

# Setup of Terminal Management System (TMS)

This Book describes the fundamentals that should be considered when setting up a terminal management system tailored to the business processes, to avoid business processes having to adapt to IT processes resulting in inefficiencies and risks on errors.

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# Introduction

A common mistake made in building IT systems, is that it is considered an IT project led by IT people / developers. It may be assumed that it is clear that IT systems should accommodate business processes, however, in practice we see that 9 out of 10 IT projects result in the other way around. Meaning that the business is required to adapt to the IT process, instead of the other way around. A missed opportunity! The root cause of this outcome is mostly:

1. Insufficient involvement of business people, as it is considered an 'IT project', where it should be considered as a **'Business project'**;
2. If there is **involvement of business people**, there usually is a lack of competency to be able to translate business processes into IT processes and the related IT architecture. That is nobody's fault, but it requires a special breed of people that have **a good understanding of the business process AND are IT savvy.**

The purpose of this HandBook is to describe the outlines of the business process of dealing with Energy Products (Fluid bulk) and outline the fundamentals required in terms of setup, that will result in a User friendly and efficient solution that enables the business to optimize processes. It will describe a setup that is future proof to ensure continuity. There are two basic starting points that should be considered at all times:

1. The principle of **What You See Is What You Get** (WYSIWYG). A common mistake made is that functionality is developed without fully understanding what business processes it is covering. This means that when you look out the window and you see a Vessel coming in to discharge Product, that is what a User should be able to register;
2. Especially in bulk, which is very different from piece goods, the **Physical Product comes with administrative aspects.** When these Products mix, the record keeping should facilitate in keeping track of the administration. This is commonly referred to as a **Parcel administration** or a **Lot administration.**

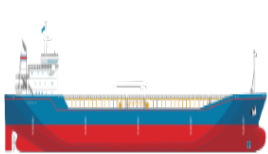
# The Fundamentals

The Fundamentals describe the basic concepts that should be covered at a granular level to accommodate the building of features to result in a good TMS.

# Means of Transport and the concept of a Visit

'Goods don't fall from the sky'.

The operational business of a Terminal that deals with energy products, starts with receiving Products. These Products are carried by a Means of Transport (MoT). The following MoT's are common in the industry.



Vessel



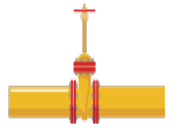
Barge



Truck



Train



Pipeline

Any MoT has their own particulars in terms of what to register. For example, a Vessel will have an International Maritime Organization (IMO) number, which is a unique identification number and is referred to in the business by name. A truck on the other hand comes with a license plate number and won't have a name. A Train has wagons and each wagon has an ID. So each type of MoT has its own set of details that need to be registered.

Furthermore, it is important to note that these MoT's are in the business of transport, meaning they can visit the terminal today and be back tomorrow for another operation. Therefore, when registering a Visit, registering the MoT by identification is not sufficient, it should also be registered under the Estimated Time of Arrival (ETA).

The Means of Transport visiting the terminal is registered under an identification and estimated time of arrival. The registration of a **Visit**.

Looking at the **inbound process**, the registration of a Visit requires a setup by Visit type. In terms of setup the aim is to do this in a generic manner, so that the principle of setting up a Visit type is characterized by:

1. The identification of the MoT. This is the name and/or registration numbers. Think of IMO numbers in case of Vessels, license number for Trucks, Wagon numbers for trains, etc.;
2. The ETA; and

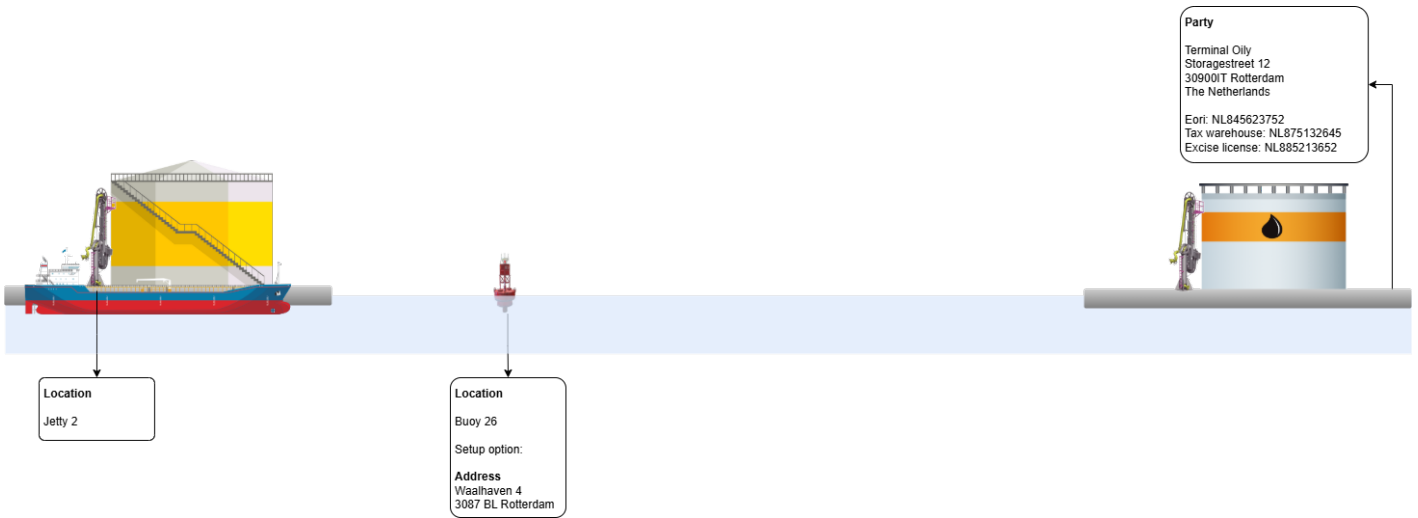
3. Other specific data elements driven the type of MoT, where it should always be flexible to add a data element.

# Locations

The governance of customs processes is done via authorizations/licenses. In these licenses, an important element is the identification of locations that are considered approved for the application of the license. To allow the application of business rules, but also the general requirement of keeping record of the location of products, the proper setup of Locations is essential. Below the some common examples emphasize the principle:

1. The entire Terminal with the address. Although not always relevant from the start, a License could cover for example multiple Terminals, meaning that the setup should be in such a way that the Terminal is linked to a license number, but also has its own identification reference. For example, in the Netherlands there are two Terminals. One in Rotterdam and one in Amsterdam. Both Terminals fall within the scope of the same license with license number X. Each Terminal has its own 'Tax warehouse reference'. The Rotterdam Terminal has Tax warehouse reference Y, belonging to License X and the Amsterdam Terminal has 'Tax warehouse reference Z', while belonging to License X. This setup is also relevant to the registration of Parties, which is described in the Chapter Parties;
2. Jetties at the Terminal. Operationally speaking a Vessel will typically berth at a Jetty, hence this information is likely to be available already. A Jetty should be considered a Location where it is possible to apply settings to a Jetty such as 'label' them as belonging to a certain license yes or no;
3. Tanks. Some Member States license tanks instead of the full Terminal for (certain) customs procedure. To keep flexibility and allow for implementation of Measures of Internal Control, Tanks should be considered as Location just like Jetties allowing for allocation to licenses. This would allow the implementation of business rules where not only an Activity is validated if it is allowed under a certain license, but also if the license covers the Location where the Activity takes place. For example, if an Excise warehouse license does not include a Jetty and a User is trying to register an Activity related to Excise controlled goods at the Jetty, the system has the parameters and setup to prompt the User that said Activity is not allowed at the jetty location;
4. Remote locations. Remote locations, such as Buoys (also referred to as Dolphins) or remote jetties not belonging to the Terminal infrastructure wise can be part of a License. The concept of Locations should also cover these type of Locations in terms of settings, where, for example, a Buoy has a registration number and/or address. For example, in case Product is moved under the governance of a license from a Terminal Jetty 1 to a Buoy 12, the record keeping should show the Movement from Jetty 1 to Buoy 12. When the Vessel leaves from Buoy 12 after performing an operation a declaration is likely to require the identification of the Buoy 12 as Place of Dispatch with the listing of address details. Hence, in terms of setup it should be possible to register a Location with an address.

Wherever a Location is used in the business process, Location details should be available from the Locations setup.



# Parties

In the dealing with Products, we deal with various Parties in the Supply chain. The Parties involves vary from Customers to Surveyors, but also Consignors and Consignees, or Customers of our Customers to which assets are sub-leased. Hence, a generic concept is the registration of Parties of which certain data related to those Parties should be available in the operational process.

For example. When Product is loaded for a destination being another Terminal, a User should be 'bothered' only with specifying the destination/Consignee. In all likelihood, a customs declaration or electronic message is required in which the Consignee must be listed with potentially address details, a 'Tax warehouse reference' and a License reference. This data should be readily available from the parties setup, instead of a User having to specify every single time. As explained under Locations, a Terminal (Rotterdam and Amsterdam Location example) can be one of multiple locations listed under a License. This means that on the registration of Parties it should be carefully considered that certain data elements can be listed per party. In this case the physical location (Third Party Terminal name) should be registered as a Party including data elements such as:

1. Address details;
2. Economic Operators Registration and Identification (Eori) number (if available);
3. Excise warehouse license number (if available);
4. Tax warehouse reference number under Excise warehouse (if available);
5. ....

Another example is a Customer. When we import Product for our Customers, typically the VAT on import is for the account of the Customer. In many cases there is a facility subject to a license that allows the customer to defer the VAT to their periodic VAT return, where they don't have to pre-finance the VAT and then recover, but they can simply include it in their VAT return as a payable and receivable at the same time. If we do the import declaration, we don't want to 'bother'the user by having to include this information. Rather the registration of the Customer under Parties should allow the registration of a 'VAT deferment license' number. Hence, wherever a business process involves Party information, the details around the Party should come from the Party setup rather than having to key in data at every instance.

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# Products and Parcels

By far, the most important part of a sufficient setup of a record keeping is the so-called **Parcel administration**.

Customs is all about Products. Please let that sink in.

Yes, Products are transported with a means of Transportation or are stored and blended in tanks. But without Product, no need for MoT's to transport Product or Tanks to store and blend. So the starting point should always be the Product.

**No Product, no business!**

A **Product** is defined as a **physical substance or article**. Something you can physically identify, point at or pick up. The Product is the thing that Operations deal with to Move or to apply a Service to, such as homogenizing.

A **Product** is defined as a **physical substance or article**

In the case of piece goods, you can easily keep them apart. For example, when you receive a car component, such as a steering wheel, you can have a 'top shelf' where you store steering wheels brought in from outside the EU (referred to as having a **non-Union customs status** (commonly referred to as Bonded or T1) and a 'bottom shelf' where you store steering wheels coming from the free circulation of the EU (referred to as having a **Union customs status**) (commonly referred to as T2). The same thing applies to the origin of the Products. One steering wheel coming from the US, the other coming from Germany. You could add labels to the steering wheels. A Product is registered by **Trade name** and **Commodity code**.

With bulk products this is not possible. That means it should be recorded in the record keeping and the data is tracked by **accounting segregation**.

A **Parcel** is the **registration of a Product with certain administrative characteristics**. For example, a Parcel has a:

1. Customs Status (non-Union (T1 Bonded) or Union (T2));
2. Origin;

3. value;
4. Etc...

Let's say we receive gasoil originating from the US, which is discharged into a Tank containing gasoil originating from the EU. After discharge, the Tank contains Gas oil (Product). The Tank contains two Parcels, namely an x quantity of Gas oil originating from the US and an x quantity of Gas oil originating from the EU. Physically segregating these Parcels is practically undoable, therefore the registration of a Parcel allows for the application of accounting segregation and tracking of the Products as received. For compliance purposes it is critical to provide for an **audit trail**, which requires a sufficient **Parcel administration**.

A **Parcel** is the **registration of a Product with certain administrative characteristics**

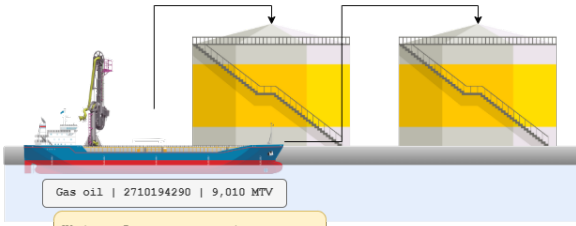
A parcel is identified by a unique reference where at least a part of that reference is static, meaning that when administrative changes are done to an existing Parcel, the Parcel can always be identified. When a parcel is registered, new activities can take place in relation to that Parcel or part of that Parcel. To preserve an audit trail, it is important to maintain a relation between Parcels, by a so-called Parent-Child relation. This is typically done by means of three Parcel elements in terms of reference:

1. The **Ultimate Parent**. This is the Parcel reference created the first time a Product is registered by means of a Parcel. This means a first time registration of a Parcel results in a Parcel without having an (ultimate) parent registration;
2. The **Parent**. This is the reference to the Parcel where the current Parcel (Child) directly comes from. This means a first time registration of a Parcel results in a Parcel without having a parent registration;
3. The **Child**. This is the Parcel reference, where dependent on if there is a Parent reference, it is considered the Child reference.

In case of the registration of a Blended Product, the Parcel will have multiple Parent references showing the relation to the Components.

The words Parcel and Lots are sometimes used interchangeably, but could refer to the same principle. Or sometimes a Lot is referred to as a part of a Parcel. Any form of Stock Keeping Unit and name can be used, as long as it serves the principles.

Before Discharge

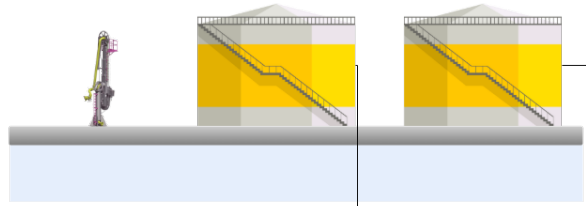


Gas oil | 2710194290 | 9,010 MTV

Ultimate Parent: n/a  
 Parent: n/a  
 Reference: #1

**Attributes**  
 Commodity code: 2710194290  
 Quantities:  
   KGV 9,010,000  
   KGA 10,060,000  
   L15  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 800 p/MT

After Discharge



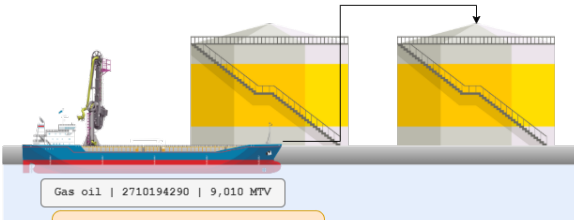
Ultimate Parent: #1  
 Parent: #1  
 Reference: #2

**Attributes**  
 Commodity code: 2710194290  
 Quantities:  
   KGV 4,000,000  
   KGA 4,705,882  
   L15  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 800 p/MT

Ultimate Parent: #1  
 Parent: #1  
 Reference: #3

**Attributes**  
 Commodity code: 2710194290  
 Quantities:  
   KGV 5,000,000  
   KGA 5,882,353  
   L15  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 800 p/MT

Before second Discharge

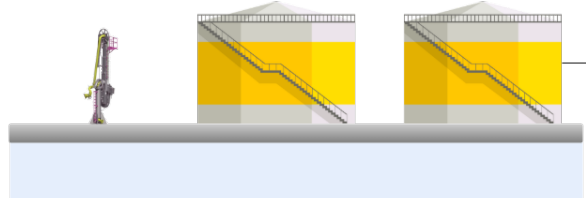


Gas oil | 2710194290 | 9,010 MTV

Ultimate Parent: n/a  
 Parent: n/a  
 Reference: #4

**Attributes**  
 Commodity code: 2710194490  
 Quantities:  
   KGV 2,999,000  
   KGA 3,528,235  
   L15  
   L20  
 Customs status: T1 Bonded  
 Origin: EU  
 Value: USD 750 p/MT

After second Discharge



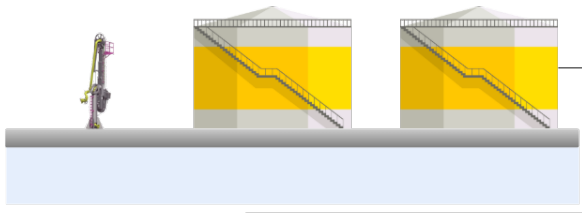
Ultimate Parent: #4  
 Parent: #4  
 Reference: #5

**Attributes**  
 Commodity code: 2710194490  
 Quantities:  
   KGV 3,000,000  
   KGA 3,529,412  
   L15  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 750 p/MT

Ultimate Parent: #1  
 Parent: #1  
 Reference: #3

**Attributes**  
 Commodity code: 2710194290  
 Quantities:  
   KGV 5,000,000  
   KGA 5,882,353  
   L15  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 800 p/MT

After registration Blend



Ultimate Parent: #4  
 Parent: #4  
 Reference: #5

**Attributes**  
 Commodity code: 2710194490  
 Quantities:  
   KGV 3,000,000  
   KGA 3,529,412  
   L15  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 750 p/MT

Ultimate Parent: #1  
 Parent: #1  
 Reference: #3

**Attributes**  
 Commodity code: 2710194290  
 Quantities:  
   KGV 5,000,000  
   KGA 5,882,353  
   L15  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 800 p/MT

Ultimate Parent: n/a  
 Parent: #3, #5  
 Reference: #6

**Attributes**  
 Commodity code: 2710194490  
 Quantities:  
   KGV 8,000,000  
   KGA 9,411,765  
   L15  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 781.25 p/MT



# Cargo documents

Any cargo comes with various documents. These documents are typically archived in an archiving system. However, some data from the documents accompanying the Products is relevant to register with the Parcel. There are various possibilities. Some examples are:

1. A Transit document, whereby it is relevant that the registration of the Parcel is linked to this document as it requires an Unloading remarks message in which the quantity received is reported, based on the Measurement(s) of the (Child) Parcels in the Tank or receiving Means of Transport (MoT). Also the declaration for the Product requires mentioning of this Transit Document by means of an indication of the Type of Document and the reference number (MRN) of the document;
2. An e-AD, with a similar principle as the Transit document with the requirement to send a Report of receipt;
3. A Preferential Origin document such as an Origin declaration or an EUR 1, whereby reference needs to be made to the document type and reference number in the required declarations;
4. A Bill of Lading with relevant details such as a Density and a quantity;
5. Etc...

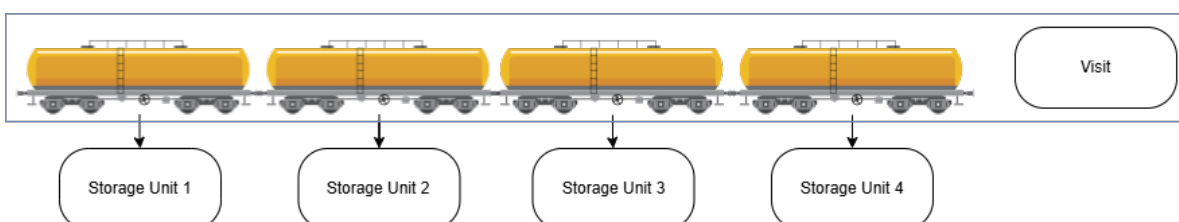
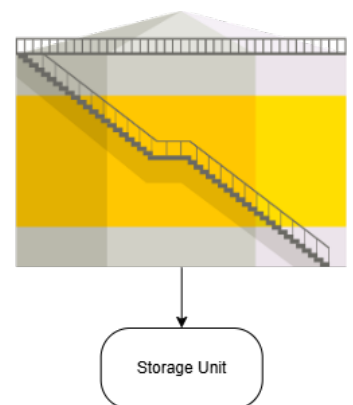
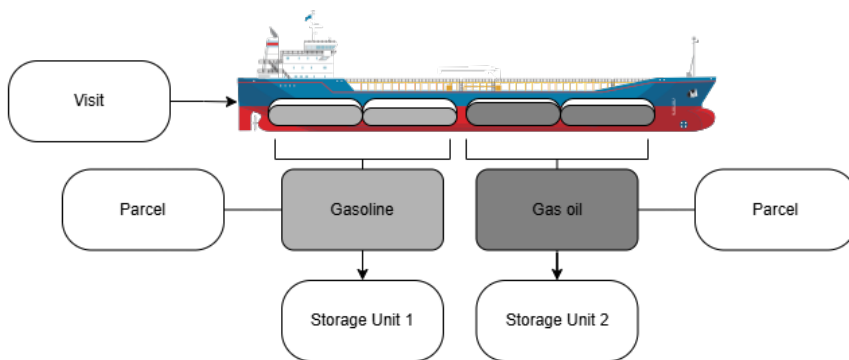
# Storage Unit

Any (bulk) Product is physically contained somewhere. This can be a compartment on a Vessel, a Truck or in a Train Wagon. Or it could be in a Tank or a Pipeline. To identify the physical location where a Product can be taken from we refer to the concept of a Storage Unit. For example, if a Vessel arrives carrying Gasoline and Diesel, there will be at least two Storage units. So the Storage Unit is used to identify the physical segregation of Product for registration purposes.

The **Storage Unit** is used to identify the **physical segregation of Product for registration purposes**.

In the aforementioned example, it could be that the Gasoline is physically spread over 10 compartments. For the operation there is no relevance to register all these 10 components so the User can suffice with one Storage unit that will allow the registration of a Movement from that Storage unit to another. Should there be a need to register 10 Storage units, the option should be there. Some examples:

1. A Visit can have one or more Storage Units.
2. A Tank or Pipeline equals one Storage unit by default.
3. A train holds a Storage unit per wagon.



# Activities - Movements or Services

So now that we have covered the registration of the Means of Transport (MoT), Locations where these MoT's can be located, the Products and related information, we are getting to the registration of the things we will do with the Product. The Activities.

An **Activity** means any **action / operation involving Product(s)**

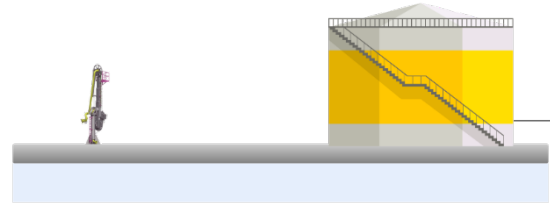
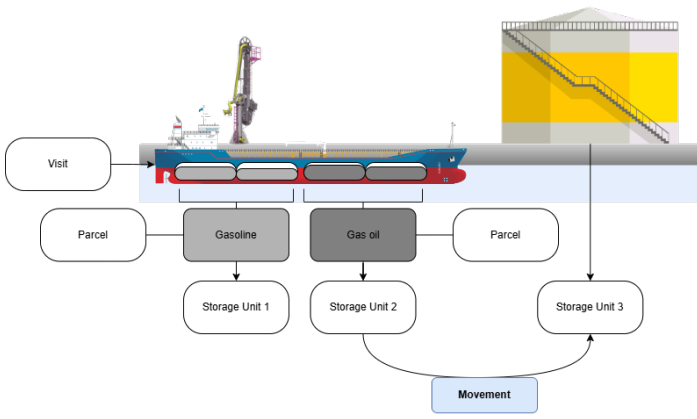
In the business of storage and handling of Energy Products the most prominent Activity is Moving the Product. Therefore, one of the Activity types is a Movement. A Movement is the physical relocation of Product, meaning the product is moved from one Storage Unit to another Storage Unit.

A **Movement** means the physical movement of Product from one Storage Unit to another

Apart from moving Product, other Activities are relevant. Any Activity that is not a Movement is considered a Services. These two concept also relate back to the contractual agreements and basis for invoicing, where typically throughput, where the registration of Movement play a role, and Service are the basis for invoicing. By using these concepts, the basis is there to govern the 'order to cash' process. Services can come in various types. A few examples:

1. Release for free circulation (import);
2. Booking of a quantity as received without a physical Movement;
3. Registration of a Blend;
4. Heating of product;
5. Homogenization;
6. Etc.

A **Service** is any **Activity that is not a Movement**



Ultimate Parent: #4  
 Parent: #4  
 Reference: #5  
**Attributes**  
 Commodity code: 2710194490  
 Quantities:  
   KGV 3,000,000  
   KGA  
   L15 3,529,412  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 750 p/MT

Ultimate Parent: #1  
 Parent: #1  
 Reference: #3  
**Attributes**  
 Commodity code: 2710194290  
 Quantities:  
   KGV 5,000,000  
   KGA  
   L15 5,882,353  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 800 p/MT

Ultimate Parent: n/a  
 Parent: #3, #5  
 Reference: #6  
**Attributes**  
 Commodity code: 2710194490  
 Quantities:  
   KGV 8,000,000  
   KGA  
   L15 9,411,765  
   L20  
 Customs status: T1 Bonded  
 Origin: UK  
 Value: USD 781.25 p/MT

Registration Blend

Service