

# 4. Safety stock

What is Safety Stock ?

“A quantity of stock planned to be in inventory to protect against fluctuation in demand or supply”

The formula of Transformation Center is the following:

$$\text{Safety Stock}_{\text{M}} = \left( \frac{\text{SS}_{\text{Past demand RLT}}}{\text{Average Past Demand}_{\text{during RLT}}} \right) \times \text{Future demand during SHS RLT}$$

$\text{Safety Stock}_{\text{past demand RLT}} = k * \sigma_{\text{past demand weekly}} * \sqrt{\text{RLT}_{\text{weeks}}}$   
 Rate calculation (Step 1 and 2)  
 (Step 3)

The Safety Stock is calculated following the 3 main steps below:

1. Calculate Safety Stock based on Demand Variability formula ( $k * WD * \text{RLT}$ )
2. Calculate proportion to past demand average during RLT => Safety Stock based on past/Average Past Demand during RLT
3. Apply proportion to the future demand average during RLT => For each month, calculate the future demand during RLT

Then the last result in step 3 is reworked with the Safety Stock matrix below, following the Variability and the Usage of the item.

## Variability & Usage Effect

|                   |          | <10/52 weeks |      | >35/52 weeks |
|-------------------|----------|--------------|------|--------------|
| Variability/Usage |          | L            | M    | H            |
| CoV < 50%         | X (Low)  | SS/3         | SS   | SS           |
|                   | Y (Med)  | SS/2         | SS/2 | SS           |
| CoV > 100%        | Z (High) | SS/3         | SS/2 | SS           |

**REMARKS:**

> To calculate the Demand Variability and the Average Past demand, we look at the actual demand (Internal + External) on the last 108 weeks based on the last requested GI date. Data come from the following BW Query:

**BW\_QRY\_MVSDSO56\_0002 / Historical Data - Sales & Purchase Orders**

> **Variability** is calculated with the following formula:

$$\text{Coefficient of Variation (COV)} = (\text{Demand Variability} / \text{Demand Average}) * 100$$

Then the Variability is determined as:

- **Low (X)** if the CoV is below 50%
- **Medium (Y)** if the CoV is between 50% and 100%
- **High (Z)** if the CoV is above 100%

> **Usage** is determined following the number of weeks with demand, out of the last 108 weeks

Usage is:

- **Low (L)** if the number of weeks with demand is below 10
- **Medium (M)** if the number of weeks with demand is between 10 and 35
- **High (Z)** if the number of weeks with demand is above 35

**Additional functionalities:**

There is a specific view that used for 2 additional functionalities that will impact Safety stock.

| Horizon  | Actual Total | Past extern | Demand = External demand only       | Past weeks                          | Actual Total | Past deman | Past deman | Past deman |
|----------|--------------|-------------|-------------------------------------|-------------------------------------|--------------|------------|------------|------------|
| W05-2021 | 2 900        | 1 820       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 1 820        | 4 399      | 9 436      | 6 312      |
| W06-2021 | 4 600        | 4 600       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 4 600        | 4 399      | 9 436      | 6 312      |
| W07-2021 | 23 660       | 12 860      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 12 860       | 4 399      | 9 436      | 6 312      |
| W08-2021 | 11 340       |             | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |              | 4 399      | 9 436      | 6 312      |
| W09-2021 | 2 840        | 2 840       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 2 840        | 4 399      | 9 436      | 6 312      |
| W10-2021 | 2 080        | 2 080       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 2 080        | 4 399      | 9 436      | 6 312      |
| W11-2021 | 10 840       | 40          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 40           | 4 399      | 9 436      | 6 312      |
| W12-2021 | 11 200       | 5 800       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 5 800        | 4 399      | 9 436      | 6 312      |
| W13-2021 | 8 940        | 3 000       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 3 000        | 4 399      | 9 436      | 6 312      |
| W14-2021 | 1 080        | 1 080       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 1 080        | 4 399      | 9 436      | 6 312      |
| W15-2021 | 12 620       | 1 820       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 1 820        | 4 399      | 9 436      | 6 312      |
| W16-2021 | 5 400        | 5 400       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 5 400        | 4 399      | 9 436      | 6 312      |
| W17-2021 | 4 560        | 4 560       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 4 560        | 4 399      | 9 436      | 6 312      |
| W18-2021 | 7 680        | 7 680       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 7 680        | 4 399      | 9 436      | 6 312      |
| W19-2021 | 5 600        | 200         | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 200          | 4 399      | 9 436      | 6 312      |
| W20-2021 | 9 720        | 4 320       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 4 320        | 4 399      | 9 436      | 6 312      |
| W21-2021 | 1 040        | 1 040       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 1 040        | 4 399      | 9 436      | 6 312      |
| W22-2021 | 17 340       | 16 260      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 16 260       | 4 399      | 9 436      | 6 312      |
| W23-2021 | 17 680       | 12 280      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 12 280       | 4 399      | 9 436      | 6 312      |
| W24-2021 | 5 400        |             | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |              | 4 399      | 9 436      | 6 312      |
| W25-2021 | 17 860       | 1 620       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 1 620        | 4 399      | 9 436      | 6 312      |
| W26-2021 | 23 160       | 16 140      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 16 140       | 4 399      | 9 436      | 6 312      |
| W27-2021 | 1 080        | 1 080       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 1 080        | 4 399      | 9 436      | 6 312      |
| W28-2021 | 6 860        | 1 380       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 1 380        | 4 399      | 9 436      | 6 312      |

This view is accessible through the shortcut named "P&I - Weekly past demand"

> It is possible to unselect specific weeks from the calculation of these datafields but this action is not supported by TC as it should include all 108 weeks. You can do so by ticking / unticking the box called "Past weeks" in the view above.

> For TS exclusively: it is possible to only consider External demand for the calculation of Past demand average and Past demand variability. You can do so by ticking / unticking the box called "Demand = External demand only" in the view above.

**Be careful, if you tick this box, it will be at SKU level and it will also impact other data such as Past demand average (none zero) & Future demand which are used in Safety Stock & Cycle Stock calculations.**

**The Contractual Safety Stock**

| P&I - Safety stock details                                    |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 143458R@8356R AEROFROTH 70 160KG 353LB PE TH DR 7723 Atequiza |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |
| 12 / 12 / 6242  | Horizon                             |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |
| Data fields   | M06-2023                            | M07-2023                            | M08-2023                            | M09-2023                            | M10-2023                            | M11-2023                            | M12-2023                            | M01-2024                            | M02-2024                            | M03-2024                            |
| CoV [%]   | 263.87%                             | 263.87%                             | 263.87%                             | 263.87%                             | 263.87%                             | 263.87%                             | 263.87%                             | 263.87%                             | 263.87%                             | 263.87%                             |
| Safety Stock Matrix   | M-Z                                 | M-Z                                 | M-Z                                 | M-Z                                 | M-Z                                 | M-Z                                 | M-Z                                 | M-Z                                 | M-Z                                 | M-Z                                 |
| SHS RLT final [Day]   | 28                                  | 28                                  | 28                                  | 28                                  | 28                                  | 28                                  | 28                                  | 28                                  | 28                                  | 28                                  |
| Past demand average [KG]                                      | 802                                 | 802                                 | 802                                 | 802                                 | 802                                 | 802                                 | 802                                 | 802                                 | 802                                 | 802                                 |
| Past demand variability [KG]                                  | 2 115                               | 2 115                               | 2 115                               | 2 115                               | 2 115                               | 2 115                               | 2 115                               | 2 115                               | 2 115                               | 2 115                               |
| Future external sales [KG]                                    | 1 600.00                            | 4 480.00                            | 480.00                              | 2 240.00                            | 480.00                              | 2 240.00                            | 2 240.00                            |                                     | 1 600.00                            | 2 800.00                            |
| Future demand (for Safety stock) [KG]                         | 1 600.00                            | 4 480.00                            | 480.00                              | 2 240.00                            | 480.00                              | 2 240.00                            | 2 240.00                            |                                     | 1 600.00                            | 2 800.00                            |
| Demand = External demand only                                 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Future demand RLT (for Safety Stock) [KG]                     | 1 493.33                            | 4 046.45                            | 433.55                              | 2 090.67                            | 433.55                              | 2 090.67                            | 2 023.23                            |                                     | 1 544.83                            | 2 666.67                            |
| <b>Contractual safety stock [KG]</b>                          |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |
| Safety stock [KG]   |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |                                     |
| Safety stock proposed [KG]                                    | 1 262                               | 3 421                               | 367                                 | 1 767                               | 367                                 | 1 767                               | 1 710                               |                                     | 1 306                               | 2 666.67                            |

The contractual safety stock is an additional field, taken into account in the Target stock calculation. It is a manual datafield that will allow the planner to adjust the safety stock, by adding or removing quantities, month by month and item by item.

This field is located in the 11. Safety stock tab in the Dynasys data review workspace.