

Safety Stock Planner

How-to guide: what the workbook does, how to use it and what every number means.

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Safety Stock Planner

Size each item's safety stock and reorder point from demand and lead-time variability, and find the buffers set today that are short or excessive.

For: Inventory planners, buyers, materials and supply-chain managers setting min/max and reorder points in an ERP.

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Quick start

1. On Setup, type your company name and currency, pick the demand period and set your carrying-cost rate and the service level for each class.
2. On Item Register, list your items: unit cost, average demand and its standard deviation per period, lead time and its standard deviation, and the safety stock set today.
3. Read the recommended safety stock and reorder point per item, and the status against today's setting.
4. Open the Dashboard: the ten largest gaps, the cost of a higher service level and the totals by class.

What is in the workbook

Start Here	Read this first: what the workbook does and how to use it.
Setup	Company, currency, demand period, carrying-cost rate, tolerance and the service level for each class.
Item Register	One row per item: demand and lead-time variability in, recommended safety stock, reorder point and the gap to today's setting out.
Dashboard	Recommended against current buffers, the ten largest gaps, what a higher service level costs, and totals by class.
Method	How every number is calculated, with assumptions, limits and sources.
Verify	Self-check: the workbook's formulas recomputed on fixed inputs against an independent reference.

What each number means

Quantity	How it is calculated	Units
Z factor	NORM.S.INV(cycle service level): the standard normal value with that probability below it.	-
Lead-time demand	Average demand per period x lead time.	units
Std dev of LT demand	$\sqrt{L \times sd^2 + d^2 \times sL^2}$; d and sd per period, L and sL in periods.	units

Quantity	How it is calculated	Units
Safety stock	Z factor x std dev of lead-time demand (shown to the nearest unit).	units
Reorder point	Lead-time demand + safety stock: reorder when stock on hand plus on order falls to it.	units
Lead-time share	$(d \times sL)^2 / (\text{std dev of LT demand})^2$: the part of the variance from lead-time variability.	%
Safety stock value, holding cost	Safety stock x unit cost; x the carrying-cost rate for the annual holding cost.	currency, currency/y
Gap, gap value	Current safety stock - recommended; x unit cost, to the cent. Negative = short.	units, currency
Current vs recommended	Below target under recommended x (1 - band); Above target over recommended x (1 + band); else On target.	-
Holding cost change	(Recommended buffer value - current buffer value) x carrying-cost rate.	currency/year
Cost of service	Buffer value with every item at one service level: NORM.S.INV(level) x sum of (std dev of LT demand x unit cost).	currency
Ten largest gaps	Items ranked by the helper column Action rank (absolute gap value, ties in register order), looked up with INDEX/MATCH.	-

Assumptions, limitations, sources and the self-check (the Verify sheet, which recomputes the workbook's formulas on fixed test inputs) are in the workbook. The last page shows the Dashboard with the example data for Harbour Pumps, a fictional business.

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Engineering estimates for planning and improvement work. Verify the results against your own process, data and standards before you rely on them.

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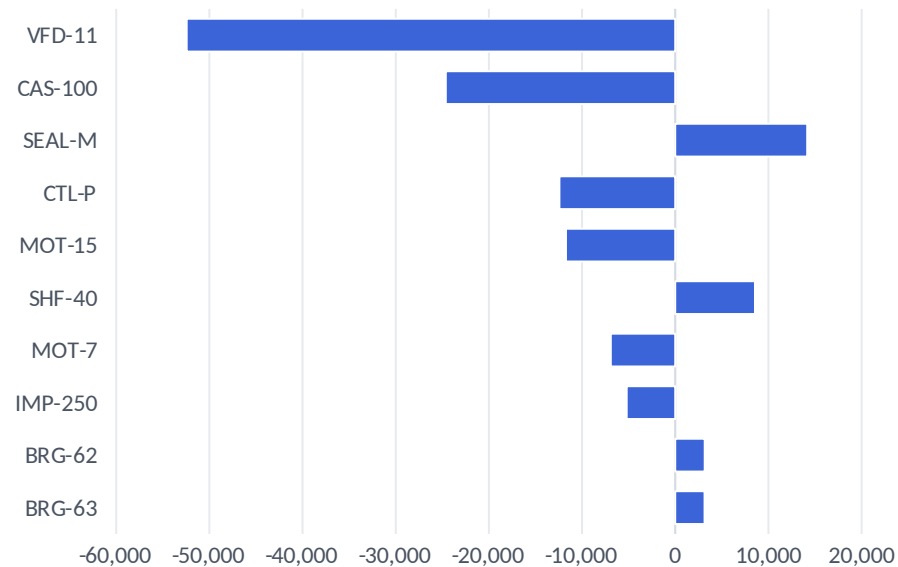
Recommended against current buffers, the ten largest gaps, what a higher service level costs, and totals by class.

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Showing 24 items for Harbour Pumps (example). Demand and lead time per week; safety stock = $z \times \sqrt{L \times sd^2 + d^2 \times sL^2}$.

RECOMMENDED BUFFER VALUE (GBP)	CURRENT BUFFER VALUE (GBP)	ITEMS BELOW RECOMMENDED	HOLDING COST CHANGE (GBP/YEAR)
260,981	194,598	6	+14,604
Safety stock x unit cost, all items	Safety stock set today x unit cost	Short of the band on Setup: stockout risk	Recommended minus current, x carrying rate

Ten largest gaps (value): short < 0 < excess



Cost of service: buffer value by service level

