# Loss Calculation Process

Based on the requirement collected from NOC there are three kinds of loss calculation in practice prevailing in case of petroleum products

1. Tank Truck Loss
   * Normal Temperature Loss
   * Claimable Loss
2. Working loss
3. Temperature Loss for decantation

## Tank Truck Loss calculation

Loss/gain calculation is one of the major component in the GRN which can be applicable in both internal transfer and import. In case of petroleum products the density of the product changes with the change in temperature and it is obvious that the fuel can have the probability for both contraction and expansion. Gain/loss is generally calculated on each chamber; actual delivered vs the actual receipt. TT are not provided with any incentive in case there is any gain on the fuel quantity, however a tolerable limit for the loss is set which be very much essential in segregation of claimable loss if the loss exceeds beyond the tolerable limit. Major things needs to be considered in calculation of losses

* Losses should be segregated chamber wise, that means gain in a chamber is not allowed to be adjusted with loss in the next chamber
* Losses arises due the to dip difference at the time of dispatch and receipt is actual losses, which can be further classified in normal Loss and Claimable losses
* In computing Temperature losses, the formula is highly dependent on Product Specific Factor (PF)

***PF for HSD/SKO/ATF = 0.75***

***PF for MS = 1.06***

Claimable loss is charged to the TT as per the selling rates of the concerned product in the fuel depot

**Solution in SBO**

* Calibration details of all the trucks shall be updated in the database
* The separate field for entering oil dip and temperature shall be provided
* The system shall automatically calculate the losses in the system and would generate the values for such losses. **The financial impact for the loss is the matter of debate which is not yet closed**
* The Value of Claimable loss shall be Closed by automatic issue of AP Invoice to the TT after ascertaining the quantity of the loss.
* In case of **Decant,** the system shall also calculate the temperature loss for the tank and record the same in the system.

**Example of Loss calculation**

Let us consider a 12 KL (i.e. 4 chambers with each chamber capacity of 3000 liters) TT with following calibration is received with the following parameters

TT Calibration Details:

**Over Dip 167.6 167.1 166.5 167.2**

**Oil Dip 121.3 134.5 133.2 133.4**

**Dispatch Info:**

Dispatch Temperature: 320C

Dispatch Density: 0.786

Dispatched Product: HSD

Assume that when the product is received, the product shows following parameters:

Received Temperature: 290C

Received Density: 0.788

Observed Oil Dip 120.8 134.5 133.0 133.0

Chamber No. 1 2 3 4

Dispatch oil dip 121.3 134.5 133.2 133.4

Received Oil Dip 120.8 134.5 133.0 133.0

Difference in dip(cm) 0.5 0.0 0.2 0.4

**Chamber loss is computed chamber wise by the following formula**

|  |
| --- |
| ***Calculation***  *= round (round(3000/121.3)\*.05)*  *= round (round(24.83)\*.05*  *= round (25\*.05)*  *= 13 liters* |

So for this particular example chamber loss is calculated as

Chamber No 1 2 3 4

Dispatch oil dip 121.3 134.5 133.2 133.4

Received Oil Dip 120.8 134.5 133.0 133.0

Difference in dip(cm) 0.5 0.0 0.2 0.4

Chamber loss 13 0 5 9

**The next phase is the computation of Temperature loss**

Temperature loss is the quantity of the product that will remain unclaimed from the particular TT/Transporter due to changes in the environmental temperature. The maximum allowable Temperature Loss is 1 percent of the total chamber capacity. Which means a 12 KL TT won't have previlage of more than 120 liters in total as Temperature Loss. Yet it is to be taken of great care that the Temperature Loss is computed chamber wise rather than computing in total and distributing in equal proportions among the chambers.

\*In computing TL, the formula is highly dependent on Product Specific Factor (PF)

**Temperature loss specific to a chamber is computed by the following formula:**

**Note:**

PF for HSD/SKO/ATF = 0.75

PF for MS = 1.05

Here in this particular example,

Dispatched Temperature 320C

Received Temperature 290C

Temperature Difference 30C

The calculation of the Temperature loss would be

= Round ((3000/1000)\*30\*0.75) ltrs.

= Round (6.75) ltrs.

= 7 Ltrs

In general, a **WRONG ASSUMPTION,** we might tend to assign Temperature Loss of 7 liters in each chamber. The following illustrates the wrong assumption

**CAUTION : WRONG CALCULATION**

Chamber No. 1 2 3 4

Dispatch oil dip 121.3 134.5 133.2 133.4

Received Oil Dip 120.8 134.5 133.0 133.0

Difference in dip(cm) 0.5 0.0 0.2 0.4

Chamber loss 13 0 5 9

Temperature Loss 7 7 7 7 <-----**This is WRONG**

**Explanation :** *This calculation is wrong because if we see chamber number 2, there is zero chamber loss. Thus we should not assign any Temperature Loss in this chamber. Similarly, we see that in chamber 3, the Chamber loss is 5, but assigned Temperature Loss is 7. No Temperature loss more than Chamber loss is assigned to a particular chamber. Instead we should assign Temperature Loss to 5 liters in chamber 3 instead of 7 liters.*

The correct calculation for Temperature Loss should yield the following:

Chamber No. 1 2 3 4

Dispatch oil dip 121.3 134.5 133.2 133.4

Received Oil Dip 120.8 134.5 133.0 133.0

Difference in dip(cm) 0.5 0.0 0.2 0.4

Chamber loss 13 0 5 9

Temperature Loss 7 0 5 7 <-----**This is CORRECT**

***Note: Incase CL exceeds .25% of the total invoiced quantity of the product, TT shall be charged double for the entire CL quantity.***

Suppose, TT is carrying 20,000 Ltrs of MS and the total CL is calculated 100 liters then total CL% is 100/20000 i.e .5%. If the sales rate of MS is 100 then the TT shall be liable to pay 100\*100\*2 for the loss occurred

## Working Loss

Working loss/gain is generally referred to as difference in total book value and actual closing stock of a particular day. Most importantly, in petroleum products temperature plays a vital role as the volume of fuel is dependent on the temperature. As per the discussion with NOCL team, the following are the crucial aspects that need to be considered in the storage process

* Every branch has well definition of all the storage areas along with the calibration details,
* Every storage is currently tagged with the specific product: that means a storage area/unit should be receiving only the product that is associated with that storage area/unit.
* Storage area/tanks requires timely maintenance also, which shall also be recorded and updated in each of the storage location masters. *The details of M&I are mentioned in corresponding module.*
* Once the tanker arrives in the depot and GRN process is completed, the Tank truck is either diverted or decanted in the storage area.
* Decanted location is mentioned with the location codes while decanting
* The storage location storing the same product are usually connected with each other through connecting pipelines.
* All the depots have a practice of gauging each and every storage tank twice a day; the gauging at morning reflects the opening stock and at evening reflects the closing stock of the day.
* The working loss/gain is the difference of actual stock vs the book value.
* Currently, NOCL only records all the working loss in quantity and has no impact on the financial module.