vertical multistage pump and shares its hydraulics, so SARV 1-17 and SAR 1-17 have the same curve and either designation may be quoted. The jockey has to hold the system above the main pump's churn (shutoff) head, otherwise the main pump starts on every small leak. Heads are read at 1 m³/h, about 1% of duty on the mid-range sets. Jockeys are 220–240 V single phase, DN25.

Engine. Ratings are gross and already carry a 20% buffer over the pump rating for site derating — see page 2. Fuel tanks are 5.07 L per gross engine kW plus 5%.

SLD sets are built from SEB pumps. The SLD range is the SEB end suction pump with a diesel engine in place of the motor, direct coupled on a common baseplate, so any SEB hydraulic can be supplied as an SLD set. Four of the sets above use SLD 32-250 and SLD 40-315 builds that are not in the standard SLD model list but follow the SEB 32-250 and SEB 40-315 curves exactly. Quote them as built to order.

Note: This table gives details of the standard product range available. Other systems can be specified to suit particular site requirements in terms of control features, flow and pressure.

Model Designation

SEDJ 250 / 7 - 30 - 40 - 1.5

250 rated flow in US gpm · 7 rated pressure in bar · 30 electric motor HP · 40 engine HP · 1.5 jockey HP

Full range: SEDJ 50/6-10-15-1 · 50/9-20-27-1.5 · 100/7-20-27-1.5 · 100/8-25-32-1.5 · 100/9-25-32-1.5 · 200/6-20-27-1 · 250/7-30-40-1.5 · 350/8-50-75-1.5 · 500/7-60-80-1.5 · 500/10-75-100-1.5

Electric HP is the SEB rating, which is also the SLD pump rating, so the electric and diesel pumps in a set always share a curve. Where the SC close-coupled alternative carries a different motor rating — SEDJ 50/9 and 100/9 — table 1 gives it.

Acceptance Checks

Churn. Churn is the pump running with the discharge closed — the impeller turning but no water leaving the set. Flow is zero and the water in the casing simply circulates and warms. A centrifugal pump makes its highest head at zero flow, so churn head is the greatest pressure the set can put into the system, and it is the pressure the pipework, valves, flanges, gauges and hose have to stand whenever the system is idle and a pump runs. On a fire set that happens routinely: the jockey pump tops up small leaks against a closed system, and the main pump sits at churn between starting on a pressure drop and the first hydrant or landing valve being opened. NFPA 20 therefore caps churn head at 140% of rated head. Churn is also called shutoff, no-flow or closed-valve head.

A fire pump is judged on three points of its curve, not one. NFPA 20 asks that churn head — the head at zero flow, which is the pump's maximum head — does not exceed 140% of rated head, and that the pump still delivers at least 65% of rated head at 150% of rated flow. The pump's maximum head and maximum published flow are tabulated below alongside the two limits, together with the curve points either side of the 150% flow, so every figure can be checked back to the pump literature. The checks are against the SEB selection in table 1, which is also the SLD pump, so one check covers the electric and the diesel drive.

Worked example — SEDJ 500/7, rated 113.6 m³/h at 71.4 m

150% flow = $1.5 \times 113.6 = 170.4 \text{ m}^3/\text{h}$ — inside the pump's 210 m³/h maximum, so a head is published there

Minimum head at that flow = $0.65 \times 71.4 = 46.4 \text{ m}$

Head at 170.4 m³/h, between the 144 and 180 m³/h columns:

$$78.5 + (70.5 - 78.5) \times (170.4 - 144) \div (180 - 144) = 72.6 \text{ m} \geq 46.4 \text{ m} \checkmark$$

Maximum churn head allowed = $1.40 \times 71.4 = 100.0 \text{ m}$ — pump churns at 88.0 m ✓

Model	Rated duty		Pump limits			150% flow check				Result
	Q m³/h	H m	Max head at churn m	Churn as % of rated (limit 140%)	Max published flow m³/h	150% flow m³/h	Curve points either side, m³/h → m	Head at 150% m	Minimum, 65% of rated m	
SEDJ 50/6	11.4	61.2	70	114%	24	17.1	15 → 66.0 / 18 → 63.0	63.9	39.8	pass
SEDJ 50/9	11.4	91.8	97	106%	24	17.1	15 → 90.0 / 18 → 86.0	87.2	59.7	pass
SEDJ 100/7	22.7	71.4	84	118%	48	34.0	27 → 75.2 / 36 → 70.0	71.1	46.4	pass
SEDJ 100/8	22.7	81.6	90	110%	48	34.0	27 → 80.7 / 36 → 75.8	76.9	53.0	pass
SEDJ 100/9	22.7	91.8	95	103%	42	34.0	27 → 92.5 / 36 → 87.0	88.2	59.7	pass
SEDJ 200/6	45.4	61.2	68	112%	84	68.1	54 → 59.0 / 72 → 50.0	52.0	39.8	pass
SEDJ 250/7	56.8	71.4	90	125%	90	85.2	84 → 63.5 / 90 → 57.0	62.2	46.4	pass
SEDJ 350/8	79.5	81.6	92	113%	138	119.2	108 → 80.5 / 120 → 78.0	78.2	53.0	pass
SEDJ 500/7	113.6	71.4	88	123%	210	170.4	144 → 78.5 / 180 → 70.5	72.6	46.4	pass
SEDJ 500/10	113.6	102.0	122	120%	180	170.4	138 → 103.0 / 180 → 76.0	82.2	66.3	pass

Heads at the 150% point are straight-line interpolations between the two published columns shown. Where a duty sits near the end of a curve, confirm against a certified curve before order. Every set also has to be non-overloading out to 150% flow, since absorbed power keeps rising as head falls — this governs the motor and engine ratings in tables 1 and 2.

SEDJ 500/7. The 80-250 casing is used for electric pump 2 rather than the 65-250 because its published table runs to 210 m³/h, so the 150% point is a tabulated figure and not an extrapolation. The 45 kW build of this casing is supplied to order. Two close-coupled alternatives are available: **SC 65-315/55**, tabled above, which carries the duty comfortably at 111.3 m and holds 82.2 m at the 150% point, but whose churn head of 122 m is 171% of rated — rate the downstream pipework, valves and hose for 12.2 bar and fit a pressure relief valve; and **SC 65-250/37**, a 37 kW option giving 79.4 m at duty with churn at a more comfortable 129% of rated, though its published curve ends at 138 m³/h so the 150% point is not tabulated.

Engine Sizing and Derating

Engine ratings are gross. The SLD literature calls for roughly 3% per 300 m of altitude and 2% per 5 °C above 25 °C, plus an allowance for the cooling fan, battery charging and any clutch. The engines in table 2 are therefore sized on the pump rating divided by 0.80, a buffer that covers site derating to about 1,500 m at 30 °C together with a 5% auxiliary allowance.

Engine gross kW ≥ pump kW ÷ 0.80
37 kW pump: 37 ÷ 0.80 = 46.3 kW → **75 HP (55.9 kW)**

Available on site = gross × (1 – alt/300 × 0.03 – (T–25)/5 × 0.02) × 0.95
75 HP at 1200 m, 30 °C: 55.9 × 0.86 × 0.95 = **45.7 kW** against 37 kW ✓

Pump kW	Engine	Gross kW	Buffer	Altitude limit at 30 °C
7.5	15 HP	11.2	49%	2,700 m
15	27 HP	20.1	34%	1,950 m
18.5	32 HP	23.9	29%	1,600 m
22	40 HP	29.8	36%	2,000 m
45	80 HP	59.7	33%	1,860 m
37	75 HP	55.9	51%	2,800 m
55	100 HP	74.6	36%	2,000 m

Check the engine against the site before order. The altitude limits above are the point at which the derated output falls to the pump rating at 30 °C ambient. They are a guide, not a guarantee: real derating depends on the engine make and model, the ambient the set actually sees in its plant room, and the auxiliaries hung off the crankshaft. On any site above roughly 1,500 m, or where the plant room runs hotter than 30 °C, confirm the derated output against the engine maker's data and uprate to the next frame if it does not clear the pump rating with a margin. Sets sold into the East African highlands — Kampala at about 1,200 m, Nairobi at 1,800 m, Addis Ababa at 2,350 m — should be quoted with this check already done.

The buffer is applied to the pump rating, not to the power absorbed at the duty point, so it also covers the pump being run out along its curve. Where a set is quoted for a site above the altitude limit shown, move to the next engine frame.

Fuel and Ancillaries

Fuel tank = 5.07 L per gross engine kW, plus 5%

15 HP: 11.2 × 5.07 × 1.05 = **60 L**
27 HP: **110 L** · 32 HP: **130 L**
40 HP: **160 L** · 75 HP: **300 L**
100 HP: **400 L**

Scope of supply

- Electric pump with motor on baseplate
- Diesel pump with engine, coupling and guard
- Jockey pump with its own starter
- Suction and discharge manifolds, gate and check valves, flexible connectors
- Electric and engine controllers, batteries and charger
- Pressure switches, gauges, test line and flow meter

Standards

- NFPA 20 — stationary fire pumps
- EN 733 — SC pump dimensions
- IEC 60034 — motors, IP55 class F
- IEC 61439 — controllers
- EN 1092-1 — flanges
- EN ISO 9906 — performance test

Verification note. All pump models, motor ratings, currents and heads in this issue are taken from the Satte SC, SEB, SLD and SAR literature. Heads at duty are linear interpolations of the published tabulated points and carry the usual tolerance — confirm the duty point against a certified curve before final selection. Absorbed power at duty is not published for the SC and SEB ranges; ask for a certified curve with the power plotted where the duty sits near the end of the curve, and size the engine on that rather than on the pump nameplate.

Performance stated at 50 Hz with clean water at 20 °C. Satte reserves the right to alter specifications without notice.