

Specifications for TDI, Aniline, MTD, NB and OTD unwelded MS Drums – 19Kg

Part-1 : Technical :

A. Technical Specification :

- M.S. un-welded Barrels Grade-A (Type-II) as per IS-1783(Part 1): 2014 including latest amendments.
1. Capacity of drum: Minimum gross capacity of the drums measured with water at ambient temperature shall be 210 liter.
 2. Dimensions of drum: For TDI, Aniline & Nitrobenzene Drums, dimension & construction shall be as per Figure-1. For MTD & OTD Drums, dimension & construction shall be as per Figure-2.
 3. Material of Construction for drum: The body and ends of drum shall be made from cold rolled carbon steel sheets conforming to Grade CR1 or CR2 (old grades "O" or "D") of IS 513:2008. The nominal thickness of steel sheets for body & ends of drum shall be 1.0 mm & 1.2 mm, respectively.
 4. Construction of drum:
 - a. The sheets shall be blanked & formed to shape. The blanks shall be free from cracks, rust, dents, pitting & any other defects.
 - b. Vendor may give alternate design of hoops like "W" bead instead of shown in Figure 1 & 2.
 - c. The vertical seam joint for the body of the drum shall be exactly in the center of the two closures provided on the top cover of the drum.
 - d. The body shall be continuously resistance welded as to provide airtight joint. The top & bottom ends shall be seamed to the body as shown in Figure 1 & 2. The seam shall have rolled 7 layers of sheets with sealing compound forming core at the joint of body and end sheets. The sealing compound forming the core shall be flexible and chemically resistant to the product to be packed i.e. TDI, Aniline, MTD, NB and OTD as the case may be.
 5. Closure for TDI, Aniline & NB drum: The drum shall be fitted with two screwed closures, one of 50 mm and the other of 20 mm diameter. Only "TRI-SURE" or "TITE SEAL" make closures shall be used. Closure of any other make shall not be acceptable to GNFC. The position of the closures shall be as shown in Figure-1. Closures should have EPDM Gasket.
 6. Closure for MTD & OTD drum: The drums shall be fitted with two screwed closures, each of 50 mm size in diameter. Only "TRI-SURE" or "TITE SEAL" make closures shall be used. Closure of any other make shall not be acceptable to GNFC. The position of the closures shall be as shown in Figure-2. Closures should have EPDM (or PP if specifically asked by GNFC) Gasket.
 7. Color of cap seals should be white, with GNFC logo in Light Orange Color (Shade No. 557 under Red & Orange Head as per IS 5:1994) as indicated in Figure-3. 10% extra cap seals shall be required without any extra cost for both closures. Finish: The drum shall be in clean conditions, the inside being totally free from rust, water droplets, foreign matter and sheet burning and excessive oil.
 8. Colour: Supplier shall use make of paint of GOODLASS NEROLAC/BERGER/ASIAN PAINTS only. The shades shall be as per the number specified in IS document for paint shades named below:
 - a. For TDI drum: TDI barrels should be painted with Cherry Red color. Color shade

No. is RAL 3005. Colour shade sample will be given by GNFC to suppliers. The shade shall match exactly with the sample. Our TDI-II Dahej plant uses fully automatic drumming machine where glossy paint surface creates problem in function of the machine. Hence, supplier shall take necessary care to avoid such problem of painting quality.

- b. For Aniline drum: Aniline barrels should be painted with Golden Yellow color having shade equivalent to Shade No. 0313 of Asian Paints.
 - c. For MTD drum: MTD barrels should be painted with Bottle Green color having shade equivalent to Shade No. 0205 of Asian Paints.
 - d. For Nitrobenzene (NB) drum: NB barrels should be painted with Golden Brown color having shade equivalent to Shade No. 0413 of Asian Paints.
 - e. For OTD drum: OTD barrels should be painted with Black color.
9. TDI, Aniline & NB barrels shall be painted with Stove Enamel Paint. Paint drying is to be done with oven, preferably conveyORIZED oven having precise temperature controls, at minimum temperature of 120 °C. The paint thickness should be 25 microns to 35 microns. The paint shall be as per IS-101.
 10. MTD & OTD barrels shall be painted with Stove Enamel Paint. Paint drying is to be done with oven, preferably conveyORIZED oven having precise temperature controls, at minimum temperature of 150°C. As the MTD & OTD barrels are filled with material that is having a temperature of about 140°C, the quality of paint used must be able to resist this temperature. The paint thickness should be 25 microns to 35 microns. The paint shall be as per IS-101.
 11. Tare Weight for drum: Tare weight of each drum (for all above mentioned category) should be minimum 19.0 kg (No negative tolerance) in painted condition irrespective of tolerances given for sheet thickness in IS-513: 2008.
 12. Supplier shall obtain IMDG (UN No) certificate for each product from Indian Institute of Packaging (IIP). Supplier shall submit valid certificate for drum before start of the supply of drum to GNFC and screen print UN No on each drum as specified in the certificate. In case at the time of dispatch of barrels the balance validity of your UN certificate is less than 3 months, you will invariably submit us extension of the same UN certificate for further 6 months, before the validity of the original certificate gets expired.
 13. The drums shall be supplied wrapped in corrugated brown paper sheet/HDPE bags.
 14. GNFC will provide details like size & type of stickers of printing matter. Supplier has to provide and paste the stickers with adequate care and as per requirement of GNFC, on drum shell.
 15. Supplier shall carry out screen printing of cap seal as per Figure-3. Supplier shall screen print supplier name and batch number as per Figure-4. For example: if supplier name is AB Company and lot No is 001 then print shall be short name of company and lot number like "AC: 001" and for next lot number "AC: 002" then after continuously like this.

B. Inspection at Suppliers' works :

Barrels shall be tested in presence of GNFC inspector/GNFC appointed third party inspection agency prior to dispatch at supplier's works as per IS-1783(Part I) : 2014 for Grade – A, Type-2. Lot size shall be 200 barrels. Internal QC Department of barrel manufacturer shall inspect the lot before offering to TPI. Proper lighting arrangement should be ensured throughout the shade during inspection.

1. Visual Inspection :
 - a. The drum shall be in clean conditions, the inside being totally free from rust, water droplets, foreign matter, dark sheet patches, sheet burning, excessive oil

or any other manufacturing defect. If one rubs the surface with finger, no oil should stick to the finger. If they fail to meet these criteria, entire lot may be rejected.

- b. Quality of chime forming of top & bottom with the shell shall be uniform, smooth & continuous.

2. Leakage Test :

2.1. Pneumatic leak test – Fully immersed water bath tub method :

- a. Each drum (i.e. 100%) shall be tested at air pressure of 50 kPa (0.5Kgf/cm²_g) with the seams under water or covered with soap solution. The drum shall not show any sign of leakage or drop in test pressure when observed for at least 10 seconds. The test shall be carried out in dip tank with full immersion of drum in water and tank shall be adequately illuminated so that even minor leakage shall be noticed. Exact leakage location can be identified afterwards.
- b. If there is a leakage (even minor) found during leakage test, the drum shall be rejected. No repair is allowed.
- c. The air to be used for pneumatic testing shall be dry corresponding to (-20^o C) dew point minimum. The quality of the air shall be demonstrated during the inspection.

2.2. Helium Leak Test :

In lieu of above mentioned pneumatic leak test at 2.1, supplier may carry out 100% drum testing as per alternative methods described in clause No 9.1 (b) (Helium Leak Test- online / offline) of IS-1783(Part-1):2014, detailed as follows:

- a. Drums to be filled with Helium gas 2% of the drum volume i.e @ 4.2 litre and immediately to be closed by closure. Thereafter, drum to be moved to automatic helium leak detector machine having vacuum chamber and generates a vacuum of – 9 mBar at outside of the drum. Any leakage of Helium gas which comes out, shall be analysed by a Helium Leak Detector Unit in mass spectrometer.
- b. Hole size in sample calibration drum : Max 12 Micron
- c. Vacuum Pressure : - 9 ± 1 mBar
- d. Automatic helium leak detection machine shall be checked before start of actual drum testing by sample calibration drum with maximum hole size of 12 micron and shall be repeated after every 100 actual drum testing. Automatic helium leak detection machine shall be calibrated in such a way that sample drum shall be rejected.
- e. If there is leakage rate less than sample drum leak rate, such drums are passed by the machine and declared as acceptable drums. If leakage rate more than acceptable, the drum shall be rejected and no repair shall be allowed.

3. Drop Test :

- a. One drum from lot of 200 drums offered for inspection shall be subjected to drop test. Fill the barrel to 98 percent of its gross capacity with water at ambient temperature and close it properly. Suspend the barrel with diagonal in the vertical position and raise it to a height so that the lowest point on the drum is 1.80 m clear off the horizontal striking test surface. The striking surface shall be horizontally plain concrete floor or steel plate at least 40 mm thick. The drum shall be dropped in such a way that it strikes the floor at the bottom rim, at its junction with the side seam. The same drum shall be dropped so that it strikes the floor at the top rim at its junction with the side seam.
- b. The drum shall be examined for any leakage of water after the test. Any leakage of water shall indicate failure of the drum in the test.

4. Hydraulic Pressure Test:

One fresh drum from lot of 200 drum offered for inspection shall be subjected to a gradually applied hydraulic pressure of 200 kPa (2.0 Kgf/cm²_g). The pressure shall be maintained for at least 5 minutes and any leakage of water or drop in the pressure shall indicate failure of the drum in the test.

5. If the sample drum fails either in drop test or hydraulic pressure test, two more drums from the lot of 200 drums, offered for inspection, shall be taken for the test. These two drums shall be subjected to the test in which drum failed in initial testing. If any drum out of these two drums fails in repeat test, complete lot shall be rejected.
6. Following test shall be carried out for paint of Barrel as per IS 101 -1964 (latest amendment):
 - a. Scratch Hardness
 - b. Stripping Test
 - c. Thickness of paint to be applied on the Barrel shall be minimum 25 microns uniformly with maximum permissible limit of 30 microns.
 - d. Paint shade shall match with sample shade given by GNFC.
7. Printing matter stickers to be checked for proper pasting.
8. Third party Inspection agency shall fill all the inspection data as per inspection report format attached herewith.

C. Inspection of drums at GNFC site :

In addition to the inspection carried out by Third Party Inspection (TPI) agency/ GNFC at Vendor's works, inspection of barrels will be carried out on receipt of material at GNFC site. Site inspection and acceptance/ rejection norms are as follows:

1. Review / verification of Third Party Inspection (TPI) / GNFC inspection report to be carried out.
2. 10% barrels, of the lot received at site against each challan, will be selected at random by GNFC for inspection.
3. Visual inspection will be carried out in these 10% sampled barrels.
 - a. If no defect is observed, complete lot will be ACCEPTED.
 - b. If defects are observed in less than 10% barrels, of sampled barrels (i.e. 2 barrels in 20 sampled barrels of lot of 200 barrels), complete lot will be ACCEPTED barring defective barrels.
 - c. If defects are observed in more than 10% barrels, of sampled barrels, complete lot will be given for SEGREGATION.
 - d. After segregation by the vendor, again inspection will be carried out for 10% sampled barrels. Here lot size will be considered as number of barrels offered for inspection after removing defective barrels.
 - e. If defects are observed in less than 10% barrels, of sampled barrels, complete lot will be ACCEPTED barring defective barrels.
 - f. If defects are observed in more than 10% barrels, of sampled barrels, again complete lot will be given for segregation and above procedure will be repeated.
 - g. Maximum 3 segregations will be allowed. After third segregation, if defects are observed in more than 10% sampled barrels, complete lot shall be REJECTED.

4. After each segregation, re-inspection is to be carried out by GNFC. Charges of Rs. 2000 will be deducted towards charges of re-inspection as follows.

Usage Decision Code	Description	Inspection Charges (Rs.)
AR1I (Re-Inspection)	Lot is accepted after First Re-inspection	2000
AR2I (Re-Re-Inspection)	Lot is accepted after second Re-inspection	4000
AR3I (Re-Re-Re-Inspection)	Lot is accepted after third Re-inspection	6000

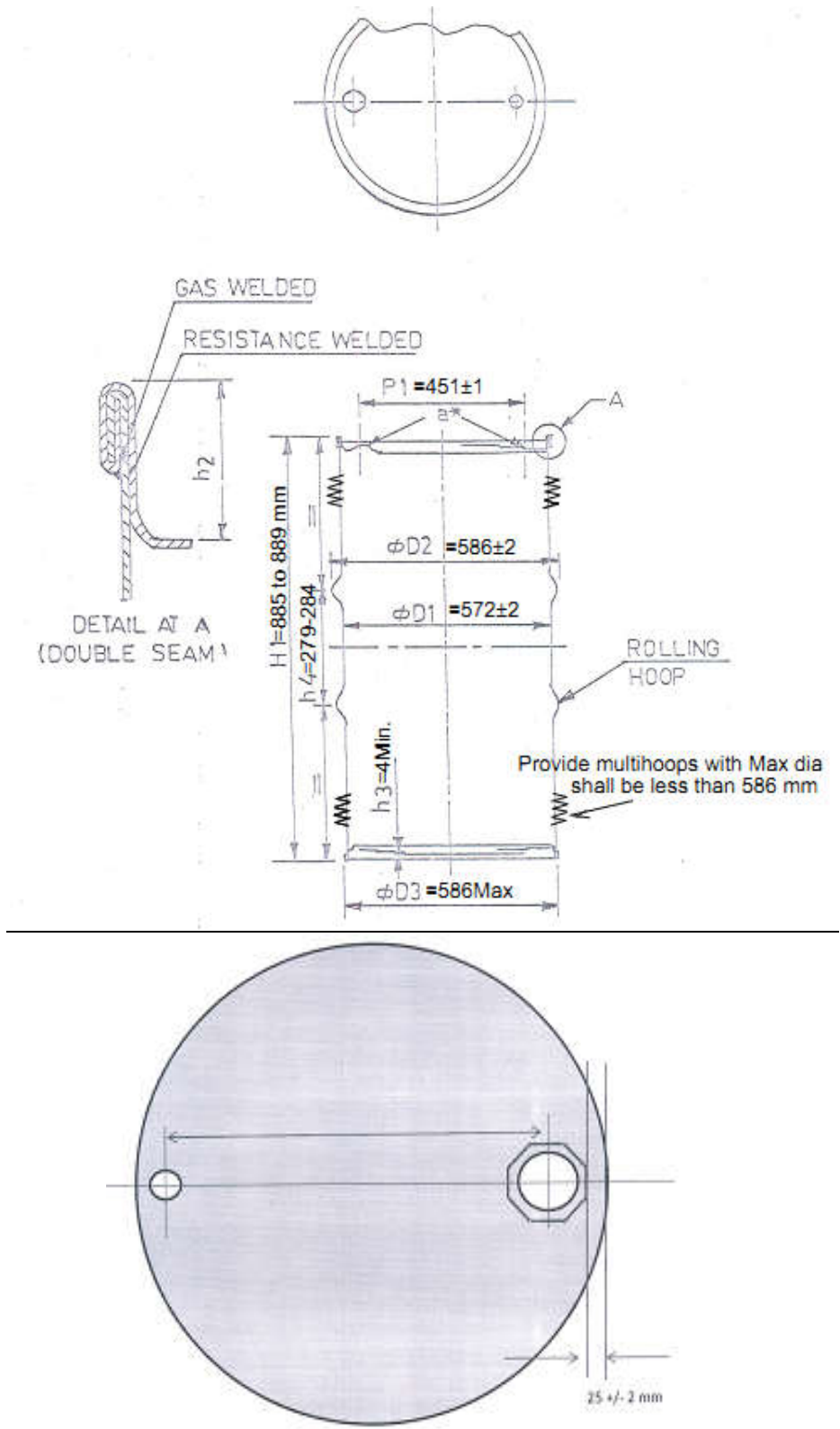


Fig 1 : Unwelded MS Drum for TDI, Aniline & Nitro Benzene (NB)

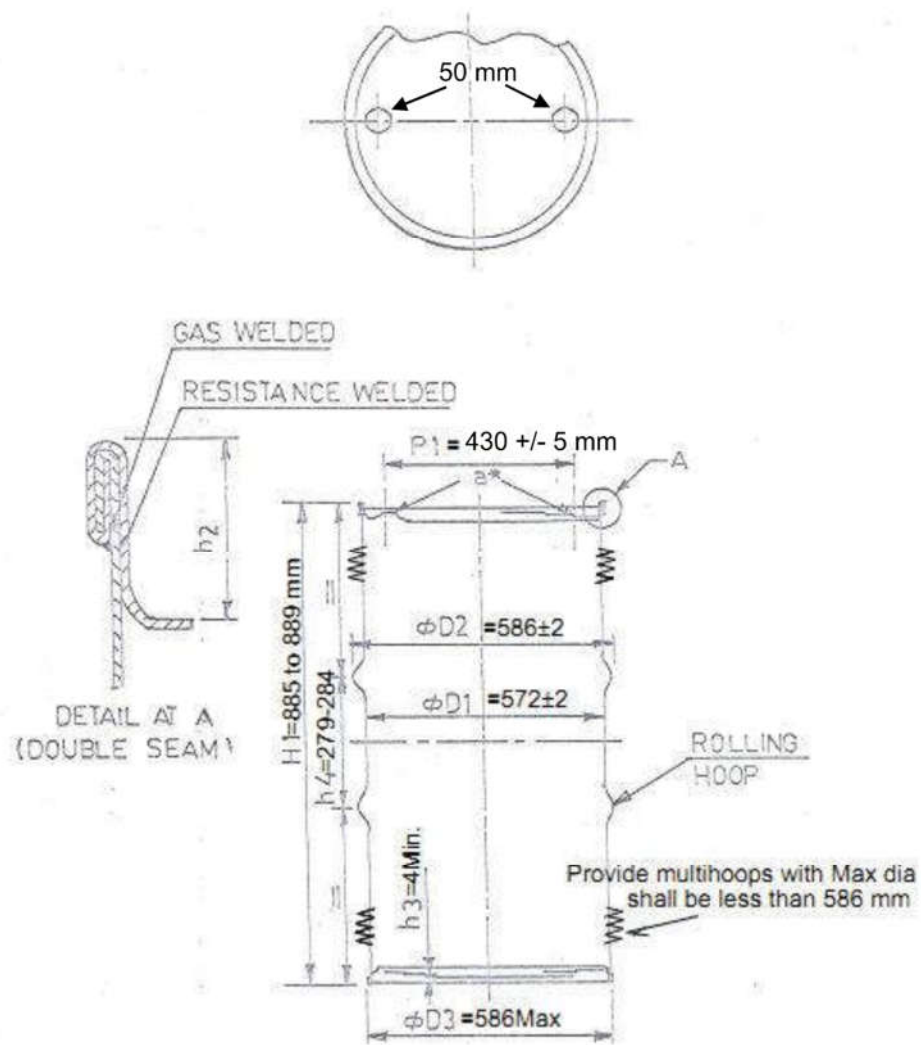


Fig 2 :Unwelded MS Drum for MTD & OTD

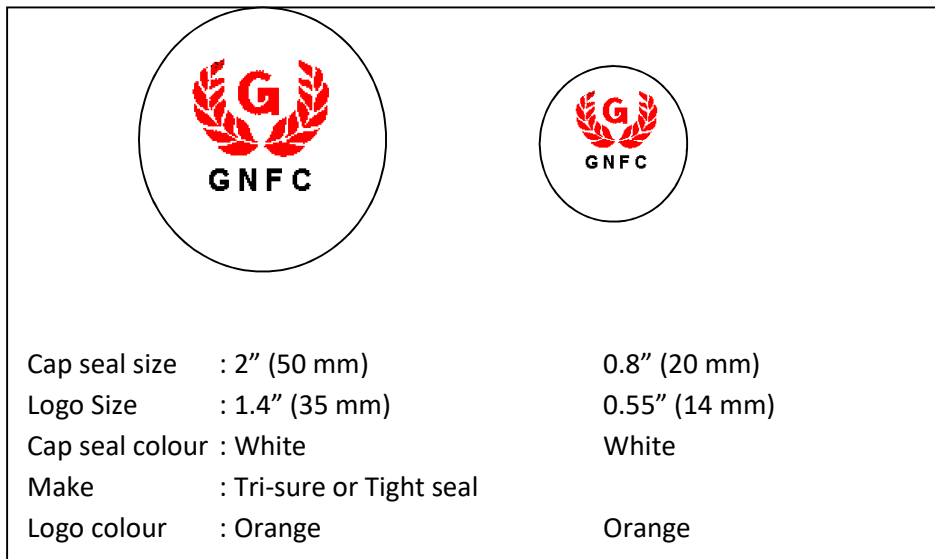
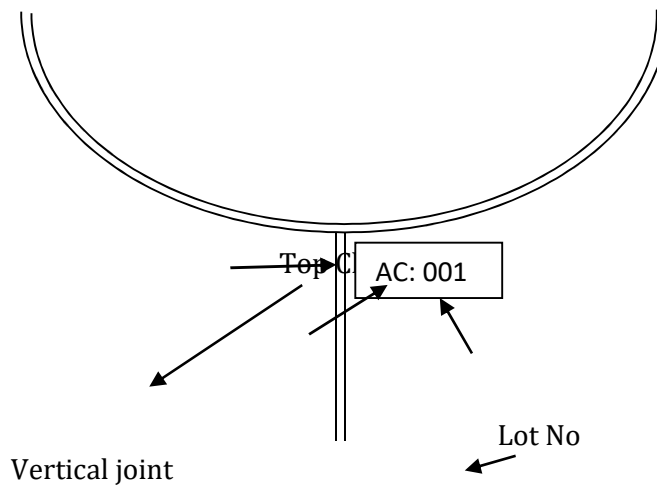


Fig 3 : Printing matter & detail of cap seal



Company's short name

Size of block shall be 4" x 2"
 Supplier & batch identification
 e.g. AB Company – batch 001

Fig 4: Supplier's Logo & Lot No Printing

INSPECTION REPORT OF MS BARRELS FOR TDI / ANILINE /MTD / NB / OTD

Report No	:		Date of Inspection	:	/	/	2020
Manufacturer	:		File No.	:			
Customer	:	M/s. Gujarat Narmada Valley Fertilizers & Chemicals Limited					
PO No.	:		PO Date	:			
PO Quantity	:	Nos.	Qty offered for inspection	:	Nos.	Lot No.	:


Parameters	Testing Criteria/ Specified Value	Sample Size		Accept (Nos.)	Reject (Nos.)	Readings/ Remarks
		(Spec)	(Actual)			
Physical/ Dimensional Inspection :						
Visual Check	General & inside with light	100 %				
Weight	Minimum 19.0 kg (No Negative tolerance)	10%				
Overall Height	885 to 889 mm	10%				
Depth of top& bottom	Chime height 17 ± 2 mm	10%				
	bung with cap seal lower than chime					
Drum Diameter	572 ± 2 mm	10%				
Diameter at hoop	586 ± 2 mm	10%				
Hoop Distance	279 ~ 284	10%				
Bung Distance	451 ± 1 mm	10%				
	430 ± 5 mm (MTD/OTD)					
Closure Size	50 mm & 20 mm	10%				
	50 mm & 50 mm (MTD/OTD)					
Closure	Tri-Sure /Tight Seal Make	100%				
Gaskets	Only EPDM	100%				
Vertical Seam Position	150 mm on either side of center	100 %				
Capacity	210 liter	1 No.				

Testing :						
Leakage Test	Pneumatic	0.5Kgf/cm^2_g	100 %			
	Helium	$-9 \pm 1 \text{mbar}$, Hole 12μ , 4.2 litre He				
Hydrotest		2.0Kgf/cm^2_g for 5 minutes	1 No.			
Drop Test 1.8 M height at Diagonal		Bottom Rim	1 No.			
		Top Rim (Same Drum)				

Paint Inspection :						
Scratch Hardness Test			1 No.			
Stripping Test			1 No.			
Thickness		on Top (25~35 Microns)	10%			
		on Shell (25~35 Microns)	10%			
		on Bottom (25~35 Microns)	10%			
Barrel Colour			10%			
Printing Matter	GNFC Stickers		10%			

Document Verification :						
		Document No	Equipment Sr No			Remark
		Test Certificate of CRCA sheets				
		Internal test certificate of supplier				
		Pressure Gauge				
		Temperature Gauge				
		Weighing Scale				
		Coating thickness Gauge				
		IIP Certificate Valid Upto				
		UN No as per IIP Certificate				

Overall Remarks : Lot is ACCEPTED / REJECTED. Final Accepted Qty : _____ Nos

Inspection Identification mark : Barrels are marked on top surface of barrels the small / big closure as  And painted withpaint	TPI LOT NO. TPI Stamp Sign of Inspector	Supplier Lot No. Sign & Stamp of Supplier
Dispatch Clearance: Based on the above inspection, M/s is advised to dispatch the accepted barrels (Nos.) to M/s GNFC under proper protection & care, along with this report and copies of relevant TCs		Name of Inspector Inspection Agency