



Applied Sciences

bp Lubricants

Quality Assurance Manual for Bulk Distributor, Mini Bulk, Re-Filling and Re-Packing Operations

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The latest version of this dated document can be obtained by contacting your bp representative. Please refer to the 'Introduction' of this manual for details of the limitations of bp liability with respect to this manual.

VERSION CONTROL

Version	Date of Publication	Version History
4.0	February 2026	Periodic review. See Document Change Log table for summary of changes
3.0	March 2023	Periodic review. See Document Change Log table for summary of changes
2.0	5 th April 2019	Changed title to: Quality Assurance Manual for Bulk Distributor, Mini Bulk. Whole document added totes as new container type. Whole document: Clarification on water finding paste use. Whole document: Clarified when water testing is required. Section 1.2 Revised disclaimer. Section 1.3.1: Added IATF reference. Section 1.3.3 Updated record retention timeframes. Section 2.6.1 Added additional product family detail to table. Section 3.1: Added MoC section as section 3.1. Section 3.3: Re numbered section to account for new MoC section. Section 3.2: Added detail about flat topped storage tanks. Section 3.4.1: Update sampling details. Added section 3.4.1.1 and 3.4.1.2 to clarify sample retain and testing requirements. Oil-based and viscosity product testing is now based on risk. Section 3.4.2: Changed should to shall for 3rd party testing if entity does not have testing capability. Section 3.6: New filtration requirements, clarified requirements. Section 3.7: Added section on product segregation. Section 3.7 – 3.9 renumbered due to addition of new section 3.7. Section 4.6. Changed seals requirements to a should instead of shall. Section 7: Added new example forms. Appendix 2: Added detail for additional product families and removed reference to family 13
1.1	21 June 2016	Updated section 3.3.1
1.0	6 April 2016	Global document created

DOCUMENT CHANGE LOG FOR VERSION 4.0

Section	Major/ Minor/ Information	Summary of Changes
1.1	Information	Description of “Distributors” has changed
1.1	Information	Description of what is bulk/mini bulk
1.3.1	Information	1 mandatory requirement added to inform bp if quality certifications are revoked
1.3.1	Information	1 mandatory requirement to be pre-approved by bp to handle OEM FF 1 mandatory requirement changed to a recommendation about quality policy
1.3.2	Information	1 mandatory requirement to inform bp if changes to manual cannot be implemented
1.3.3	Information	New section. This has 1 mandatory requirement to contact bp in situations as described in the section
1.3.11	Information	1 recommendation to search websites for SDSs (links added)
1.2	Information	1 mandatory requirement to comply with laws/regulations
2.1	Minor	1 mandatory requirement to safely dispose of all product flush
2.1.2	Information	A change to a mandatory requirement
2.2	Minor	1 mandatory requirement where compressed air is used the receiver tanks need to be drained
2.4.1	Minor	Section re-written which includes new mandatory requirements, please review
2.5	Information	1 mandatory requirement removed
3.2	Minor	Section significantly re worded with new and updated mandatory requirements. Please Review.
3.3	Minor	1 recommended requirement changed to mandatory so that air compressor drain points are maintained
3.3.1	Major	1 recommended requirement changed to mandatory so that Galvanised steel and PVC shall not be used
3.3.2	Minor	1 new mandatory requirement to label hoses and a mandatory requirement changed to recommended relating to storing hoses on the ground
3.3.3	Minor	1 recommended requirement changed to mandatory to record all volume movements
3.4.1, 3.4.1.1 and 3.4.1.2	Information	Sections 3.4.1.1 and 3.4.1.2 deleted and replaced with tables 5 and 6 for sampling, testing and retains
3.4.2.6	Information	1 mandatory requirement to contact bp if grease product has oil separation

3.6	Minor	1 mandatory requirement to not re-fill or decant products in product families in table 7a. Additional information added for Subsea Control fluids. Table 7b recommended requirements re-written
3.9.1	Minor	1 mandatory requirement to reduce interval between calibrations where equipment has been found to be out of calibration. 1 recommended requirement to check flowmeters between formal calibrations
3.10	Information	1 mandatory requirement for all CoAs and CoCs to have bp or Castrol letterheads
4.1	Information	1 mandatory requirement to request a CoA from bp if no CoA received with shipment
4.2	Minor	3 new mandatory requirements, 1. to sample and test all incoming bulk and 2. If bulk sample is hazy do not unload and 3. Sample to be taken from the first IBC/Tote when unloading directly from the incoming bulk container
4.3.1	Information	1 mandatory requirement to calibrate electronic devices to confirm volume in storage tanks/vessels. 1 mandatory requirement to confirm non electronic devices are accurate for use
4.4	Information	1 mandatory requirement to label all tanks containing bulk product to be properly labelled
4.6.1	Information	New section on container cleanliness – no new mandatory requirements
4.6.2	Minor	New section containing several new mandatory requirements
4.6.3	Minor	New section containing several new mandatory requirements
4.8	Information	Some changes and addition to some recommended practices
5.2	Information	1 mandatory requirement is that empty package storage is assessed during site assessments
5.4	Minor	5 mandatory requirements relating to fill weights/volumes, please review
5.10	Minor	1 mandatory requirement to label grease bins/skid tanks with various information. 1 change to a mandatory requirement to include a time stamp in place of a sequence number
5.13	Minor	1 mandatory requirement to contact bp for shelf-life dates. FEFO added for possible inventory management
Appendix 2	Minor	Four product families have moved from the blue column to the yellow column. These are highlighted in red in the CCM table for ease of identification

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1. INTRODUCTION

bp products are formulated to specific technical and quality standards established by both industry groups and by Original Equipment Manufacturers (OEMs). bp Lubricants understand these demands and are committed to providing quality products to our customers.

bp Lubricants has rigorous standards and processes to ensure that our products maintain their quality levels from point of blending through delivery to customers.

The wording and terms used in this manual align with the definitions in bp standards:

- Shall - indicates a mandatory practice.
- Should - indicates a recommended practice - designates a specific recommended action where conformance is not mandatory.
- May - indicates an optional practice - designates an option that is neither mandatory nor specifically recommended.

This manual shall be incorporated or referenced in all internal quality management systems. Quality in bp is based on continuous improvement therefore the manual should be considered a base to strive for improvements to encourage an environment of excellence.

The contents of this manual are strictly private and confidential. The manual and its contents shall not be further disclosed unless approved in writing by bp.

1.1 SCOPE

Sites in scope for this manual are those that “handle the fluid/grease” as part of any process that they conduct on behalf of bp which includes:

Bulk Distributors are defined as a site that receives bulk product and distributes to the customer in bulk.

Re-fillers (also called re-packers) which are further defined as a site that receives bulk or packaged product and transfers into different type or size packages.

For the purposes of this manual, bulk product is defined as non-packaged product which arrives on site via truck, rail car, iso-tainer, grease bins/skids or similar sized containers or product which is stored in a storage vessel on site.

For the purposes of this manual, mini-bulk are trucks or other bulk containers that have more than one compartment that may transport multiple products.

For the purposes of this manual, packaged product is defined as product in IBC/Totes, drums, or lower volume containers. IBCs may also be used as a storage container.

Sites out of the scope of this manual are as follows:

- All Blenders and Brake Fluid operations as these are covered by other bp Quality Assurance manuals.
- Warehouse operations – sites that only store and distribute packaged bp products and therefore do not handle the fluid.
- Re-Labelers – label over or re-label the current package and therefore do not handle the fluid.

If the site is unsure if this manual is applicable, contact the bp representative.

NOTE: All definitions above are for the purposes of this manual. Other definitions can be used by the business.

Sites shall not handle OEM FF (First Fill) products unless pre-approved by bp.

This manual does not include bp Policy and Procedures for Health, Safety, Security and Environment (HSSE). However, information on bp standards in these areas can be obtained if requested via the bp representative. bp expects sites to comply with all applicable legislation with respect to health, safety, and environment.

1.2 DISCLAIMER

In this manual the term “bp Lubricants” shall extend to include any relevant affiliate within the bp group of companies.

This manual provides a set of minimum requirements for handling and storing lubricants products produced by bp Lubricants and outlines a set of general practices that may help sites achieve product quality goals, however, the site shall comply with applicable laws and regulations.

Understanding the limitations of bp Lubricants’ recommendations, each site or any third party who uses or refers to this manual (“**Relevant Party**”) should always consider any other product related requirements and practices needed for product quality and compliance. This includes without limitation, in relation to product quality, the handling, storage and labelling prescribed by any applicable law or regulation (“Law”). A Relevant Party should contact their bp representative and agree an additional or alternative course of action whenever the Relevant Party is concerned that compliance with the recommendations in this manual would be insufficient for the preservation of product quality during handling and storage of lubricant products produced by bp Lubricants or would put the Relevant Party in breach of Law.

1.3 GENERAL REQUIREMENTS

The American Petroleum Institute (API) has published industry guidelines for handling of bulk lubricants. These are:

- Recommended Practice 1525 - Bulk Engine Oil Testing, Handling and Storage
- Recommended Practice 1525A - Bulk Engine Oil Chain of Custody and Quality Documentation

bp Lubricants recommend the use of the latest versions of these publications only where the API standards are more stringent than the requirements in this manual.

1.3.1 MINIMUM SITE QUALITY REQUIREMENTS

bp does not mandate sites hold ISO 9001 certification except where the site handles OEM FF products, but all sites shall establish, implement, maintain, and continually improve an auditable Quality Management System (QMS). The QMS shall include all documentation determined as being necessary to ensure effectiveness. The site shall determine the resources needed to manage the QMS and provide that resource.

As part of the QMS, the site is highly recommended to have a quality policy defined by top management which is effectively implemented. The policy should provide a commitment to continuous improvement of the QMS and outline a framework for setting quality objectives. The site shall additionally set annual quality objectives and measure performance against these objectives.

The site shall ensure adequate training and communication of the sites quality management system, quality policy and objectives.

The site should plan and conduct internal audits to verify compliance to their QMS. The site shall review this bp quality manual against the sites QMS each time the site receives a new updated version of the manual and incorporate potential changes in the sites QMS. Management shall review the bp audit findings and these shall be used as part of the continuous improvement plan in setting quality objectives.

bp may require copies of the documentation related to the sites quality systems. Site's handling automotive OEM FF products shall be required to have ISO 9001 or IATF 16949 certification. Contact the bp representative for more information.

An on-site product quality assessment of a site is typically required by a bp representative for approval to handle certain products as these products may have additional handling and/or contractual requirements.

If any quality certification is revoked or suspended, the site manager shall advise the bp representative within 72 hours.

1.3.2 QA MANUAL MAINTENANCE

There may be periodic updates to this manual. Confirmed changes will be communicated from the bp representative and may require changes within the site. Therefore, the site should designate one employee along with a back-up to maintain this quality manual and ongoing compliance.

Sites shall be responsible for ensuring that manual changes are recorded and implemented.

The table 1 below describes the manual change categorization and implementation timing.

TABLE 1: CATEGORY AND IMPLEMENTATION TIMING

Category	Description	Timing
Information	Requires no change to processes or procedures at sites	Implement as applicable to the change
Minor	May require slight change but no new process or CAPEX (e.g., change to ASTM test method, change to retain volume)	Review and implement within 6 weeks
Major	May require engineering or process change, could affect cost, or require CAPEX (e.g., change to cross-contamination limits, new test method, new blend process)	Implementation timing shall be submitted to bp for review within 2 months.

If the site cannot implement as per the table above, the bp representative shall be advised, and a resolution agreed.

This manual will be version and date controlled by bp.

1.3.3 INTERACTIONS WITH BP

Some quality issues are beyond the authority of the site staff to resolve. For those issues listed below, as well as any others that may carry a product quality risk, the bp representative shall be contacted for a resolution and records retained per section 1.3.4:

- Use of non-conforming product
- Waivers
- Exemptions - Site shall contact the bp designated contact to request an exemption from any mandatory requirement of this manual (only in exceptional circumstances)

- Use of returned product
- Product test failures at receipt or delivery

1.3.4 DOCUMENT CONTROL AND RECORDS RETENTION

Records shall be kept in support of any bp customer enquiries which may arise.

Documents may be kept in any convenient secure format (paper, electronic) and sites shall be required to provide copies of records upon request.

All documents shall contain identifying information such as a title, date, author etc. and be accessible. Documentation related to the site QMS shall have a retention period.

Unless a country or other legal obligation states differently, the document retention times in the table 2 below shall be applied where applicable:

TABLE 2: DOCUMENT RETENTION PERIOD

Document Type	Retention Period
Certificate of Analysis (CoA) (Incoming product)	1 year minimum
Filling records	5 years minimum
Statistical Process Control records (SPC)	3 years minimum
Equipment calibration records	5 years minimum
Maintenance records	3 years minimum
Training records	For the duration of the individual staff employment + an additional 2 years
Product Testing records	5 years minimum
Documentation on Non-Conformances	5 years minimum
Outbound delivery paperwork to customer	5 years minimum
Management of Change (MoC) documentation	3 years minimum

When documents have reached the expiration of the relevant retention period, those documents should be disposed of provided there is no longer a business use for the documents.

1.3.5 SITE CLEANLINESS

It is important that all areas used for receiving, filling, re-packaging, storage and distribution are clear, clean and organized to minimize the risk of contamination of the finished goods.

Sites are required to have a pro-active approach to their site cleanliness. Sites shall have and use processes which effectively minimize or eliminate sources of contamination into products. bp

recommends that the site develops an assessment checklist and use this checklist to conduct site checks on a regular basis. The checklist should assess all potential sources of contamination and include at a minimum:

- Contamination due to rust from tanks, pipes etc.
- Contamination from airborne matter that could get into tanks or other containers.
- Water or moisture contamination in tanks or containers.
- Dust, dirt or water contamination in hoses.
- Floors, walls, stairs and other surfaces cleanliness (e.g., free of dirt, oil and grease).
- Equipment cleanliness (e.g., free of dirt, oil and grease).
- Hoses, pumps including grease drum pumps.
- The condition of filling lines (clean and unbroken).
- Empty package storage conditions (stored to eliminate or minimize contamination with dirt, water and other forms of contamination).
- The cleanliness and potential contamination of loading and unloading areas (e.g. dirt and rain).

1.3.6 TRAINING

All staff shall have the necessary competencies and skills to correctly perform roles impacting product quality. The site shall define and document the skills and competencies for these roles. Specific training relating to quality shall be provided to ensure all staff have the defined skills and competencies. Records of the training completed shall be maintained as per section 1.3.4.

1.3.7 CONTINGENCY PLANNING

The site shall have a defined and documented contingency plan to help to ensure business continuity in the event of equipment failure or other unforeseen events that specifically relate to the final product quality. Examples are:

- Filtration equipment
- Metering and weighing equipment (flowmeters / balances)
- Fluid testing equipment

1.3.8 STATISTICAL PROCESS CONTROL (SPC)

SPC data can help sites determine if processes are in control. For example, SPC can be used to ensure legal fill weights / volumes. Sites are strongly recommended to use SPC to monitor testing, filling, and other activities. Techniques may include histograms, pareto charts, control charts and process capability studies. Where SPC is used the methods and parameters shall be defined and the records maintained as per section 1.3.4.

1.3.9 RETAIN SAMPLES

Sites shall store all retain samples in such a way to keep them in good condition and so they can be easily identified if they are required in a product enquiry. The following storage conditions and labelling conditions shall be followed:

- Stored inside, at ambient temperature and out of direct sunlight.
- In containers that minimise ingress of water and other contaminants. Ideally these containers are clear so that samples may be viewed without opening such as glass. High Density Polyethylene (HDPE) is acceptable if glass cannot be used for safety reasons. Polyethylene Terephthalate (PET) shall not be used for marine retains due to product incompatibility. Preferred containers for grease are HDPE or tin tubs.
- Clearly labelled (see table 3 below for minimum label requirements).

Section 3.4.1 (tables 5 and 6) provides additional information on the procedure for obtaining samples for testing and retains. The table 3 below provides retain sample guidance.

TABLE 3: RETAIN SAMPLE GUIDANCE

Sample type	Minimum sample volume required	Retention period	Minimum labelling requirements
Incoming bulk (if retained)	100ml	6 months	Product name Date received. Date sample taken. Bulk compartment number/ID. Name of person who took sample.
Start of run filling line samples	100ml	6 months	Product name Filling date and time
	500g (Grease)	6 months	Batch number Fill codes* Line number (if site has multiple lines)
Bulk and mini bulk loading (shipping)	100ml	6 months	Product name Loading date and time
	500g (Grease)		Batch/lot number Bulk**/mini bulk*** compartment number where applicable

* NOTE: Fill code shall be traceable to incoming batch or bulk tank

** Tanker/Isotainer/Flexibag/Railcar

*** Bulk containers that have multi compartments that can transport multiple products

1.3.10 QUARANTINING NON-CONFORMING PRODUCT AND PACKAGING

Any non-conforming product or packaging shall be processed in one of the following ways:

- Segregated in a designated and clearly marked quarantine area or if such an area is not practical, clearly labelled or tagged with an appropriate comment such as:
 - Quarantine
 - Quarantine - Out of specification
 - Quarantine - Damaged
 - Quarantine - Returns

These measures should prevent the accidental use of non-conforming product or packaging.

1.3.11 PRODUCT HANDLING

The site shall contact the bp representative if either:

- They currently handle a bp product and the product family or other critical information is not known.
- They receive a new bp product not handled before.

This is to confirm:

- If there are any special handling requirements such as dedicated tanks and equipment or comingling hazards with products in the same families.
- The product family category for the cross-contamination matrix
- Maximum water contamination limits as required by product family
- Product shelf-life dates
- Additional QC testing limits / acceptance criteria
- Filtration requirements

For up to date SDSs, the site shall either search on bp/Castrol websites or contact the bp representative.

2. PRODUCT QUALITY AND PREVENTING CONTAMINATION

To ensure bp products perform as expected in the end application it is critical that the site ensures minimal or no contamination to avoid any reputational damage to bp as a supplier of top tier lubricants.

2.1 PRODUCT CONTAMINATION

Sites may handle many types of products such as engine oils, gear oils, transmission fluids and hydraulic oils. These products have unique properties and customer performance expectations. Contamination shall be minimized to ensure product quality and customer satisfaction. Appendix 2 defines the cross-contamination limits between product families and section 2.6 provides more information on product families.

There are four different types of cross product contamination.

- Cross-supplier contamination
- Cross-family (bp products) contamination
- Viscometric contamination (i.e., product viscosity grade change)
- Contamination between dyed and undyed products

Cross-supplier, cross-family and viscometric contamination can adversely affect product performance in the application. Contamination between dyed and undyed products can have a negative impact on customer's perception.

NOTE: Product flush oil shall not be reintroduced into any bp, or Castrol branded product. Sites shall ensure that all product flush oil is disposed of safely and in accordance with applicable laws and regulations.

2.1.1 CROSS-FAMILY / CROSS-SUPPLIER CONTAMINATION

Cross-supplier contamination is contamination of any bp product with a product from a different company regardless of product type. Cross-family contamination is defined as contamination of one bp product with another bp product; for example, contamination of a bp engine oil with a bp transmission fluid.

Cross-supplier or cross-family contamination may lead to off specification product.

To avoid cross-supplier and cross-family contamination dedicated systems should be used. Where non-dedicated systems are used:

- For cross-supplier contamination effective draining, flushing, and cleaning is required to ensure previous non-bp product is removed.
- For cross family contamination the cross-contamination matrix in Appendix 2 shall be followed.

2.1.2 VISCOMETRIC CONTAMINATION

Viscometric contamination is caused by the mixture of the same family of products with different viscosity grades.

Viscometric contamination can adversely affect product performance. For multi-grade oils, the high and low temperature properties of the finished product may be adversely affected by mixing products of different SAE grades. Higher viscosity grades engine oils such as SAE 40 or SAE 50 may negatively impact lower viscosity grade oils such as SAE 0W-20 and SAE 5W-30 to the extent of compromising performance. Additionally, straight grade oils (i.e., non-W straight grades) may impact multi-grade oils designed to provide low temperature performance. This applies not only to engine oils, but also to gear oils, hydraulic oils and other multi-grade lubricants designed to provide wide temperature range performance.

During bulk receipt, bulk loading and re-filling operations, flushing of transfer hoses / pumps shall be conducted when switching two viscosity grades or more, for example, SAE 20 to SAE 40 or ISO 32 to ISO 68.

2.2 WATER CONTAMINATION

Water contamination can occur during any of the following:

- Transit from bp to the site
- Unloading of bulk shipments into site tanks
- Through site entities tanks located outdoors or in the ground
- Through use of steam coils inside storage tanks (see section 3.2)
- Loading bulk trucks for shipment to the end customer
- Re-filling or re-packing into drums or other packaging
- From incoming packaging
- Where there are condensing water conditions
- Where there are high humidity conditions during any of the above situations or activities
- From compressed air (if used to clear lines). If compressed air is used, the site shall regularly drain the receiver tanks of the air dryer, as water is likely to enter the lines, or according to the air drier manufacturer recommendations.

To ensure product quality the site shall check for water contamination in oil-based products according to the tests in section 3.4.2.1 for:

- All outgoing bulk shipments. (See table 6 in section 3.4.1. for the sampling requirements)
- Samples of product from the filling line (see table 6 in section 3.4.1 for sampling requirements)
- Samples from storage tanks at a regular frequency (see section 3.2).

2.3 PARTICULATE CONTAMINATION

Particulate contamination can occur during the following activities:

- Unloading or loading bulk shipments
- Filling or loading (with no filtration, or using incorrect or using a damaged filter)

- Re-filling or re-packing (if located outdoors)
- Ineffective flushing of storage tanks, pipes, lines etc.
- Incorrect storage of empty packaging.

To ensure product quality the site shall filter product, as required per section 3.6, during bulk loading or filling into packaging.

2.4 FLUSHING PROCESSES FOR SYSTEMS

2.4.1 NON-DEDICATED SYSTEMS

Flushing non-dedicated systems shall be done to meet the cross-contamination matrix (Appendix 2). The cross-contamination matrix consists of a colour-coding system, and each colour represents a different level of allowable cross contamination when changing a system from one product family to another product family. The colour descriptions are:

Colour	% Carryover allowed	Action
Red	0% - No carry over allowed	Drain, flush and clean
Yellow	0.2%	Drain and flush
Blue	1%	Drain

This is relevant for the following situations that are detailed in Appendix 2:

- Changing to a different product family (bp to bp product)
- Changing from a non-bp manufacturer to a bp product

In addition, the following situations, not detailed in Appendix 2, will require flushing to ensure minimal carry over:

- Changing viscosity grades of the same product family by 2 or more SAE or ISO grades for example changing from ISO 32 to ISO 100 or from SAE 0W20 to SAE 10W40 or different NLGI grades
- Changing to the same product family but where the products contain different dyes or fragrances.

The site shall conduct a product quality risk assessment based on system designs and operating equipment and to document a flushing procedure. Site shall be able to demonstrate the effectiveness of this documented procedure in complying with the Cross Contamination Matrix (CCM) limits in Appendix 2. This procedure shall be made available upon request by bp or during a quality assessment by bp.

The site may contact the bp representative for guidance on completing a risk assessment or the changeover procedure.

The following is highly recommended to significantly reduce flush volumes

- Use of dedicated lines/hoses/pumps/filters
- Segregation based of product families and CCM limits (avoid changeovers with tighter limits)
- Pigging
- Draining (optimally sloped lines, low point draining capability etc.)
- Air blowing (use an air dryer with compressed air pumps)

Notes:

- Sites shall not “rework” product from draining/flushing operations into bp products
- Sites shall have processes in place to collect, label, segregate/quarantine and dispose of product generated from flushing/draining operations

2.4.2 DEDICATED SYSTEMS

Dedicated systems may be required from receipt to shipment for some product types as advised by bp. The dedicated system includes any tanks, pumps, lines, hoses and filters for bulk receipt / delivery and filling into packaging.

2.5 ADDITIONAL ACTIONS TO PREVENT CONTAMINATION

This section provides advice for the site that when taken into consideration should reduce contamination incidents and could reduce costs for the site:

- Know the products. Identify product families for each product handled and train employees on the detrimental impacts of product contamination.
- Examine equipment and determine areas of potential cross contamination and the potential volume.
- Do not use colour as the only means to determine whether the product is contaminated. When changing from dyed to undyed products colour may be used as one of the indicators.
- Calculate the internal volume of hoses and pipework or use the results from laboratory testing to determine the flush amounts required to meet the maximum contamination limits defined in appendix 2. Keep in mind that by reducing the length and/or the diameter of the hose or pipework the level of contamination could be significantly reduced.
- Eliminate dead volumes in systems, where possible.
- Consider contamination that can occur during filling or re-filling operations.
- Consider contamination that can occur in the unloading / loading process of bulk trucks.
- If dedicated or segregated lines are not used, consider the use of short jump hoses to reduce the contamination and flush volumes.
- Document the volumes required for flush for each truck during loading / unloading to reduce the chance of drivers making mistakes in how much volume each piece of equipment has in the lines.

- Order bulk trucks with sumps that empty the trucks completely.
- Use a flush container to change over lines and ensure all residual product from the previous shipment is removed.
- Inspect all trucks to ensure there is not a heel in the bottom of bulk trucks.
- If compressed air is used to clear lines, it shall be dried, and equipment regularly maintained to minimize moisture ingress into the product.

2.6 PRODUCT FAMILIES

All bp products are classed into a product family. Product families may have different cross contamination and water limits as well as filtration requirements. The cross-contamination matrix in Appendix 2 lists acceptable carry over limits between product families; the maximum water limits are defined in appendix 5 and the filtration requirements are listed in section 3.6.

The table below is a list of bp product families which may be handled by the site. The cross-contamination matrix in Appendix 2 lists more detailed definitions of the product families. The site shall ensure that the product families of all the products they handle are known to them to ensure that the requirements for cross contamination, maximum allowable water content and filtration are met. If it is unclear, the site shall contact the bp representative to confirm the product family.

2.6.1 PRODUCT FAMILY EXAMPLES / PRODUCT FAMILY WATER LIMITS

See appendix 5 for a list of the maximum allowable water content limit for each product family.

2.7 NON-CONFORMING PRODUCT

If a product is contaminated or out of specification contact the bp representative for advice and action. All non-conforming products shall be quarantined according to section 1.3.10. Depending on the nature and severity of the non-conformance, the site may be required to determine the cause of the non-conformance and implement correction actions.

All documentation related to non-conforming product, including actions, taken shall be retained as per section 1.3.4.

3. OPERATIONAL EQUIPMENT AND SITE ACTIVITIES

3.1 MANAGEMENT OF CHANGE (MoC)

The site shall plan, implement and control all processes that may affect product quality; this includes implementation of a Management of Change (MoC) process. The MoC process shall be a formal, systematic process to document, evaluate, approve and communicate temporary and permanent changes that could impact safety, product quality, compliant and reliable operating activity. The MoC process shall be applied to product, process and people changes.

Risks associated with the change shall be identified and gaps closed to ensure product quality is maintained. Each MoC shall follow an approval process and be fully documented. The site shall similarly control any outsourced processes.

3.2 STORAGE TANKS

Water and other contaminants can accumulate in storage tanks from sources such as environmental factors (e.g. humidity) or process equipment (steam or cooling coils or other water containing devices). Sites shall not use water filled/ballasted level measurement devices in any storage tank or vessels.

If water/moisture limits specified in Appendix 5 are unable to be met due to atmospheric moisture absorption, sites shall install desiccant breathers.

Note: for safety, where desiccant breathers are fitted, tanks shall also have vacuum breaker valves installed to mitigate risk of tank collapse if vent blockage occurs.

Flat top tanks should be located indoors or outdoors under cover. The site shall conduct a risk assessment to ensure water cannot enter the tank.

Underground tanks are not recommended. Where underground tanks are used the site shall ensure measures are in place to prevent contamination such as water.

For tank designs as described in the table 4 below, the site shall check storage tanks for the presence of water and/or other contaminants at the prescribed interval and whenever there is a change in product in the tank, as part of tank maintenance operations including maintenance of internal heating/cooling coils that use water or other fluid. If water or emulsion is detected, remove the contaminated material using a dewatering system, external pump, or by cleaning the tank during product change or maintenance.

The maintenance program should be maintained in the site QMS, and records kept as per section 1.3.4.

TABLE 4: TANK CONFIGURATIONS AND WATER TESTING

Tank Location	Tank Configuration	Draw off location	Water testing and other contaminants	Minimum testing interval	Remove free water regularly where possible
Indoor or outdoor	Cone bottomed, curved or flat top	At lowest point of cone	Not required	Not applicable	Not applicable
Indoor	Cone bottomed, curved or flat top	No draw off at base of cone	Yes	12 months	Yes
Outdoor	Cone bottomed, curved or flat top	No draw off at base of cone	Yes	6 months	Yes
Indoor	Flat bottomed, curved or flat top	Anywhere	Yes	12 months	Yes
Outdoor	Flat bottomed, curved or flat top	Anywhere	Yes	6 months	Yes
Outdoor	Underground	Anywhere	Refer to bp representative		

Sites should review local requirements for tank maintenance (example.g. US API standard, bp engineering standards).

Where tanks are used for finished product storage refer to appendix 5 for maximum water limits for oil-based products.

Refer to section 3.4.2.1 for information on testing for water in oil-based products.

All tanks shall be clearly marked with the raw material or product name as well as with any legally required markings. Where a tank only has a number, the site shall have a documented system that cross references the number with the material stored in the tank. Similarly, all pipework that links the tank shall be labelled at manifolds, junction valves or termination points including arrows indicating direction of flow. The exception is where the system is fully automated, and labelling is not required. However, the site shall label at termination points.

When changing tank service used for finished product, sites shall conduct a risk assessment taking appendix 2 into account to allow for an effective transfer procedure including determination if there is sludge/sediment at the bottom of the storage tank. This procedure shall be available upon request by bp or during a site assessment.

3.3 LINES, HOSES, PUMPS AND METERS

The design, usage and maintenance of the piping, pumps, meters and hoses used to transfer bp lubricants products are critical to maintaining product quality. While it is preferred that individual products have dedicated equipment, this is not always physically or economically feasible. Utilization of good planning may minimize and/or remove potential contamination of shared equipment. For acceptable limits of carryover from one product to another, sites should refer to the cross-contamination matrix in Appendix 2 and the information on Product Families in section 2.6.

All lines and hoses shall be drained, flushed and/or cleaned prior to use as per the requirements of the cross-contamination matrix in Appendix 2. The flush volume required is dependent upon the size and length of the lines or hoses. Draining and flushing removes other sources of contamination aside from residual products such as moisture and particulates.

bp recommended practice is to maintain a hose register and use traceable tags/identification on each hose denoting the product or product family. The register can be used to schedule and record all inspection, testing and maintenance.

If using a compressor to blow out lines, there shall be a dryer unit in place and/or a regular schedule in place to ensure compressor, associated air receivers and drain points are maintained to prevent moisture build up.

3.3.1 LINES / PIPING

Lines should be made of Schedule 40 carbon steel or stainless steel as per API 1525. If other materials are used, they shall be compatible with the bp Lubricants products. Galvanized steel and PVC pipe shall not be used.

If lines are leaking or corrosion is evident, investigate and remedy immediately.

3.3.2 HOSES

It is recommended that dedicated hoses are used for each individual product family and that they be drained and capped when not in use. Hoses shall be labelled. Hoses should not be stored on the ground, and they shall be hung or capped to eliminate sources of contamination. Where common hoses are used between product families, to minimize contamination, they shall be drained, flushed, and cleaned to meet the requirements of the cross-contamination matrix in Appendix 2.

3.3.3 PUMPS AND METERS

As a general recommended practice, dedicated pumps and meters should be used for each different product family. The site shall follow the cross-contamination matrix in Appendix 2. For calibration requirements for meters see section 3.9.1.

Properly sized positive displacement pumps are recommended. If only a truck pump is available, extra care shall be taken to assure that the pump is empty by flushing and draining prior to use to minimize contamination.

A system shall be in place to record all bulk volume movements, with beginning and ending balances recorded.

3.4 PRODUCT SAMPLING, TESTING AND RETAIN REQUIREMENTS

To accomplish efficient sampling for testing and retains, the availability of the following items is recommended:

- Clean, clear, and dry bottles for taking representative samples.. Refer to section 1.3.9 for information on container types.
- Equipment for the required tests as listed in section 3.4.2.1 for oil-based products and section 3.4.2.3 for water-based products and any additional test equipment that may be required for solvent-based products.

3.4.1 SAMPLES REQUIRED AND SAMPLING PROCEDURE FOR TESTING AND RETAINS

Samples shall be taken for incoming bulk products (excluding packed finished goods), outgoing bulk products and when filling IBC/totes, drums, pails and small packaging (refer to table 5 and 6 for more details).

During filling, process changes such as tank movements/transfers, transfer lines and hose changes and manifold adjustments may introduce contaminants that compromise the quality of the product. When there is a configuration change on the filling line, the lines shall be sufficiently flushed prior to sampling to ensure that the sample taken represents the product loaded on the filling line. Flush volumes shall be based on the volume of the shared hardware i.e. lines, hoses, tanks, manifolds etc. that the product contacts.

A detailed description for receiving bulk is captured in 4.1 and 4.2.

TABLE 5: INCOMING REQUIREMENTS

Sample Type	Sample Point	Samples	Required Tests ¹	Sample size ²	Retention sample size ²	Retention time ²
Incoming bulk or mini-bulk container to site before unloading	Bulk container compartment ³	1 per compartment	Appearance	Approximately 300 ml	100 ml (optional)	6 months (optional)
Incoming bulk container after unloaded to site storage vessel	There is no requirement to take samples for testing or retains after transferring from incoming bulk container to storage vessel					
Incoming packaged products for re-filling/decanting into smaller packs, including greases	No requirement to take samples for testing or retain. Site to check CoA and paperwork with labels on the packs including batch number checks					

¹ See 3.4.2 for detailed description for appearance

² Sample sizes: 300 ml (10 oz.), 100 ml (4 oz.), 500g; refer to 1.3.9 for sample storage and labelling details

³ Sample at the truck tank bottom, where possible

TABLE 6: OUTGOING REQUIREMENTS

Sample Type	Sample Point	Samples	Required Tests ¹	Sample size ⁵	Retention sample size ⁵	Retention time
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Site storage tank to bulk or mini-bulk delivery container	Bulk delivery compartment ⁶	1 per compartment	Appearance, Water	300 ml	100 ml	6 months
Filling from incoming bulk container to IBC/tote - lubricant based products	IBC/tote	First filled	Appearance, Water	300 ml	100 ml	6 months
Filling from incoming bulk container to IBC/tote - Water-based products	IBC/tote	First filled	Appearance, pH	300 ml	100 ml	6 months
Filling from incoming bulk container to IBC/tote - Solvent-based products	IBC/tote	First filled	Appearance	300 ml	100 ml	6 months
Filling from storage vessel/tank to IBC/drums or Pails – lubricant based products	IBC/tote, drum or pail	First filled	Appearance, colour, water ²	300 ml	100 ml	6 months
	IBC/tote, drum or pail	Last filled ⁷	Appearance, colour, water ²	300 ml	N/A ⁷	N/A ⁷
Filling from storage vessel/tank to IBC/drums or Pails - water based products	IBC/tote, drum or pail	First filled	Appearance, colour, pH ³	300 ml	100 ml	6 months
	IBC/tote, drum or pail	Last filled	Appearance, colour, pH ³	300 ml	N/A ⁷	N/A ⁷
Filling: Change in configuration ⁴	Packaged product	First filled after starting up	Appearance, colour, water content (or pH for water-based products)	300 ml	N/A	N/A

Filling from IBC/Tote/drums to smaller packs – lubricant based products	Packaged product	First filled per batch	Appearance and water	300ml	100ml	6 months
Filling from IBC/Tote/drums to smaller packs – water-based products	Packaged product	First filled per batch	Appearance and pH	300ml	100ml	6 months
Filling from IBC/Tote/drums to smaller packs – solvent based products	Packaged product	First filled per batch	Appearance	300ml	100ml	6 months
Grease filling from Grease Boxes, Bags or Drums into bins or other type of bulk container	Visually inspect each box, bag or drum prior to filling/decanting into bulk container according to section 3.4.2.6. The sample for retain may be taken at any time during filling (from one of the packs before filling or after filling from the bulk container)			500g	500g	6 months
Grease filling from Grease Boxes, Bags or Drums into smaller packs	No requirement to take samples for testing or retain. Visually inspect each box, bag or drum prior to filling/decanting into smaller packs according to section 3.4.2.6					

¹ See 3.4.2 for detailed description of tests and test requirements

² Kinematic viscosity tests required for high-risk lubricant deliveries (e.g., OEM FF)

³ Only required if the pH values are reported on the CoA

⁴ Examples of line configuration change

- Source tank change from one tank to another
- IBC to another IBC
- Hose transfer line change
- Manifold change
- Re-fill at intermediate/day tank

⁵ Sample sizes: 300 ml (10 oz.), 100 ml (4 oz.), 500g; refer to 1.3.9 for sample storage and labelling details

⁶ Sample at the truck tank bottom, where possible

⁷ If the site is filling less than 5 IBC/totes and drums the last filled sample is not required. If filling pails, then last sample is required.

3.4.2 TEST REQUIREMENTS

Product testing is carried out to confirm that the product is not contaminated prior to shipping. The test requirements will depend on whether the sample is oil-based, water based or solvent-based. Sites shall conduct testing requirements listed in sections 3.4.2.1 or 3.4.2.3 below.

If the site does not have capability to run the tests listed in sections 3.4.2.1 and 3.4.2.3 samples shall be sent to an appropriate 3rd party laboratory. This laboratory should be ISO 9001 certified. The results of these tests are required before product is shipped to the end customer.

All test results shall be compared with the CoA. If the CoA is not available or a missing QC specification range, the site shall contact the bp representative or use own internal reference sample to check for colour and appearance.

3.4.2.1 MANDATORY TESTING FOR OIL BASED PRODUCTS

- APPEARANCE

Product appearance shall match the Certificate of Analysis (CoA) or information on the appearance shall be provided by the bp representative. Products shall not be hazy or milky unless stated on CoA or with prior notification by the bp representative. These properties may indicate the presence of free water.

- COLOUR

Product shall be compared to a specification sheet, a CoA, or a previous shipment of the same product. A difference in colour may indicate that the wrong product was shipped or that a contamination has occurred.

NOTE: Product formulation changes may occur. Changes are commonly due to raw material modifications including, but not limited to, performance and category upgrades. As a result, the appearance of new receipts of the same product may differ over the course of time. If a significant, unanticipated change is noted, please contact the bp representative.

- WATER CONTENT

NOTE: Water detection paste is not approved for product testing because it only detects free water. If desired, sites may use paste to test tanks for moisture, but site shall check labelling to ensure this paste is approved for use with lubricant products. Paste designed for detecting water in fuel products is unacceptable. Where water testing is required, it shall be done by the crackle test or Karl Fischer methods (Appendix 1).

- The site shall conduct water testing for outgoing samples as per table 6 in section 3.4.1 Testing shall be completed by either a hot plate crackle test or Karl Fischer by ASTM D6304 (refer to Appendix 1), however, if a failure* is recorded by the crackle test method the following steps are required:

- A second sample shall be tested.
- If the second sample tests positive for water a quantitative determination by Karl Fischer shall be determined. See table in appendix 5 for maximum water contents per product family.
- Contact bp representative for advice.

*A failure here is defined as any indication of water by the crackle test method (Appendix 1).

- VISCOSITY

Sites shall test for kinematic viscosity for higher risk deliveries (e.g. OEM FF) where bp has communicated this test shall be done. If viscosity is exempted by bp Supply Chain this will be provided by a written exemption. For all other sites viscosity testing is optional but highly recommended.

bp highly recommend using equipment to measure the kinematic viscosity that meets ASTM D445, ASTM D7042 or ASTM D7279. Alternately Cannon SimpleVis may be used. If the Cannon SimpleVis is used the site shall have identified an external laboratory where results can be validated if discrepancies or differences are found. The external laboratory shall be ISO 9001 or ISO 17025 certified depending on product.

- Additional tests as specified by bp to meet quality or contractual obligations.

3.4.2.3 MANDATORY TESTING FOR WATER BASED PRODUCTS

- APPEARANCE

Water-based products vary in appearance, and the appearance shall be verified against the Certificate of Analysis (CoA) and/or information on the appearance shall be provided by the bp representative.

- COLOUR

Product shall be compared to a specification sheet, a Certificate of Analysis, or a previous shipment of the same product for colour. A difference in colour may indicate that the wrong product has shipped or that a contamination has occurred.

NOTE: Product formulation changes may occur. Changes are commonly due to raw material modifications including, but not limited to, performance and category upgrades. As a result, the appearance of new receipts of the same product may differ over the course of time. If a significant, unanticipated change is noted, please contact the bp representative.

- pH

NOTE: Sites shall test for pH only if reported on CoA. The use of pH strips is acceptable. Some water-based products may need to be diluted with water before testing as per the testing parameters and result on the Certificate of Analysis (CoA).

- Additional tests as specified by bp required to meet quality or contractual obligations.

3.4.2.5 TESTING FOR SOLVENT BASED PRODUCTS/AUTOMOTIVE COOLANTS

The site shall check the appearance. Other testing on solvent-based products, automotive coolants, requires specialist equipment and if the site is handling these products, they shall contact the bp representative for any test requirements.

The site shall contact the bp representative if these products changes colour or appears hazy.

3.4.2.6 TESTING FOR GREASE PRODUCTS

Some greases may have a small amount of visible oil (oil separation). If this occurs, the grease may require additional mixing in the pail prior to re-packaging or removing the free oil before introducing the grease transfer pump. The site shall contact the bp representative for instructions.

Sites repackaging grease products, shall inspect the grease prior to re-packaging to confirm:

- Colour
- Appearance (the consistency of grease shall be smooth, no clumps, bubbles or visible particles) water free, and contamination free.

3.5 MIXING OF PRODUCT BATCHES

The site may need to mix different batches of the same bp product however this practice should be minimized as much as possible.

Conditions for allowed mixing are as follows:

- Records of mixed batches shall be kept including:
 - Date of receipt or filling
 - Any lot number information
- Advice from the bp representative shall be sought before mixing batches of licensed or OEM FF products as this may not be allowed.

3.6 PRODUCT FILTRATION

bp Lubricants filter products before they are shipped which helps to ensure the products reach customers free from visible debris and able to perform satisfactorily in service.

Some driveline products have stringent filtration requirements and filtration at the site is required. Sites shall filter products which require filtration prior to filling tank trucks, re-filling or re-packaging activities as listed below in table 7a.

For product families in table 7A, the site shall not re-fill or decant (pack to pack) unless approval received from bp.

TABLE 7A: MANDATORY FILTRATION REQUIREMENTS

bp Product Family Classification	Product Family Description	Minimum Filtration
7 and 13	Automatic Transmission Fluids (ATFs) including CVTFs and DCTFs All OEM FF automotive driveline products (includes EP containing oils, ash containing oils, ATFs, CVT, and double clutch fluids)	10 microns, 95% efficiency or 12 microns, 99% efficiency
12a and 18d	Hydraulic Fluids (Subsea Control Fluids)	See below*

* For subsea control fluids in product family 12d and 18a there are specific filtration criteria. If the site cannot use the specific filter type contact the bp representative:

- Use PALL filter, part number HFU640UY045J
- Filter size 4.5 microns.

For all other products filtration is recommended and recommended filtration sizes are listed in table 7b below. Sites shall ensure all lines and hoses are flushed to ensure particulates are minimised.

TABLE 7B: RECOMMENDED FILTRATION REQUIREMENTS

Product Families	Recommended Filtration
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4, 5, 6, 10, 19	40 - 60 microns (95% efficiency) cartridge, or 20-25 microns nominal bag or 550# strainer
2, 3, 8, 9, 11, 12 and 16	Filtration with pore size not bigger than 150 microns (nominal, no defined efficiency rating). Filtration can be conducted using a Bag filter or Cartridge filter or Strainer (100# maximum)
21	No general requirements – follow any specific guidance

Some customers may have ISO cleanliness requirements or other customer specific filtration requirements beyond those listed in the table above. Where there are customer specific requirements these shall be met by the site. Testing at a frequency specified by bp QA or the supply contract may be required to confirm compliance.

The site shall never use a filter less than 10 microns.

For small tanks, a portable filter cart may be used. Some filter carts come fitted with an online particle counter to monitor performance. All filters should be dedicated to product family but if shared between product families then flushing shall be required to ensure no contamination.

The site shall have a process to ensure filters are maintained. Filter changes shall be driven by use of differential pressure indicators, time bound frequency, or volume of product filtered. Filter changes shall be recorded.

3.7 PRODUCT SEGREGATION AND QUARANTINE

All product filled prior to the sample being approved shall be segregated to prohibit accidental shipping.

3.8 DOCUMENTING SITE ACTIVITIES

bp highly recommends the site to documentation of certain product quality related activities at a site is important as there may be an occasion when a quality issue occurs and having traceable records such as: unloading/loading logs, movements in and out of storage tanks, equipment calibration, filling procedures and product testing may aid in resolving these issues.

The form in section (7.1) is an example of a “[Review of Activities](#).” It contains a comprehensive sample of the items that should be regularly checked by the site.

3.9 CALIBRATION AND MAINTENANCE OF PROCESS CONTROL AND TEST EQUIPMENT

Calibration and maintenance of equipment that affects product quality is required to ensure correct storage, sampling, testing, filling and delivery conforming to relevant country laws and regulations. Sites shall maintain equipment in accordance with manufacturer's guidelines and internally generated maintenance schedules. The site shall regularly check calibration of equipment, as listed in section 3.9.1, at intervals between the formal traceable calibrations. Maintenance records shall be maintained.

3.9.1 RECORD AND MANAGEMENT OF EQUIPMENT

Meters and scales used for re-sale of product shall at a minimum be calibrated yearly.

A list of equipment requiring calibration shall be maintained. This list shall include as a minimum:

- Laboratory QC testing equipment.
- Volume and weight gauging equipment, for example, meters and scales.
- Temperature measuring device.

To ensure valid results from measuring equipment the site shall:

- Calibrate or verify at specified intervals against measurement standards traceable to national or international requirements. If no standards exist, methods used for calibration shall be recorded.
- Calibrate the equipment as per the manufacturer's recommendation as a minimum.
- Protect the equipment during handling, maintenance, and storage to avoid against drift from calibration.
- The calibration status of a piece of equipment is clearly displayed or as required by any local regulatory agencies and applicable law. This may be achieved by attaching a tag or label to the equipment.

It is highly recommended that:

- Check weights should be used to monitor calibration accuracy between formal calibrations for weighing equipment.
- Checking flowmeters between formal calibrations (e.g. by dispensing into an IBC or other pack and weighing on a calibrated and traceable scale).

An established procedure is required to prevent the use of equipment which is either beyond the calibration due date or is found to be out of calibration.

When equipment is out of calibration (either range or due date) the site shall:

- Remove from service and tag accordingly until equipment is determined to be within accepted tolerance.
- Record corrective actions to restore equipment for traceability purposes. Keep records according to section 1.3.4
- Reduce the interval between two calibrations or introduce verification using secondary standards between consecutive calibrations.

3.10 SHIPPING DOCUMENTATION

Quality documentation in the form of a certificate of analysis (CoA) or certificate of conformance (CoC) shall be sent to end customers upon request.

All CoAs and CoCs shall have bp or Castrol or Aral letterheads.

4. BULK PRODUCT HANDLING

This section describes activities and processes relating to receipt and dispatch of bulk product. This includes testing, handling, and storage to prevent product contamination.

4.1 BULK RECEIVING

bp and Castrol products are shipped with documentation that contains information including, but not limited to, the product name and quantity for each compartment. A Certificate of Analysis (CoA) shall accompany each incoming bulk delivery. Before unloading, it is important to inspect these documents to confirm that the correct product(s) and quantities have been received. If no CoA is provided with the incoming material, then the site shall request a CoA from bp, review the delivery paperwork and confirm product identification and quantity. For tags and seals (if used) shall be similarly checked. A [Product Management Table – Receipts Log](#) (an example is given in section 7.2) shall be maintained for documenting each receipt of product.

To confirm delivered quantities with Bill of Lading or delivery paperwork, bp Lubricants recommend the use of a weighbridge or mass flow meters. If bulk deliveries, e.g. trucks/isotainers/flexi-bags are gauged rather than weighed, accurate measurement of the temperature of the product to be transferred is important. To compensate for temperature related expansion and contraction of products the site shall mutually agree a temperature with bp Lubricants.

4.2 PRODUCT SAMPLING AND TESTING

Sampling on incoming bulk and mini bulk shall be completed prior to the product being transferred from the truck or other bulk container compartments to any site vessel or tank. This assures that existing storage tank contents are not compromised.

A representative sample* of product in each compartment of the truck or other bulk container shall be taken and checked for visual appearance:

- If any sample is hazy the site shall not unload. Contact the bp representative
- If samples are not hazy the site can unload into storage tank/vessel

* bp recommend that this sample is retained.

- For trucks and mini bulk, ideally the sample should be a bottom sample, following a flush; in circumstances where a bottom sample is not possible, a top sample should be taken after mitigating any associated risks (e.g., working at height). Where a top sample is taken, the site shall drain the manifold before transferring to the site storage tank/vessel. The product flushed shall be inspected for any sign of haziness, water or sediment.
- For Iso tainers, a bottom sample following a flush
- For flexi-bags, an outlet sample following a flush

If, after testing, any product is found to be out of specification when comparing with the CoA or contaminated with water or particulates, an additional sample shall be taken for further analysis. If off-specification or contamination results are confirmed contact the bp representative for advice on return, rework, or disposal.

If the site is directly unloading from the bulk delivery truck or bulk container into totes/IBCs and not unloading into a site vessel/tank, then the sample shall be taken from the first tote/IBC, refer to table 6 for sampling, testing and retains. If the tote/IBC is being re-used then refer to section 4.6.3.

4.3 PRODUCT UNLOADING

4.3.1 TANK CONTENT AND CAPACITY

The product in the tank shall be verified before any transfer lines are attached. The storage tank shall be gauged to confirm that enough space (ullage) is available to hold the quantity delivered. If a tank does not have a gauge, then a method that can accurately determine tank volume shall be used. Electronic devices used to confirm volume in the vessel shall be calibrated (see section 3.9). Non electronic devices/physical devices shall be inspected for accurate use.

An example of a [Tank Readings Form](#) is included in section 7.3 of this manual. Using forms of this type assist daily recording of fluid movements for each tank in service. Alternatively, if the site uses Enterprise Resource Management (ERP) to track product movements the site should regularly cross check actual volumes against the volumes indicated by ERP.

4.4 PRODUCT STORAGE AND HANDLING

All bulk products shall be stored in tanks which are clearly marked to include, at a minimum, the product name, product grade (if applicable), capacity and any other identifying features required by any government law or regulation. Sites shall conduct testing of product for water on tank contents at intervals as per section 3.2.

The site shall maintain a log of product storage tank contents. Section 7.2 could be used as an example of a *Storage Tank History Log*. The information contained benefits both the site and bp Lubricants in the event any product issues are raised by end customers. Section 7.5 contains an example of this log. Sites may use ERP to track storage tank history.

Handling and storage information may be found in section 7 of the relevant Material Safety Data Sheet. If additional information is required contact the bp representative.

4.5 PRODUCT TRACEABILITY

To guarantee traceability for bulk products the site shall keep the following records:

- Date of loading and unloading.
- Product name.
- Tank number.
- Records of mixed batches (see section 3.5).
- Volume transferred to the bulk container including compartment number as applicable.

4.6 BULK AND MINI BULK LOADING

The following operational practices shall be used to ensure end customers receive the quality products they have ordered. Bulk containers include Trucks, Railcars, flexi-bags, and Iso-tainers. Mini bulk are tanker trucks with multiple small compartments where the product can typically be metered to customers via compartment dedicated pumps, hoses and meters.

- Transportation trucks and local bulk delivery equipment shall have tightly sealed and closed loading domes.
- Bulk container compartments shall meet the cleanliness requirements of section 4.6.1 and 4.6.2 below.
- All bulk container compartments shall be inspected prior to loading. With trucks in dedicated service carrying the same product, loading with a small residual of product from prior shipment may be acceptable with bp approval. Inspection is still required as even tank trucks in dedicated service will become dirty and require periodic cleaning. It is

recommended to check for water by sampling from the bottom valve while exercising proper safety and spill precautions.

- Products from different product families should be handled in segregated loading systems or stringent flushing procedures shall be implemented. Refer to Appendix 2 – cross contamination matrix.
- Prior to loading the site shall ensure all filling lines are flushed and drained if they are not dedicated. NOTE: Flush cannot be added into bp products.
- During transfer of product to the truck always verify that no leaks are visible and the level in the storage tank is decreasing.
- A representative sample shall be taken of each compartment after loading; where a compartment is loaded from the top it is recommended to take a sample from the bottom valve of each compartment and where loading is via the bottom manifold a top sample from each compartment is recommended.
- Samples shall be tested prior to release. For sampling, and testing see sections 3.4.1 and 3.4.2. See section 1.3.9 table 3 for retain and labelling requirements.

4.6.1 CONTAINER CLEANLINESS

To ensure cleanliness it is important that the trucks, rail cars, iso-tainers, other bulk containers and mini bulk are clean and dry before bp products are filled. Even those that are dedicated to a product type may have residual product, water, dirt, and other foreign matter.

All trucks, rail cars, iso-tainers, other bulk containers and mini bulk should have a cleanliness certificate. However, even with these certificates foreign matter may sometimes be found in compartments and associated equipment such as lines, pumps, valves, manifolds and hoses where applicable. Therefore the site shall always refer to table 8 below.

TABLE 8: CONTAINER CLEANLINESS

	Compatible Products ²	Compatible Products ²	Incompatible products ⁴
--	----------------------------------	----------------------------------	------------------------------------

	Bulk	Mini bulk	
CCM information ¹	These products are coded yellow and blue	These products are coded blue Yellow ³ may be considered compatible if site can demonstrate cross contamination are within limits	These products are coded red
Incoming	Bulk container does not need to be cleaned. Confirm previous product has been drained so only an oil film remains		Bulk container shall be clean ⁵ and dry (no oil film)
Inspection (each compartment with a flashlight)	Visual (to ensure only residual product remaining and no visible foreign contaminants)		Visual
Inspection (rest of tanker)	Open manifold and internal/external valves - drain		
Flushing	Not required but flushing is required for hoses, lines etc. in the Distributor site		

1. Use appendix 2.
2. For example, engine oil to engine oil or hydraulic oil to hydraulic oil.
3. Yellow for Mini bulk are likely to be incompatible because the volume of any product left remaining in the compartment after draining represents a higher % compared to the volume of the bulk container. Therefore, a 0.2% maximum cross contamination will be difficult to meet
4. Non bp products are also considered to be incompatible with bp products.
5. This manual does not specify the cleaning procedure of the truck or bulk containers.

4.6.2 CONTAINER CLEANLINESS – GREASES

The site shall have a documented inspection process to ensure bulk grease containers (e.g., bins) are free of visible contamination. Such internal inspection is required for both customer dedicated bins and non-customer dedicated bins. Internal inspection is only possible for bins with hatches and no internal follower plates.

External inspection shall also be conducted and documented to cover any other sources of potential contamination (e.g., filling points, fittings, dust caps, breathers etc.).

Where a reusable bin/bulk container is changing service from one product to another, the site shall either conduct internal cleaning of the bin or alternatively consult with the bp designated contact to determine if cleaning is necessary for the specific change of service.

4.6.3 BULK CONTAINER AND IBC RE-USE

Re-using returned bulk, mini bulk containers and IBCs are allowed but the site shall ensure the following requirements are met to minimize the risk of contamination. The site shall have a documented re-use process including any cleaning procedures and shall be available during site assessments. The site shall confirm with the bulk container suppliers if there are any useful life limitations for prolonged use.

Sites re-using bulk, mini bulk containers and IBCs for the purpose of supplying the same product to customer shall (unless indicated as a should):

- On returning to site, the container should be drained of any previous batch of product.
- Inspect the inside of the container with a flashlight to confirm no visual signs of contamination (water, dirt, foreign objects). If contamination is observed, the container shall be cleaned before re-using or shall be disposed
- Where applicable, remove previous product label and attach the approved labelling with the new batch number and filling date
- The product in the filling line has been tested for water contamination before loading into the containers.
- Sites should consider numbering the re-used IBCs/Totes to facilitate traceability

Where a site changes the use of the container from one product to another product, the site shall meet the requirements of the above bullet points but shall also meet the following additional requirements below:

- Meet the product Cross Contamination Matrix (see Appendix 2)
- Where applicable, remove previous product label and attach the approved labelling for the new product.

4.7 NON-CONFORMING BULK PRODUCT

A product may not conform for several reasons, some examples are:

- Product out of specification.
- Product is contaminated.
- Obsolete product or obsolete claims.

The site shall have a documented process to quarantine non-conforming bulk product to prevent accidental shipment to customers. The site shall contact the bp representative for advice.

4.8 DELIVERY OF BULK PRODUCT TO END CUSTOMERS

The following practices should be completed by the driver for bulk deliveries: See Appendix 4 for additional information.

- Confirm the product in the customer's tank prior to making any hook ups for product transfer.
- Product should not be unloaded if the customer unloading point is not clearly marked with full product name (matching customer order and delivery documents):
 - If not clearly marked, consult with customer, and agree if unloading should continue or agree next steps.
- Confirm, using meters or gauges (or visual if these are not available) that the customer's tank has enough available space to hold the volume to be delivered. It is highly recommended for the driver and customer to communicate during unloading to prevent over filling.
- Hose correctly & securely connected to the tank/connection point (customer's accountability) & vehicle compartment/outlet (driver accountability). Driver to confirm with customer.
- If unloading from a multi-compartment truck in the same delivery using non-dedicated lines or a common pump the driver shall perform the following to minimize effect of cross contamination:
 - Unload the lower viscosity grade product first if applicable.
 - Flush the lines.
 - Use empty pails to hold any flush. Spill prevention measures shall be in place.
 - Return flush to site for disposal unless other arrangements have been agreed.
- For mini bulk deliveries there are additional requirements. A checklist for mini bulk delivery may be obtained from the bp representative (OMS document number 19646). An example of a delivery checklist that may be used during product delivery is included in section 7.8.

4.8.1 BULK DELIVERY DRIVER TRAINING

bp recommend entities provide some basic familiarization training to delivery drivers. The training will be related to quality and potential sources of contamination. The following is recommended to be included in the training:

- Effects of contamination:
 - Cross product contamination can seriously affect performance claims.

- Water contamination can result in a hazy product and cause performance additives to drop out.
- Particulate contamination can result in damaging sensitive applications where strict cleanliness standards are required by the end user.

5. PACKAGED PRODUCT HANDLING

It is critical that uncontaminated product is filled into clean labelled containers of the correct specification to ensure that products in the marketplace perform as expected by the customers and meet all performance claims.

Mixing different products and/or mixing different viscosity grades in the same package is **strictly prohibited**; for example, mixing an ISO 32 fluid with an ISO 68 fluid to obtain an ISO 46.

Filling into packages shall occur

- Indoors in a clean dry environment for 200 litre drums or smaller packs
- Indoors or outdoors under cover for larger packs (IBCs, skid tanks, iso-tainers, grease bins)

5.1 RECEIVING PACKAGED PRODUCT

All incoming packaged product shall be compared with the Bill of Lading (BoL) and CoA to ensure the correct material has been received. If no CoA is provided with the incoming material, then the site shall review the delivery paperwork and confirm product identification and quantity.

5.2 EMPTY PACKAGING STORAGE

All empty packaging materials shall be stored in such a way as to keep both inside and outside clean and dry. Methods for storing empty packages shall be assessed during site assessments. It is especially important to keep the inside clean and dry, so product is not contaminated with particulates and / or water. Larger pails and drums should be stored with caps in place.

5.3 PACKAGING INSPECTION PRIOR TO FILLING

All drums, pails, IBCs, totes, and grease bins shall be inspected internally for water, rust and other contamination prior to filling and shall not be used unless free of contaminants. Where liners are used, ensure they are intact and appropriate for product. Drums and pails shall be inspected externally and shall not have significant packaging defects, including dents, creases and/or peeling paint. bp may supply incoming inspection protocols and the site shall follow these where supplied. See Appendix 3 for more guidance on acceptable conditions.

For smaller packaging such as bottles, internal inspections are not mandated but it is best practice to carry out a random number of internal inspections. The site shall inspect packaging for external damage and defects (see Appendix 3).

5.3.1 DAMAGED GOODS FOR USE

Damaged packaging shall be quarantined according to section 1.3.10 and either returned to the supplier or disposed (see section 5.12.1).

Damaged goods shall not be used unless approved by a bp representative.

5.3.2 NON-CONFORMING PACKAGING

Non-conforming packaging shall be quarantined according to section 1.3.10 and either returned to the supplier or disposed (see section 5.12.1). Examples of non-conforming packaging include:

- Illegible or damaged labels
- Stained labels
- Incorrect labels
- Incorrect pack colour
- Packs with significant damage (Refer to Appendix 3).

5.4 GENERAL FILLING REQUIREMENTS

Filling product into packaging can be broadly categorized into the following:

- Filling from bulk into various size packaging (see section 5.5)
- Re-filling from one package to another package (see section 5.6)
- Decanting from one package to another package (see section 5.6)

Site shall ensure that no water or particulate contamination (filling indoors away from rain, high humidity or dusty conditions) can occur during re-filling or decanting.

All filling/re-filling/decanting equipment shall be drained, flushed and/or cleaned to meet the cross-contamination matrix (see Appendix 2).

Product filling/re-filling/decanting shall not start until fully authorized by a designated site authority. Filling authorizations shall be in writing, fully traceable and include verification that fluid and packaging match. This could be a simple filling log with date, batch number, pack size, fill code and approval sign off (see section 7.4 for sample log).

The area in proximity of filling/re-filling/decanting shall be cleared of any unwanted/incorrect packaging or labels to prevent accidental use. Correctly sized filters shall be used to filter product as per section 3.6.

For packaging inspection prior to filling refer to section 5.3.

It is highly recommended to attach traceable numbered tamper evident tags to the IBC to both top and bottom seals.

It is recommended that grease bins are sealed.

A sample shall be taken and tested for contamination at the times listed in Table 6 in section 3.4.1 when filling packs.

Filled packs shall not be shipped until testing approval is obtained from designated site authority. Other checks shall include:

- Labels are correct* and attached correctly (check all labels if more than one is applied).
- Fill weights/volumes are correct**.
- Packs are correctly sealed.
- Packs are not damaged.

* The site shall undertake to accurately represent product safety information listed in the latest product Safety Data Sheets (SDS). The site shall contact the bp representative for latest SDS.

** Site shall use a calibrated scale or flowmeter to ensure correct fill weight/volume. “Measuring sticks” of any kind shall not be used. Sites shall comply with any country legal requirements regarding weights & measures. Sites shall measure and control the fill weight/volume to match label content, special care taken where multiple nozzles are used for volumetric filling. To convert to fill weight when using a volumetric flow meter, the equation below shall be used. Any scales or meters used for custody transfer measurements shall be appropriately maintained and calibrated according to all regulations (see section 3.8). The site shall account for the tolerances of the weighing equipment when using the equation below to prevent underfilling.

$$\text{Fill Weight} = (\text{Desired Package Volume}) \times (\text{Density}^{\dagger})$$

[†]at agreed temperature

Where the filling system has >1 fill nozzle / fill head, the site shall have a process to ensure each nozzle is dispensing the correct volume by measurement of weight of containers at the start of filling from each nozzle and then at periodic intervals.

5.5 FILLING INTO PACKAGING FROM BULK

Only sites who are authorized by bp shall repackage bulk product into IBCs/totes, drums, pails, or small packs for sale to customers. Records of pack filling shall be maintained; an example of a

drum, keg, IBC/tote, and pail packaging log can be seen in section (7.4), [IBC/Tote, Drums, Kegs, Pails, and Carton Packaging Log](#). The site shall ensure traceability (see section 5.10).

Where packaging is authorized by bp the site shall use bp approved packaging and labels (design and label content). Some sites may be authorized to print bp labels. Locally designed labels shall not be used.

For general requirements see section 5.4 which also apply to this section.

5.6 RE-FILLING OR DECANTING PACKAGE TO PACKAGE

Re-filling or decanting from one package to another package shall not be allowed without prior approval from bp.

Re-filling or decanting from an IBC or drum may be conducted in one of the following ways:

- IBC
 - Attach hose to bottom drain hole and use a pump to re-fill into smaller packs
 - Use stinger pipe at the top of the IBC and pump to re-fill into smaller packs
- Drum – Use stinger pipe and pump to re-fill into smaller packs
- Decanting from IBC/Drums to smaller packs using
 - A simple funnel and decant into empty package on a scale
 - A hand-held pump and decant into empty package on a scale
 - Raise IBC/Drum off the ground and use gravity

To ensure product quality the site shall flush residual product from pumps, meters, hoses, and stinger pipes when preparing to changeover to the next product.

Where packaging is authorized by bp the site shall use bp approved packaging and labels (design and label content). Some sites may be authorized to print bp labels. Locally designed labels shall not be used.

For general requirements see section 5.4 which also apply to this section.

5.7 PACKAGING OF HAZARDOUS MATERIALS

UN certified containers shall be used for products indicating a UN hazard on the most recent SDS, which includes, but not limited to, the following categories:

- Flammables Liquids
- Corrosives
- Oxidizers
- Others (for example Marine Pollutants or Environmental Hazards)

5.8 NON-CONFORMING FILLED PACKS

Filled packs found to be non-conforming for any reason (including those on the list below) shall be quarantined according to section 1.3.10:

- Incorrect lubricant product is packaged into labelled bottles, drum, kegs etc.
- Product is found to be out of specification or contaminated.
- Packs have mismatched front to back labels or incorrect labels.
- Packs do not meet any local or regional requirements.
- Packs are under filled or over filled.
- Fluid leaking from closures or the package itself.
- Damaged packs (see Appendix 3 for visual guidelines).
- Returned by the customer for any other or unknown reason

5.9 PRODUCT RE-USE

Incorrectly packaged product can be re-filled into correct containers. The product shall first be returned to a suitable storage tank or other suitable container. The suitable storage tank or container shall be clean and dry. The product shall be re-tested before filling.

5.10 PRODUCT TRACEABILITY

To guarantee traceability, all packaging (for example IBC, drums, pails, cartons, bottles) shall contain the following information:

- Product name
- Filling date
- Filling code
- Filling line (if applicable)
- Filling line sequence number or time stamp on the drum, bottle and carton is recommended.

Sites may use any numbering system desired for the fill code, however; it shall ensure it can be traced to the original bp shipment (e.g., batch number or other identification code) and product filled and identify original packaging source.

For small packs, the site shall add traceable coding to both bottles and cartons.

For greases bins/skid tanks shall be labelled with product name, product code, customer name and unique bin/skid tank number.

5.11 STORAGE CONDITIONS FOR PACKAGED PRODUCT

To maintain product quality, all packaged products should be stored upright and indoors / under cover to protect it from accelerated deterioration. Where insufficient indoor storage is available the following conditions shall apply:

These storage conditions apply to full unopened containers and opened part filled containers:

- Refer to the product data sheet or safety data sheet for any special storage requirements and adhere to those requirements.
- Smaller packaged product (product in cartons) shall not be stored outdoors unless completely under cover and raised off the ground.
- If being moved for shipment, smaller packaged product may be temporarily stored outdoors but this shall only be for short periods of time (< 1 day) and under conditions that offer protection from the environment.
- bp highly recommend that Finished Goods, including those in drums, pails or kegs are stored outdoors under the following conditions:
 - Metal drums, pails and kegs shall be stored horizontally if possible or alternatively upright and covered and raised off the ground to avoid contact corrosion.
 - Plastic containers should be stored upright with covers over the tops of the containers. Some plastic containers have bungs designed to shed water and these may be stored without covers. Plastic containers, if necessary, may be stored horizontally.
 - Metal or plastic containers may be stored fully inverted (top side down) to prevent water ingress. This is only allowed if the container is approved for inverted storage.
- IBCs/Totes may be stored outside ideally undercover.
- Some products, including water based Industrial products, are particularly sensitive to extremes in temperature. For water based Industrial products, if the storage temperatures will exceed ~ 40°C or be below ~ 0°C, please refer to the storage information on the SDS or contact the bp representative for guidance.

Larger containers such as grease bins, isotainers and similar sized bulk containers may be stored outdoors but undercover and away from direct sunlight.

5.12 DAMAGED GOODS HANDLING

Damaged goods shall be clearly identified and quarantined according to section 1.3.10.

5.12.1 DAMAGED, UNWANTED, OBSOLETE GOODS (ANTI-COUNTERFEIT)

Products, packs, or labels which cannot be re-used due to damage, are obsolete, or are not required shall be disposed of to prevent inappropriate use or counterfeiting. The following methods are recommended:

- Product - disposed of according to all applicable waste regulations.
- Labels - destroyed / defaced / shredded / cut.
- Drums deface graphics and labels if drums are sent for recycling.
- Pails / Small Packs - drill holes.

5.13 INVENTORY MANAGEMENT

Most bp products have excellent storage stability; however, good inventory management and FIFO (First In First Out) and FEFO (First Expired First Out) are essential to ensure older product is shipped first. The site shall contact the bp representative to confirm shelf-life dates.

If inventory or customer returns exceeding the shelf-life date contact the bp representative for advice.

6. PRODUCT RETURN

If the site accepts returns, then they shall:

- Quarantine the returns according to section (1.3.10)
- Record batch numbers and fill dates
- Record visual appearance of packages including labels and tamper seals.
- Record available documentation.
- Determine if product expired/past shelf life.
- Run quality testing as applicable for product type outlined in section 3.4.
- Contact bp representative and provide all information available.
- Obtain further instruction from bp representative who will advise one of the following:
 - Return to stock.
 - Recommend additional testing.
 - Write off and dispose according with local legislation.

Where product is re-packed traceability shall be recorded such as batch number and date. Any local batch numbers shall be traceable to the original bp batch number.

7. DOCUMENTS AND FORMS

The documents in this section are recommended and are provided as examples only. The site may modify as required.

7.1 REVIEW OF ACTIVITIES

If answers to questions on a consistent basis are No, the site should review the risk and impact on product and update processes as needed.

LOADING/UNLOADING TANK TRUCKS												
1. Prior to loading, are tank compartments being cleaned that contained any corrosive or flammable products, glycol, or any non-petroleum products on the previous load?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
2. Are tank compartments clean, dry, and free from rust, scale, dirt, and liquid?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
3. Do operators know the steps by which each compartment will be loaded and in what order?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
4. Are operators aware of the practices for sampling bulk oil shipments?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
5. Are samples secured from each compartment and placed in a clean, dry, and clear container for testing and retention?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
6. Are samples labeled with product name, product code, date received, supply point, invoice number and batch number?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
7. Are all unloading hoses being inspected to be sure that they are free of contaminants?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
8. Where limited common lines are utilized, are flushing requirements in place, and followed for both unloading and loading/filling?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
9. Have samples been tested and approved prior to unloading and loading?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
STORAGE TANKS												
10. Are procedures for sampling storage tanks established and being practiced?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
11. Are movements in and out of storage tanks documented and accurate?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
12. Are there records being maintained that allow tracing of product(s) back to supply points?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
13. Are there records of tanks being tested annually for water content by crackle test? Note: If	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No

tanks are outside or have internal steam coils for heating, then the requirement to test for water in tanks is 6 monthly.												
CALIBRATION												
14. Is a procedure in place for calibration of temperature measurement, gauging equipment, meters, and scales, and are all calibrated at a minimum of annual frequency?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
15. Is lab testing equipment calibrated according to the manufacturers' requirements?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
FILLING CONTAINERS												
16. Are the proper labels and drums being used as per the Bulk Repackaging Agreement?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
17. Are required fill codes and data being recorded on container labels as per the Bulk Repackaging Agreement?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
18. Have samples been tested and approved prior to filling?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No
TESTING												
19. Is testing equipment available, and is a log kept with all test results?	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No	Yes/ No

7.2 PRODUCT MANAGEMENT TABLE – BULK RECEIPTS

Product Name

Storage Tank

[illegible]

* Compare sample to previous retain for colour and overall appearance, if hazy perform water testing. If the sample fails the crackle test, pull another sample and retest. If the second sample still fails appearance and crackle test, then contact the bp representative for advice on return or disposal.

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7.3 TANK READINGS FORM

The Tank Readings Form is recommended to track volumes in the tank farm daily. Volumes may vary with temperature.

Date: _____

Tank #	Capacity	Product Name	Starting Volume in Tank	Ending Volume in Tank	Quantity on Order

7.5 STORAGE TANK HISTORY LOG

Tank Number _____

Tank Location _____

Date	Product Stored	Tank Cleaned	Tank Drained	Preventative Maintenance Performed	Water (pass/fail)	Repairs Performed	Notes

- Please see section 3.1 for the frequency of water testing required for different tank configurations/locations.
Note: ***Water detection paste is not approved for product testing because it only detects free water. If desired, sites may use paste to test tanks for moisture, but this paste must be approved for use with lubricant products. Paste designed for detecting water in fuel products is unacceptable. Where water testing is required, it shall be done by the crackle test method or Karl Fischer (Appendix 1).***

7.6 PACKAGING/REFILLING (IBCS, DRUMS, KEGS, PAILS, AND CARTONS) TESTING LOG

Location _____

Month / Year _____

Date / Time	Product Name (and Grade where applicable)	Type of Sample (First Sample, Intermediate Sample or End Sample)	Appearance (Clear or hazy?)*	Sample Colour*	Water by Crackle (Pass/fail) **	Viscosity**	pH**	First and end of run samples retained? Y/N

* Compare sample to previous retain for colour. If the test results obtained do not match the CoA, pull a second sample. If the second sample still does not match the results on the CoA, then contact the bp representative for advice on return, or disposal.

** Refer to section 3.4.2.1 or 3.4.2.3 for mandatory testing.

7.7 BULK OUTGOING TESTING LOG

Location _____ Month / Year _____

Date / Time	Product Name (and Grade where applicable)	Compartment number	Appearance (Clear or hazy?)*	Sample Colour*	Water by Crackle (Pass/fail) **	Viscosity**	pH**	Compartment samples retained? Y/N

* If the test results obtained do not match the CoA, pull a second sample. If the second sample still does not match the results on the CoA, then contact the bp representative for advice on return, rework, or disposal. ** Refer to section 3.4.2.1 or 3.4.2.3 for required testing

7.8 DRIVER CHECKLIST

BEFORE LEAVING PLANT

- ☐ Flush the truck pumping system in accordance with local procedure.
- ☐ Verify BoL and other paperwork matches compartment product and tags.

BEFORE PUMPING

- ☐ Verify paperwork (BoL, delivery ticket) with customer.
- ☐ Verify quantity and product to be unloaded with customer.
- ☐ Verify customer tank is labelled with full product name that matches paperwork:
 - If not clearly marked or not labelled with product to be unloaded, obtain customer approval to unload or agree next steps.
- ☐ Confirm through use of meters or gauges (or visual if these are not available) that customer tank has capacity to hold volume to be delivered:
 - If tank is empty and switching service, confirm with customer that the previous product has been drained, flushed, and cleaned, if required, to remove any product which may not be compatible with product to be delivered.
- ☐ Connect correct customer tank to designated pump and to correct compartment.
- ☐ Flush all lines, pumps, and compartments into designated flush oil container to minimize cross contamination:
 - Where applicable, unload lower viscosity grade product first.

AFTER PUMPING

- ☐ When unloading is complete at customer's site, turn off pump and close all remaining valves.
- ☐ Close all tank closures and lock if applicable.
- ☐ Update quantity and product delivered on paperwork.
- ☐ Verify quantity and product received with customer and have customer sign delivery documents, where required.
- ☐ Verify by walking around truck that all hoses have been removed and stored before leaving site.

APPENDIX 1 - CRACKLE TEST - WATER IN OIL

Scope

Moisture in bp products can lead to degradation of lubricant base stock and additives, corrode component surfaces, and accelerate wear due to reduced fluid film strength.

The visual crackle test is predominantly a qualitative test but may roughly quantifies the presence of moisture in these fluids. It is a simple test which identifies the presence of free and emulsified water suspended in the oil, provided a few rules are followed.

Under carefully controlled lab conditions, the crackle test is sensitive to around 500 ppm (0.05 percent) of water-in-oil depending on the type of oil.

With practice the procedure can be advanced considerably and made more quantitative. Rather than simply listening for the crackle, adding a visual observation, and rating of the number and size of the vapor bubbles produced allows a rough indication of the amount of moisture present to be obtained (see observations below, points 3, 4 and 5).

Method

1. Raise the hot plate temperature to 155°C (310°F) to 160°C (320°F). Always use the same temperature. Recommend conducting test under fume hood or in a ventilated area.
2. Vigorously shake oil sample to achieve homogenous suspension of water in oil.
3. Using a clean dropper or laboratory syringe, place 3 to 5 drops of oil on the hot plate.

Observations

1. If no crackling or vapour bubbles are produced after a few seconds, no free or emulsified water is present
2. If very small bubbles (0.5 mm) are produced but disappear quickly, approximately 0.05 wt.% to 0.10 wt.% water is present.
3. If bubbles approximately 2 mm are produced, gather to the centre of the oil spot, enlarge to about 4 mm, then disappear, approximately 0.1 wt.% to 0.2 wt.% water is present.
4. For water levels above 0.2 wt.%, bubbles may start out about 2-3 mm then grow to 4 mm, with the process repeating once or twice. For even higher water levels, violent bubbling and audible crackling may result.
5. The presence of dissolved gases, fuel, refrigerants, and volatile solvents may cause a false positive (indicate the presence of free or emulsified water). If the site has a positive test, they should look for other possible sources of contamination.
6. If the sample is hazy, but the test is negative (no bubbles or crackle) indicating no free or emulsified water; the site should look for other sources of contamination.
7. If either number 5 or 6 occur, the site should contact the bp designated contact for advice.

No visible or audible change.



No free or emulsified water

Very Small Bubbles (0.5 mm) produced and quickly disappear.



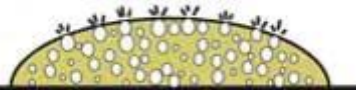
0.05 - 0.1% 500-1000 ppm

Bubbles approximately 2 mm are produced, gather to centre, enlarge to 4mm, and disappear quickly.



0.1 - 0.2% 1000-2000 ppm

Bubbles 2-3 mm produced growing to 4 mm, process repeats, possible violent bubbling and audible crackling.



0.2 and more >2000 ppm

Limitations

Although generally applicable, the crackle test does have some limitations:

1. The method is, at best, semi-quantitative.
2. Hot plate temperatures above 155°C (310°F) to 160°C (320°F) induce rapid boiling that may be undetectable.
3. The method does not measure the presence of chemically dissolved water.
4. Interferences
 - Refrigerants and other low boiling-point suspensions may interfere.
 - Different base stocks, viscosities, and additives will exhibit varying results.
 - Certain synthetics, such as esters, may not produce scintillation.

Safety Considerations

Exercise extreme caution when performing the crackle test on oils that might contain hazardous gases or low boiling point volatiles (such as ammonia compressor oils), which might produce fumes and vapours that present inhalation and/or serious skin or eye injury upon contact. When evaluating these oils, the hot plate should remain in a fume hood that allows the analyst to conduct the test without contact with fumes or vapours:

1. Follow all site PPE.
2. Do not use this test for products that contain solvent or any products with low flash points. Consult the product SDS for flash point information as needed.

Equipment Required

The crackle test can be performed with a minimum of investment using the following equipment:

1. Hot plate capable of achieving and maintaining 155°C (310°F) to 160°C (320°F) surface temperature.
2. Optional separate hot plate thermometer to verify temperature.
3. Plastic dropper or laboratory syringe.

APPENDIX 2 - CROSS CONTAMINATION MATRIX

The table below provides guidance for the sites to manage product cross contamination.

The colour key is as below:

Red	No product contamination allowed. Will require separate systems or draining, flushing, and cleaning.
Yellow	< 0.1 - 0.2% product contamination allowed. Will require draining and flushing. Extent of flushing to be determined based on system design.
Blue	< 1 % product contamination allowed. Typically draining will be sufficient but this shall be validated for product changes.

A list of product families can be found in appendix 5 of this manual.
If a product family is not listed, seek guidance from your bp representative.

The site may need to increase flushing for dyes and fragranced products (see section 2.4.1).

From this Type of Product	Into this Type of Product		
	Red	Yellow	Blue
Any non- bp product, regardless of product type or family Any PAG containing, PAO or Ester based synthetic Marine and Industrial Oils (2f,2g,2h,2i,2j) Any soluble oils (11 a, b, c) Any water-based products (12 a, b, c) Any solvent-based products (16 a, b, c)	Any bp Product		
Zinc free Industrial (2 a, b, c, d)	PAG containing, PAO or Ester based synthetic Marine and Industrial Oils (2f,2g,2h,2i,2j) Metalworking Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Free Industrial (2 a, b, c, d, e) Zinc Containing Industrial (3 a, b, c) Engine Oils (4 a, b, d, h) Gears (6 b, c) ATFs (7 a, b) Metalworking fluids (8 b) Ashless Two Stroke (10 c)	Marine (4 e, f, g) Zinc Free Engine Oils (5 a, b) Gear Oils (6a) Metalworking Fluids (8 a, c, d, e) Two Stroke (10 a, b)

Synthetic Zinc Free (2 e)	PAG containing, PAO or Ester based synthetic Marine and Industrial Oils (2f,2g,2h,2i,2j) Marine Oils (4 e, f, g) Zinc Free EOs (5 a, b) Metalworking Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Free Industrial (2 a, b, c, d) Zinc Containing Industrial (3 a, b, c) Engine Oils (4 a, b, d, h) Gears (6 b, c) ATFs (7 a, b) Metalworking fluids (8 b) Two Stroke (10 a, b, c)	Synthetic Zinc Free (2 e) Gear Oils (6 a) Metalworking Fluids (8 a, c, d, e)
Zinc Containing Industrial Oils (3a, b, c)	Zinc Free Industrial (2 a, b, c, d, e, f, g, h, i, j) Zinc Free Engine Oils (5 a, b) Metalworking Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Containing Industrial (3 a, b, c) Engine Oils (4 a, b, d, h) Gear oils (6 b, c) ATF (7 a, b) MW (8 a, b, c) Two Stroke (10 a, b, c)	Marine (4 e, f, g) Gear Oils (6 a) Metalworking Fluids (8 d, e)
Zinc Containing Engine Oils (4 a, b, d, h)	Zinc Free Industrial (2 a, b, c, d, e, f, g, h, i, j) Zn Free EOs (5 a, b) Metalworking Fluids (8 a, b, c, d, e) Water Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Containing Industrial (3 a, b, c) Engine Oils (4b, d, h) Gear oils (6 c) ATF (7 a, b)	Engine Oils (4 a) Marine (4e, f, g) Gear oils (6 a, b) Two Stroke (10 a, b, c)
Marine Oils (4 e, f, g)	Zinc Free Industrial (2 a, b, c, d, e, f, g, h, i, j) Zn Containing Ind (3 a, b, c) Zn Free EOs (5 a, b) Metalworking Fluids (8 a, b, c, d, e) Water Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Engine Oils (4 a, b, d, h) Marine (4 e, f, g) Syn Gear Oils (6 c) ATF (7 a, b) Two Stroke (10 a, b, c)	Gear Oils (6 a, b)
Zinc Free Engine Oils (5 a, b)	Zinc Free Industrial (2 a, b, c, d, e, f, g, h, i, j) Metalworking Fluids (8 a, b, c, d, e) Water Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Containing Industrial (3 a, b, c) Engine Oils (4 a, b, d, h) Marine (4 e, f, g) Zn Free EOs (5 a, b) Syn Gear Oils (6 c) ATF (7 a, b) Two Stroke (10 a, b, c)	Gear Oils (6 a, b)

EP Gear Oils (6 a)	PAG Synthetic Industrial Oils (2f,2h) Engine Oils (4 h) Metalworking Fluids (8 a, b, c, d, e) Water Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Free Industrial (2 a, b, c, d, e) Zinc Containing Industrial (3 a, b, c) Engine Oils (4 a, b d, h) Marine (4 e, f, g) Zn Free Engine Oils (5 a, b) Synthetic Gear Oils (6 b , c) ATF (7 a, b) Two Stroke (10 a, b, c)	Gear Oil (6 a)
Gear Oils (6 b, c)	Zinc Free Industrial (2 a, b, c, d, f, g, h, i, j) Metalworking Fluids (8 a, b, c, d, e) Water Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Containing Industrial (3 a, b, c) Engine Oils (4 a, b, d, h) Zn Free EOs (5 a, b) ATF (7 a, b) Two Stroke (10 a, b, c)	Marine (4 e, f, g) Gears (6 a, b, c)
ATFs (7 a, b)	Zinc Free Industrial (2 a, b, c, d, f, g, h, i, j) Metalworking Fluids (8 a, b, c, d, e) Water Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Containing Industrial (3 a, b, c) Engine Oils (4 a, b d, h) Zinc Free Engine Oils (5 a, b) Synthetic Gear Oil (6 c) ATF (7 a, b) Ashless Two Stroke (10 c)	Marine (4 e, f, g) Gears (6 a, b) Two Stroke (10 a, b)
Neat Metalworking (8 a, b, c, d, e)	Any bp product other than other Family 8	Metalworking Fluids (8 a, b, c, d, e)	
2-Stroke Oils without diluent (10 a)	Zinc Free Industrial (2 a, b, c, d, f, g, h, i, j) Metalworking Fluids (8 a, b, c, d, e) Water Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Containing Industrial (3 a, b, c) Engine Oils (4 a, b d, h) Synthetic Gear Oil (6 c) ATF (7 a, b) Two Stroke (10 a, b, c)	Marine (4 e, f, g) Zinc Free Engine Oils (5 a, b) Gears (6 a, b)
2-Stroke Oils with diluent (10 b and c)	Zinc Free Industrial (2 a, b, c, d, f, g, h, i, j) Engine Oils (4 a, b, d, h) Metalworking Fluids (8 a, b, c, d, e) Water Soluble (11 a, b, c) Aqueous (12 a, b, c) OEM/FF Driveline (13h) Solvent based (16 a, b, c)	Zinc Containing Industrial (3 a, b, c) Marine (4 e, f, g) Zinc Free Engine Oils (5 a, b) Synthetic Gear Oil (6 c) ATF (7 a, b)	Gear Oil 6 a, b) Two Stroke (10 a, b, c)
OEM/ FF Driveline (13 h)	Zinc Free Industrial (2 a, b, c, d, f, g, h, i, j) Engine Oils (4 h)	Zinc Containing Industrial (3 a, b, c) Engine Oils (4 a, b d)	Marine (4 e, f, g)

	Metalworking Fluids (8 a, b, c, d, e) Water Soluble (11 a, b, c) Aqueous (12 a, b, c) Solvent based (16 a, b, c)	Zn Free Engine Oils (5 a, b) Gear Oils (6 a, b, c) ATF (7 a, b) Two Stroke (10 a, b, c) OEM FF Driveline (13 h)	
Hydraulic System Fluids – Subsea oil based (18a)	Any bp product except 18a	Hydraulic System Fluids – Subsea oil based (18a)	
Hydraulic System Fluids – Other (18b)	Any bp product except 18b	Hydraulic System Fluids – Other (18b)	
Coolants (19)	Any bp product except family 19		Coolants (19)
Greases (21)	Any bp product		

Key:

PAG – Poly Alkylene Glycol

PAO – Poly Alpha Olefin

ATF - Automatic Transmission Fluid

OEM - Original Equipment Manufacturer

EP - Extreme Pressure

APPENDIX 3 - VISUAL PACKAGING GUIDELINES

As a supplier of top tier lubricants bp packaged product shall be sold in good condition, uncrushed, unsoiled, and free from large dents, rust or dirt that may detract from the products presentation. Product not sold in good condition can impact on the quality and damage bp's reputation.

A copy of the Visual Standards for finished product may be obtained from the bp representative.

The visual standards apply to all packaged product:

- Intermediate Bulk Container - 1000 litres (265 US gallons)
- Drums - Approximately 200 litres (53 US gallons)
- Pails - 20 litres (5 US gallons)
- Bottles
- Cartons
- Labels
- Pallets

A. Intermediate Bulk Containers

There are requirements for the frame and bladder as follows

IBC and Bladder requirements

- All IBCs shall be structurally sound
- All IBCs shall be a hollow tube type
- All bars, tubes and supports shall be visually straight
- The pallet base shall be complete with all supporting sections present
- The pallet shall be accessible by fork lift on four sides
- The pallet shall be constructed from metal or plastic materials
- The pallet shall be free from any sharp protruding objects with the potential to damage the bladder
- The pallet shall not be damaged in any way
- A minimum of 2 label panels shall be fitted to each IBC. One shall be above the outlet valve and the other on the opposite side

Pic 1: An example of an acceptable IBC



Pic 2: An example of a damaged pallet - **Not acceptable**



Pic 3: An example of a good labels



- The IBC shall be free of all labels except hazard labels, product labels and the supplier quality inspection and barcode labels.
- Three barcodes are to be fitted to every IBC. Two shall be fitted to the label panels. One shall be hidden, typically beneath the pallet.
- The IBC shall be free from any other external marking such as spray paint or marker pen on the frame or bladder
- Excessive structural rust is not acceptable
- Patches of surface rust larger than 25mm (1 inch) in their longest dimension is not acceptable. Rust shall not cover more than 5% by visual assessment of the surface of the IBC frame.

Pic 4: Rust is less than 25mm (1 inch) - acceptable



Pic 5: Rust is longer than 25mm (1 inch) - **Not acceptable**



Bladder requirements

- Manufactured from High Density Poly Ethylene (HDPE)
- 1000 litre capacity (265 US gallons)
- An outlet valve fitted to the base of the IBC
- A fill cap in the top, either 150mm or 225mm diameter
- The bladder shall not have large dents
- The fill cap and outlet valve shall be free from all contaminants

Pic 6: An example of a dented bladder - **Not acceptable**



Pic 7: No visible discolouration on a clean paper towel when wiped against the inside surface



- The outlet valve should be a ball, piston or butterfly valve, fitted with a male camlock adaptor
- Where female camlock adaptors are used as dirt caps they shall be attached to the frame using a cable
- The outlet valve shall be fitted with tamper evidence protection and a dirt cap. The outlet valve shall not protrude outside of the frame
- Fill caps shall be breather type
- Fill caps shall have tamper evident lugs

B. Drums

Drums can have varying volume capacities (approximately 200-209 litres or 53-55 US gallons). They can be made of steel or plastic. Re-conditioned drums may be used where approved.

The visual requirements relate to dents, paint removal, cleanliness and rust (for steel drums). See Part E below for labelling.

Dents

Dents covering greater depth of 5mm are **not acceptable** as indicated in the picture below.

Pic 8: Dents on drum



Pic 9: Drums that are not acceptable due to dents



Paint Removal

Drums with paint removed is not acceptable.

Pic 10: Paint removal.



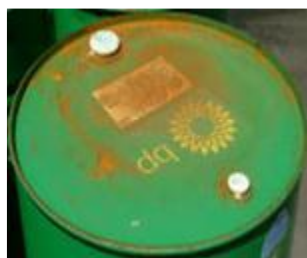
Rust

Examples of excessive rust, **not acceptable**

Pic 11: Rust on drum



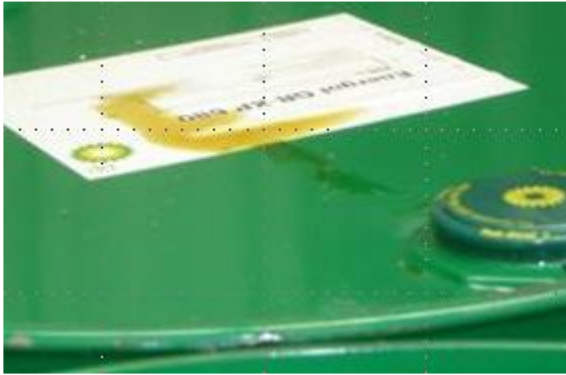
Pic 12: Rust on drum



Dirt and Oil on Drum

Any oil or dirt on the drum requires cleaning off, examples below.

Pic 13: Oil on drum



Pic 14: Dirt on drum



C. Pails

Pails are approximately 20 litres and can be plastic or metal. Issues of paint removal, cleanliness and rust (for metal pails) are similar as for the larger drums except for dents. Major dents are not acceptable as indicated in the picture below

Pic 15: Major dents – **Not acceptable**



D. Bottles and label defects

- If labels are present on the bottles then make sure they are centered, legible, clean and crease free.
- Ensure bottle is free from dents, scratches, cuts or other damage.
- No streaking of any colour should be present.

- No flash on handle or threading.
- The pictures below illustrates the main defects for bottles.

Pic 16: Examples of label and bottle defects



E. Cartons

Quality issues for cartons relate to leaks, damage and cleanliness as indicated in the pictures below

Wet Carton

Wet cartons due to water or leaks from packs inside are not acceptable

Damage

Damage to cartons or the bottles inside in cartons are **not acceptable**

Owned and approved: David Williamson

Version 4.0
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Pic 17: Damaged cartons



Pic 18: Damaged cartons and packaging



Cleanliness

Dirt on packaging shall be cleaned.

F. Labelling

Labelling for all packages, IBC, drums, pails and cartons shall be clean and legible. The following are not acceptable conditions

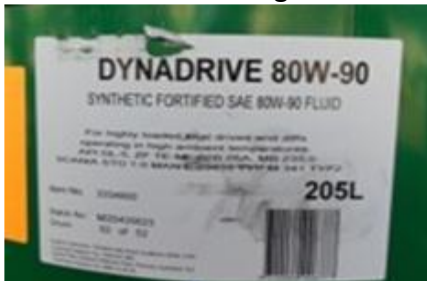
Pic 19: Label is illegible



Pic 20: Label is dirty or stained



Pic 21: Label is damaged



Pic 22: Handwritten information is not acceptable



APPENDIX 4 - DELIVERY VEHICLE PIPEWORK

It is a highly recommended practice to use dedicated pipe work as much as possible in local delivery vehicles. Manifold pipe work increases the potential for contamination of the bulk delivery therefore the volume of flush increases. A commonly used manifold pipe work design is shown below:



This design can add approximately 15 litres or more of additional flush volume or possible contamination to a delivery.

A better design is where the pipework for each compartment is directly connected to the meter. A short jump hose should be used to minimize contamination.

Having dedicated pipe work with a short jump hose will reduce flush and contamination of the delivered bulk product.

APPENDIX 5 - MAXIMUM WATER CONTENTS PER PRODUCT FAMILY

bp Product Family Classification	Product Family Description	Product Family	Water Content (Maximum, ppm)	Brand Examples
1	Heat Transfer and Transformer Oils		100	Perfecto HT
2 a-d	Zinc free Industrial oils	2a	200	Hyspin ZZ, Hyspin HVI, Alpha SP
		2b and 2c	500	Hyspin DSP
		2d	100	Perfecto T, Turbinol X
2e	Zinc free Synthetic Industrial oils (non-PAG containing)	Depending on product brand	200 - 500	Alphasyn EP
2f,2g,2h,2i,2j	Zinc free Synthetic Industrial Oils (PAG containing, PAO or Ester based, Synthetic Marine and Industrial Oils)	2f and 2h	2500	Alphasyn PG, Alphasyn T
		2g	200	Alphasyn EP Optigear Synthetic
		2i and 2j	500	Viscogen KL Tribol CH
3a-c	Zinc containing Industrial Oils	3a and 3b	200	Hyspin AWS, Hyspin HLP-D
		3c	100	Perfecto THZ

4	Zinc containing Engine Oils including Mineral and part Synthetic Engine Oils, Motorcycle Oils (2T and 4T), Gas Engine Oils and Marine System Oils	4a, 4b(i), 4b(ii), 4b(iii) and 4h	600	Magnatec, GTX, Edge, Vecton NG, Power 1 (4T), TLX Plus
4	Zinc containing Gas Engine Oils and Marine Oils	4d, e, f, and g	1000	Duratec M, CDX, MHP, TLX
5	Zinc free Engine Oils including 2T Marine cylinder oils, 4T gas Engine Oils	5a 5b	1500 1000	Cyltech RLX Super
6	Automotive Gear Oils including Powertrain Oils, UTTOs and STOUss	6a (i), 6a (ii), 6b and 6c	1000	Castrol Manual, Castrol Axle
7 and 13	Automatic Transmission Fluids (ATFs) including CVTFs and DCTFs		1000	Transmax DEXRON, Transmax MERCON
8	Neat Metalworking and Quenching Oils	8a to f	1000	Ilocut, Hyspray, Honilo, Variocut, Iloform, Rustilo 600 series, Iloquench
10	Engine Oils (2T and 4T)		600	Power 1 (2T)
11	Soluble Metalworking Fluids containing Mineral Oil		N/A contain added water	Hysol, Alusol
12	Aqueous-based Products (Mineral Oil free) including Aqueous Metalworking, Cleaners and Rust Preventives		N/A contain large amounts of added water	Syntilo, Rustilo Aqua, Techniclean HP or MP range Transaqua

16	Solvent based Fluids including Rust Preventives, Cleaners and Forming Oils		N/A as Karl Fischer not compatible	Rustilo DWX, Techniclean AX, Iloform PN
18	Hydraulic System Fluids 18a – Subsea oil based	18a	500	Brayco Micronic
19	Coolants	Concentrate	N/A - contain large amounts of added water	Radicool Radicool NF Radicool SF
		Pre-mixes		
21	Greases		1000	Spheerol LMN Spheerol AP

APPENDIX 6 - GLOSSARY

ACEA	European Automobile Manufacturers Association
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
ATF	Automatic Transmission Fluid
BoL	Bill of Lading
CCS	Cold Crank Simulation
CoA	Certificate of Analysis
CoC	Certificate of Conformance
CVTF	Continuously Variable Transmission Fluid
DCTF	Dual Clutch Transmission Fluid
EP	Extreme Pressure
FIFO	First In, First Out
FEFO	First Expired, First Out
FF	First Fill
FTIR	Fourier Transform Infra-Red
HDPE	High Density Polyethylene
HSSE	Health, Safety, Security and Environment
IBC	Intermediate Bulk Container
IP	Institute of Petroleum
ISO	International Standards Organization
MoC	Management of Change
OEM	Original Equipment Manufacturers
PAG	Poly Alkylene Glycol
PET	Poly-Ethylene Terephthalate
PPE	Personal Protective Equipment
PVC	Poly Vinyl Chloride
QMS	Quality Management System
SAE	Society of Automotive Engineers
SDS	Safety Data Sheet
SG	Specific Gravity
SPC	Statistical Process Control
STOU	Super Tractor Oil Universal
TBN	Total Base Number
UN	United Nations
UTTO	Universal Tractor Transmission Oils