



Heat Exchanger Group
BHEL Bhopal

STANDARD QUALITY ASSURANCE PLAN
ITEM CS HOT DIP GALVANIZED FASTENERS
(BOLTS, NUTS & STUDS)

QAP No.	CDE-15-3079
Revision No.	04
Date of Issue	05.05.17
Page	1 of 3

S.No.	Components & Operations	Characteristics	Class	Type of Check	Quantum of check	Reference Document	Acceptance Norms	Format of Records	Agency			Remarks
1	2	3	4	5	6	7	8	9	1	2	3	11
1.0 MATERIAL INSPECTION												
1.1	Verification of go-related Mill Test Certificates - MTCs of rolled / forged bars	Chemical composition (Heat / Product Analysis) Properties. UT of Bar (for M42 size and above) Heat Treatment (if applicable) as per the specification	Major	Visual	100%	BHEL Drg/Doc.	BHEL Drg/Doc.	MTC	V	V	V	• See Note-1 • In case mention of UT is not there in the MTC, 100% UT to be done at vendor's works out of which 10% to be witnessed by BHEL-IA
1.2	Physical verification of stock – used.	Verification of bar Diameter of bar used	Major	HT	100%	Material Spec.	Material Spec.	MTC	V	V	-	
2.0	IN PROCESS : After cut to length, forming, thread machining / rolling.											
2.1	Heat Treatment (if required to meet the mechanical properties) followed by Hot Dip Galvanizing (HDG)	Temp & time	Major	Visual	100%	Material Specn as called in BHEL Drg/Doc.	Material Specn as called in BHEL Drg/Doc.	HT Data / Chart	P	V	-	• HT is NA for Cl. 4, 8 and below. • HDG to be carried out as per IS-1367 Part-XIII.
3.0	FINISHED PRODUCT INSPECTION											
3.1	Dimensional conformity	Size of fasteners, galvanizing coating thickness , etc.	Major	Visual + Gauge	100%	As per BHEL Drg./ Doc.	As per BHEL Drg./ Doc.	IR	P	W	-	• 10% at random of each size to be witnessed by BHEL-IA. • See Note-2 & 9
3.2	Test on Finished Product Sample (See Note-4)	Product (chemical) analysis Mechanical analysis after galvanizing .	Major	As per Specn	See remarks column	BHEL Drawing / Document	As per cl. 6.0 of specn no. CDE-09-3255	Lab TC	P	V	-	• For sample size, refer cl. 6.0 of specn. No. CDE-09-3255
			Critical	Lab Test				IR	P	W	-	

Alpha 10/17
15/5/17

05.05.17

05.05.17



Heat Exchanger Group

BHEL Bhopal

STANDARD QUALITY ASSURANCE PLAN

QAP No. CDE-15-3079

Revision No. 04

ITEM CS HOT DIP GALVANIZED FASTENERS

(BOLTS, NUTS & STUDS)

Date of Issue 05.05.17

Page 2 of 3

S.No.	Components & Operations	Characteristics	Class	Type of Check	Quantum of check	Reference Document	Acceptance Norms	Format of Records	Agency			Remarks
									1	2	3	
1	2	3	4	5	6	7	8	9	10			11
3.3	Surface finish and surface integrity	- Coverage of entire surface. - Finish - Coating thickness on flat surface	Major	Visual	100 %	See remarks	See remarks & BHEL Drg.	--	P	W*	-	* 10% at random from each size to be witnessed by BHEL-IA for physical condition and proper assy (if applicable). • See Note-8.
3.4	Marking	For identification	Minor	Visual	100%	Ref. Cl.10.0 of BHEL Spec. CDE-09-3255	Ref. Cl.10.0 of BHEL Spec. CDE-09-3255	IR	P	W*	-	(*) 10% at random (selected by IA) of each size to be witnessed by BHEL-IA.
3.5	Packing and dispatch	Verification of all T.C.s for completeness	---	Visual	100%	PO, Spenn. Drg. & QAP	CDE-09-3255 cl.9	IR	P	V	V	
		Protection & Packing	---	Visual	100%	As per Cl.8.0 of BHEL Spec. CDE-09-3255	As per Cl.8.0 of BHEL Spec. CDE-09-3255	IR	P	-	-	

LEGEND :

1: Fastener Supplier, 2: BHEL-IA, 3: Customer (NTPC/NPCIL/BHEL-HWR/other if any) / Customer's IA: P-Perform, W-Witness, V-Verification, HT : Heat Treatment, MTC : Mill test Certificates/ Material Test Certificate, TCR : Test Certificate Report, IR : Inspection report, IA : Inspection Agency, I : Instrument to be used for check, HP : Hold point.



Heat Exchanger Group

BHEL Bhopal

STANDARD QUALITY ASSURANCE PLAN

QAP No. CDE-15-3079
Revision No. 04

ITEM

CS HOT DIP GALVANIZED FASTENERS
(BOLTS, NUTS & STUDS)

Date of Issue 05.05.17
Page 3 of 3

S.No.	Components & Operations	Characteristics	Class	Type of Check	Quantum of check	Reference Document	Acceptance Norms	Format of Records	Agency	Remarks
1	2	3	4	5	6	7	8	9	10	11

Note

- 1) In the absence of original correlated MTC, material to be tested for chemical test at Govt. Approved Lab / BHEL TSD / manufacturer's lab having spectrometer. In presence of original co-related MTC : No testing is required, record of the same duly endorsed by BHEL-IA with respect to original one to be furnished. *In case of spectrometer for chemical testing, calibration by OEM is also acceptable.*
- 2) All instruments, Gauges, HT facilities etc shall be duly calibrated by NABL approved agency with valid calibration record. BHEL-IA to ensure the same during inspection. Name of HT agency to be mentioned in the IR.
- 3) Mechanical & chemical Testing to be carried out in Government approved lab / reputed lab using calibrated instruments / manufacturer's lab having calibrated instruments (duly approved by NABL / NABL appointed agency). *Traceable to NABL is not acceptable.*
- 4) No repair of thread is permitted. In case of any damage in the threaded area, same shall be rejected.
- 5) **Important Note** : Fasteners received at our works may be subjected to random sampling destructive test & other checks (e.g. mechanical, chemical, acid dipping / galvanized coating thickness / hammer test / knife test etc. to ensure proper galvanizing) at BHEL-TSD to ensure compliance as per drawing and specification requirements. Rejection if any shall be intimated to supplier for replacement.
- 6) Vendor to ensure use of latest issue/revision of drawing / Spec. before start of any manufacturing activities.
- 7) For conflict if any between this QAP and any other document, same need to be brought to the notice of BHEL for clarification/ confirmation..
- 8) Adhesion & mass of coating shall be checked on randomly selected samples (selected by BHEL-IA) as called in IS-1367 / IS-2633 and to be reported to BHEL along-with all inspection reports.
- 9) Items if supplied in assembled condition, checking with gauges is not required. **Assembly to be checked manually by hand for full threaded length of bolts / studs. Ensure proper fitment.**
- 10) **Studs and Bolts**
 - For total length 100mm and above : Tensile, Yield, Elongation, Hardness, etc.
 - For total length less than 100mm : Hardness only. Co-relation with tensile strength to be established and reported in the IR based on hardness achieved.
 - Nuts of size M39 and below : Proof load test and hardness on top / bottom face of nut.
 - Nuts of size above M39 : Hardness on top / bottom face of nut only. Co-related tensile strength to be established and reported in the IR based on hardness achieved.
 - In this case, proof load test shall be in the scope of BHEL.

Approval does not relieve manufacturer/vendor from meeting BHELs requirements as per the drawing / specifications.

Prepared by Alpa Toppo Sr. Engineer (D) CDE	Reviewed by Asnok Mahār Dy. General Manager (D) CDE	Approved by : S.K. Biswas. Sr. Dy. General Manager (D) CDE
---	---	--