TENDER SPECIFICATION

No: NO.CLW/ES/3/0508

ENCLOSURE

1.DRG NO. ---------

(i) CLW/ES/3/SK-1/0508
(2) CLW/ES/3/SK-2/0508
(3) CLW/ES/3/SK-3/0508
(4) CLW/ES/3/SK-4/0508
(5) CLW/ES/3/SK-5/0508

TOTAL NO: OF SHEETS

ALT	-			
Sheet	17			

SPECIFICATION

FOR

CONSERVATOR TANK FOR MAIN TRANSFORMER.

WAG-9 (Co-Co), ELECTRIC LOCOMOTIVES

ISSUED BY
DY.CHIEF ELECTRICAL ENGINEER/CON/TU
CHITTARANJAN LOCOMOTIVE WORKS
P.O. CHITTARANJAN, 713331
DIST. - BURDWAN, WEST BENGAL, INDIA.

SPECIFICATION FOR CONSERVATOR TANK	DRN. 15/7/2000 SE	CHKD/REV SEE/D&D	D & D CENTRE CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA
	APPROVED BY 15/7/2000 DY.CEE/CON/TU-I		DATE: - 15/7/2000. NO: CLW/ES/3/0508
			ALT

ALTERATION RECORD SHEET

Amendment No.	Date of Amendment	Page No.	Alteration	Reason	Authority

SPECIFICATION FOR CONSERVATOR TANK	DRN. 15/7/2000 SE	CHKD/REV SEE/D&D	D & D CENTRE CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA
	APPROVED BY 15/7/2000 DY.CEE/CON/TU-I		DATE: - 15/7/2000 NO: CLW/ES/3/0508
			ALT

INDEX

SPECIFICATION FOR CONSERVATOR TANK	DRN 15/7/2000 SE	CHKD/REV SEE/D&D	D & D CENTRE CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA
	APPROVED BY 15/7/2000 DY.CEE/CON/TU-I		DATE: - 15/7/2000 NO: CLW/ES/3/0508
			ALT

SPECIFICATION FOR CONSERVATOR TANK

1. SCOPE: -

This specification applies to CONSERVATOR TANK for 3-Phase, 6000 HP WAG-9 class locomotive for 25 kV AC 50 Hz system.

2 Climate and Environment conditions:

* Maximum Atmospheric temperature: Under Sun: 70°C in shade : 50°C
* Humidity :100% saturation during rainy season
* Reference site conditions:

i) Ambient Temp. : Max.55°C min.0°C
ii) Humidity : 60%
iii) Altitude : 160 m above mean sea level
iv) Rain fall : Very heavy in certain areas. The locomotive will be designed to permit its running at 10 Km/hr in flood water level of 102mm above rail level.

* Atmosphere during hot weather: Extremely dusty and desertterrain in certain areas.
* Coastal area : Locomotive and equipment will be designed to work in coastalareas in humid and salt laden atmosphere
* Vibration : The equipment, sub-system and their mounting arrangement will be designed to with stand vibrations and shocks encountered in service as specified in corresponding IEC publications unless otherwise prescribed.

3. SCOPE OF SUPPLY & TECHNICAL DATA

This tank will be fitted on oil cooling unit, which is made of steel. Provision to protect from bimetallic corrosion has to be provided. Tenderer should quote for assembled tank as well as knocked down components so that assembly can be done in-house.

This conservator tank is for transformer which has the following ratings -

Rated Voltage : 25 kV AC, 50 HZ
Max. Operating voltage : 30 kV AC,50 HZ
Rated Current : 500 A.
Max. Operating current : 900 A.
The conservator tank is connected to main tank through neoprene hoses.

DESCRIPTION OF MATERIALS	IDENT. NO.	DRG. NO.	QTY./ LOCO	MATERIAL
Conservator Tank	HSTN205395R0065	CLW/ES/3/SK-1/0508	2	As per Drg. No. CLW/ES/3/SK-1/0508

The item is made of aluminium (details are given in Annexure-I). The material speciffication as adopted by ABB Secheron, OEM has been indicated in the drawing. The details of the part drg. will be given to the

SPECIFICATION FOR CONSERVATOR TANK	DRN. 15/7/2000 SE	CHKD/REV SEE/D&D	D & D CENTRE CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA
	APPROVED BY 15/7 DY.CEE/CON/TU-I		DATE: - 15/7/2000 NO: CLW/ES/3/0508
			ALT

successful tenderer. However, Tenderer can quote relevant Indian Standard with suitable justification The Tenderer should also indicate the details welding technique which will be adopted. Welding prescription as adopted by ABB Secheron, OEM is furnished below:

A) **Welding Process :**

i) MIG according to EN 288
Welding Wire: Alloy 4043/5356 1.2 mm
Protective Gas: Arghel 50/50 Monomix

ii) TIG according to EN 288
Welding Wire: Alloy 4043/5356 2.4 mm
Protective Gas : Helium, Argon

4. DOCUMENTS TO BE SUPPLIED BY THE TENDERER·

The tenderer shall interalia furnish the following in 3 copies along with the quotation.

i) Clausewise comments on the specification and test programme.
ii) Detailed drawings.
iii) Past experience with supporting papers (if any).
iv) Quality Assurance Programme.
v) Machinery & Plant for such job

5 TECHNICAL DOCUMENTS TO SUPPLIED BY THE SUPPLIER:

The following documents shall be supplied by the supplier as a part of the contract.

i) Type test reports - 10 copies
ii) Routine test reports alongwith each set - 4 copies.
iii) Maintenance manual - 20 copies.
iv) Detailed drawings - 6 copies.

6. TESTS:

The following type and routine tests shall be conducted regular order.

6.1	TYPE TESTS/CONSISTENCY TESTS	ROUTINE TESTS
6.1.1-	Checking dimensional details with respect to approved drg.	Same as in type tests.
6.1.2-	Checking quality of workmanship and their conformity with the standard specification	Same as type tests
6.1.3-	Vibrations test as per IEC 77	
6.1.4	Pressure test at 0.2 bar for 48 hrs.	Same as type tests
6.1.5	Test for Crack, Blow hole and porosity etc.	Same as type tests
6.1.6	Material composition test	---
6.1.7	Oil Leakage test	Same as type tests

7. QUALITY ASSURANCE:

Quality assurance should be as per ISO 9000. The Tenderer should confirm that the item is similar to the item which has been used for WAG-9 class of electric locomotives manufactured by M/S. ABB for Indian Railways.

SPECIFICATION FOR CONSERVATOR TANK	DRN. 15/7/2000 SE	CHKD/REV SEE/D&D	D & D CENTRE CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA
	APPROVED BY 15/7/2000 DY.CEE/CON/TU-I		DATE: - 15/7/2000 NO: CLW/ES/3/0505
			ALT

8. PAINTING:

Painting procedure adopted by ABB Secheron is also indicated below which should be followed:

a) Mechanical Cleaning: Grinding and polishing.
b) Chemical Cleaning: Thinner Silfa, Nr. 7684 ADR 3.3b
c) Corrosive Treatment: ALUPERL 1:10
d) **Primer:**
i) Primer: Biladur 2 KP Epoxid
Prodection GRD/GDA M040216-01
ii) Colour: Ral 6013
iii) Coat: 1 priming coat (for edges & corners 2 coats0
iv) Minimum 40 µm
v) Drying Time: Approx 2 hrs.
vi) Grain Size: < 30 µm

e) **TOP COAT:**
i) Top Coat: Novovern ACR 571.7, RAL 7009 Sdgl.
ii) Colour: Black/Grey
iii) Coat at C: 2 x
iv) Thickness: Min. 100 µm (Including Primer)
v) 1. Test: After 4 hrs.
vi) Grain Size: > 25 µm

f) **COAT THICKNESS: 130, 126, 183, 142, 109, 129 µm**

9. NOTE:

9.1 The tenderers can quote alternatively for Conservator tank made of steel with same outer dimensions and weight of 81.48 Kg.The thickness of steel may be selected accordingly .The tank will be filled with oil Shell Diala DX/Apar oil .Necessary protection to protect against corrosion may be provided and the details has to be indicated in the tender itself.

9.2 Tenderer should emboss their trade name, Year of Manufacture.

9.3 Tenderer should not change their sub-suppliers after prototype approved without prior permission of C-D&D.

9 4 OEM for this item is M/s NUSSBAUMER, Switzerland.

9.5 Tenderer should also indicate whether they have supplied such item to ABB Secheron or Adtranz for WAG-9/WAP-5 locomotive.

10. **REFRENCE**: The equipment used by M/s. ABB for WAG-9 class (Co-Co) electric locomotives is supplied by Nussbaumer, Bremgarten, Switzerland.

SPECIFICATION FOR CONSERVATOR TANK	DRN. 15/7/2000 SE	CHKD/REV SEE/D&D	D & D CENTRE CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA
	APPROVED BY 15/7/2000 DY.CEE/CON/TU-I		DATE: - 15/7/2000 NO: CLW/ES/3/0503
			ALT

ALUMINIUM SPECIFICATION

Composition chimique

Les composants d'alliages sont en caractères gras. Les valeurs en caractères ordinaires indiquent les teneurs maximales admissibles des autres éléments

Marque déposée Symbole[2]	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Autres éléments
Alliages non trempants									
...inium pur 99,5 ...5	0,25	0,40	0,05	0,05	0,05		0,07	0,05	0,03
...ium pur 99,0 Al99	0,50 + Fe ≤ 1,0	0,6 + Si ≤ 1,0	0,05	0,05	0,05		0,10	0,05	0,05
Aluman-100 AlMn1	0,50	0,7	0,10	0,9–1,5	0,30	0,10	0,20	0,10	0,05
Peraluman-100/101 AlMg1	0,30	0,45	0,05	0,15	0,7–1,1	0,10	0,20	0,05	0,05
Peraluman-226 AlMg2Mn0,3	0,40	0,50	0,15	0,10–0,50	1,7–2,4	0,15	0,15	0,15	0,05
Peraluman-300/301 AlMg3	**0,40**	**0,40**	**0,10**	**0,50 + Cr 0,10–0,6**	**2,6–3,6**	**0,30 + Mn 0,10–0,6**	**0,20**	**0,15**	**0,05**
Peraluman-260 AlMg2,7Mn	**0,25**	**0,40**	**0,10**	**0,50–1,0**	**2,4–3,0**	**0,05–0,20**	**0,25**	**0,20**	**0,05**
Peraluman-410/412 AlMg4Mn	**0,40**	**0,50**	0,10	0,20–0,7	3,5–4,5	0,05–0,25	0,25	0,15	0,05
Peraluman-460/462 ...g4,5Mn	0,40	0,40	0,10	0,40–1,0	4,0–4,9	0,05–0,25	0,25	0,15	0,05
Alliages trempants									
Extrudal-043 AlMgSi0,5	**0,30–0,5**	**0,10–0,30**	**0,10**	**0,10**	**0,35–0,55**	**0,05**	**0,15**	**0,10**	**0,05**
Anticorodal-053 AlMgSi0,5	0,45–0,6	0,10–0,30	0,10	0,10	0,45–0,6	0,05	0,15	0,10	0,05
Anticorodal-062 AlMgSi0,7	0,50–0,9	0,35	0,30	0,50 + Cr 0,12–0,50	0,40–0,7	0,30 + Mn 0,12–0,50	0,20	0,10	0,05
Anticorodal-080 AlMg1SiCu	0,40–0,8	0,7	0,15–0,40	0,15	0,8–1,2	0,04–0,35	0,25	0,15	0,05
Anticorodal-100[3] AlMgSi1	0,7–1,3	0,50	0,10	0,10–0,50	0,6–1,0	0,25	0,20	0,10	0,05
Anticorodal-110/112 AlMgSi1	**0,7–1,3**	**0,50**	**0,10**	**0,40–1,0**	**0,6–1,2**	**0,25**	**0,20**	**0,10**	**0,05**

PREPARD BY:- 15/7/2000

CHECKD BY:-

APPROVED BY:-

Caractéristiques physiques

Valeurs indicatives
Selon la composition et l'état précis, des valeurs légèrement en dehors de ces plages peuvent survenir

Marque déposée Symbole[2]	Etat Alusuisse	Poids spécifique	Module d'élasticité	Coefficient de dilatation thermique linéaire (20–100°C) (293–373 K)	Conductibilité thermique	Conductibilité électrique spécifique (20°C) (293 K)	Résistivité spécifique (20°C) (293 K)	Intervalle de fusion
			1000					
	Code	g/cm³	N/mm²	$\frac{1}{K} \times 10^{-6}$	$\frac{W}{m \cdot K}$	$\frac{m}{\Omega \cdot mm^2}$	nΩ · m	°C
Alliages non-trempants								
Aluminium pur Al99,0–99,5	tous	2,71	69	23,6	210–230	34–36	29–28	645–657
Aluman-100 AlMn1	tous	2,73	69	23,2	160–190	24–29	42–34	645–655
Peraluman-100/101 AlMg1	tous	2,69	69	23,8	185–200	29–31	34–32	630–650
Peraluman-226 AlMg2Mn0,3	tous	2,68	70	23,8	140–190	21–24	53–42	610–650
Peraluman-300/301 AlMg3	tous	2,67	70	23,8	130–140	19–21	53–49	600–645
Peraluman-260 AlMg2,7Mn	tous	2,69	70	23,6	110–130	16–19	63–53	600–645
Peraluman-410/412 AlMg4Mn	tous	2,66	71	23,8	110–125	16–18	63–56	590–640
Peraluman-460/462 AlMg4,5Mn	tous	2,66	71	23,8	105–120	15–17	67–59	580–640
Alliages trempants								
Extruda(-043 AlMgSi0,5	07 41 61	2,70	69	23,4	205–220 170–190 180–200	32–34 26–29 28–31	31–29 38–34 36–32	585–655
Anticorodal-053 AlMgSi0,5	07 41 61	2,70	69	23,4	205–220 170–190 180–200	32–34 26–29 28–31	31–29 38–34 36–32	585–650
Anticorodal-062 AlMgSi0,7	07 41 61	2,70	69	23,4	205–220 165–180 170–185	32–34 25–27 26–28	31–29 40–37 38–36	585–650
Anticorodal-030 AlMg1SiCu	07 41 61	2,70	69	23,6	190–215 145–165 150–170	29–33 22–25 23–26	34–30 45–40 43–38	585–650
Anticorodal-100[3] AlMgSi1	07 41 61	2,70	69	23,4	200–220 150–170 165–185	31–34 23–26 24–28	32–29 43–38 42–36	585–650
Anticorodal-110/112 AlMgSi1	07 41 61	2,70	69	23,4	195–215 145–165 150–170	30–34 23–27 24–28	34–30 45–40 43–38	585–650

PREPARD BY:- 15/7/2000

CHECKD BY:-

APPROVED BY:-

Caractéristiques technologiques

Valeurs indicative

Marque déposée Symbole[2]	Etat[3]	Résilience J/cm²	Limites d'endurance pour 10^7 alternances, N/mm² avec surface non-usinée Efforts alternés[15] R = –1	Flexions alternés[16] R = –1	Tractions répétées[17] R = ±0
Alliages non trempants					
Aluminium pur Al 99,5	01, 02, 95 24 18	> 100	– 30 40	– 40 50	– 60 80
Aluman-100 AlMn1	01, 02, 95 24 18	> 100	– 40 50	– 50 60	– 70 90
Peraluman-100/101 AlMg1	01, 02, 95 24 18	> 100	– 40 50	– 50 60	– 90 100
Peraluman-226 AlMg2Mn0,3	01, 02, 95 24 26	35	– 60 60	– 80 80	– 100 120
Peraluman-300/301 AlMg3	01, 02, 95 24 18	35	– 90 90	– 100 100	– 140 150
Peraluman-260 **AlMg2,7Mn**	**01, 02, 95** **22** **24** **26**	**35**	**–** **100** **100** **100**	**–** **110** **110** **110**	**–** **130** **140** **140**
Peraluman-410/412 AlMg4,5Mn	01, 02, 95 22	35	– 90	– 100	– 140
Peraluman-460/462 AlMg4,5Mn	01, 02, 95 22 24	35	– 100 110	– 110 120	– 140 150
Alliages trempants					
Extrudal-043[13] **AlMgSi0,5**	**61**	**10**	**70**	**70**	**100**
Anticorodal-053 AlMgSi0,5	41 61	– 10	– 70	– 70	– 100
Anticorodal-062[13] AlMgSi0,7	61	20	80	80	120
Anticorodal-080 AlMg1SiCu	07 41 61	– – 20	– – 80	– – 80	– – 100
Anticorodal-100[3] AlMgSi1	07 41 61	– – 20	– – 80	– – 90	– – 130

PREPARD BY:- 15/7/2000

CHECKD BY

APPROVED BY:- 15/7

Tableau de correspondance des matériaux

Comparaison des matériaux de marque Alusuisse avec les matériaux en alliages d'aluminium normalisés dans les différents pays. Les données indiquées concernent uniquement la composition. Les valeurs relatives aux caractéristiques de résistance mécanique doivent être demandées séparément! Autres matériaux conformes aux normes sur demande.

Répertoire des normes des matériaux:

Suisse	SN 210 900 (VSM)
Allemagne	DIN 1712 et 1725 partie 1
France	NF A 50-411 et A 50-451
USA	AA, Aluminum Association
Grande-Bretagne	BS 1470 à 1475
Italie	UNI 7427
ISO	209-1, 2779, 3335

Alusuisse Marque déposée	Suisse SN 210900	Allemagne DIN1712 et 1725 Nom	Numéro	resp. nouvelle NF, BS ansi que UNI
Alliages non-trempants				
uminium pur 99,5	Al99,5	Al99,5	3,0255	1050A
minium pur 99,0	Al99,0	Al99	3,0205	1200
.luman-100	AlMn	AlMn1	3,0515	3003/3103
Peraluman-100/101	AlMg1	AlMg1	3,3315	5005
Peraluman-226		AlMg2Mn0,3	3,3525	5251
Peraluman-300/301	AlMg3	AlMg3	3,3535	5754
Peraluman-260	**AlMg2,7Mn**	**AlMg2,7Mn**	**3,3637**	**5454**
Peraluman-410/412	AlMg4Mn	AlMg4Mn	3,3545	5086
Peraluman-460/462	AlMg4,5Mn	AlMg4,5Mn	3,3547	5083
Alliages trempants				
Extrudal-043	**AlMgSi0,45**	**AlMgSi0,5**	**3,3206**	**6060**
Anticorodal-053	AlMgSi0,5	AlMgSi0,5	3,3206	6060/6063
Anticorodal-062	AlMgSi0,7	AlMgSi0,7	3,3210	6005A
Anticorodal-080		AlMg1SiCu	3,3211	6061
Anticorodal-100[3]				6081
Anticorodal-110/112	**AlMgSi1Mn**	**AlMgSi1**	**3,2315**	**6082**
vional-100/102		AlCuMg1	3,1325	2017A
vional-150/152	AlCu4Mg1,5	AlCuMg2	3,1355	2024
Avional-156				2618A
Avional-662	AlCu4SiMn	AlCuSiMn	3,1255	2014/2014A
Unidur-102	AlZn4,5Mg1	AlZn4,5Mg1	3,4335	7020
Perunal-205/212		AlZnMgCu0,5	3,4345	7022
Perunal-215	AlZn6MgCu1,5	AlZnMgCu1,5	3,4365	7075
Super-Perunal-249				7049A
Métal pour conducteurs, non-trempant				
Aluminium pur 99,5E	E-Al99,5	E-Al	3,0257	1350
Alliages pour conducteurs, trempants				
Anticorodal-041				6101/6101B
Anticorodal-051	E-AlMgSi0,5	E-AlMgSi0,5	3,3207	6101A/6101B
Alliages de décolletage trempants				
Anticorodal Pb-109[3]	AlMgSiPb	≈ AlMgSiPb		≈ 6262
Avional Pb-118	AlCu4MgPb	AlCuMgPb		2007/2030
Decoltal-500	AlCu6BiPb	AlCuBiPb	3,1655	2011

[3] légères différences de composition

PREPARD BY: 15/2/2000

CHECKED BY

APPROVED BY:

Caractéristiques mécaniques: Tôles et bandes

Les caractéristiques mécaniques réalisables se situent entre les limites indiquées. Pour la résistance à la traction, la limite d'élasticité à 0,2% et l'allongement à la rupture, la limite inférieure indiquée correspond à la valeur garantie.

Si une malléabilité maximale est requise (pour des travaux de façonnage), la limite supérieure sera prescrite comme valeur maximale garantie pour la résistance à la traction et la limite d'élasticité à 0,2% des produits recuits

Marque déposée Symbole[2]	Etat[3]		Epaisseur[1][4]	Résistance R_m	Limite d'élasticité à 0,2% R_p 0,2	Allongement A_5	Dureté approx	Facteur f de pliage min.[14]
	Alusuisse	DIN	mm	N/mm²	N/mm²	%	HB	
Alliages non trempants								
Aluminium pur 99,5 Al99,5	01/02	W7	0,35–6,0	65– 95	20– 55	40	20	0,3
	01/02	W7	6,0 –25	65– 95	20– 55	35	20	–
	35	F8	5,0 –8,0	75–110	≥ 20	20	22	–
	24[5]	G11	0,35–10	110–150	90–145	9	35	1,0
	18	F15	0,35–6,0	≥ 150	≥ 130	3	45	2,2
Aluminium pur 99,0 Al99	01/02	W8	0,35–10	75–105	25– 60	40	22	0,5
	01/02	W8	10 –25	75–105	25– 60	30	22	–
	24	–	0,35–16	120–160	100–155	9	37	0,8
	18	F16	0,35–10	≥ 160	≥ 140	3	47	2,0
Aluman-100 AlMn1	01/02	W9	0,35–10	90–140	35– 80	24	28	0,6
	24[5]	–	0,35–16	140–180	110–170	8	45	0,8
	18	F19	0,35–2,5	≥ 185	≥ 165	3	55	3,0
Peraluman-100/101 AlMg1	01/02	W11	0,35–10	105–140	35– 90	24	32	0,6
	24[5]	G15	0,35–6,0	145–185	110–175	8	47	0,8
	26	G17	0,35–4,0	165–205	≥ 130	6	52	3,0
	18	F19	0,35–3,0	≥ 190	≥ 170	3	57	4,0
Peraluman-226 AlMg2Mn0,3	01/02	W16	0,35–6,0	155–200	60–120	20	45	0,5
	22	–	0,35–3,0	185–225	100–170	14	60	1,5
	24	G21	0,35–3,0	205–245	140–220	10	65	2,0
	26	G23	0,35–3,0	230–270	≥ 170	9	72	3,0
Peraluman-300/301[11] AlMg3	01/02	W19	0,35–6,0	190–230	80–160	20	50	0,8
	01/02	W19	6,0 –50	190–230	≥ 80	18	50	–
	98	durch Kaltverfestigung	5,0 –50	≥ 190	≥ 80	12	50	–
	95	F19	25 –50	≥ 190	≥ 80	12	50	–
	95	F21	5,0 –8,0	≥ 210	≥ 140	12	60	–
	22	G22	0,35–8,0	220–260	130–220	14	70	1,5
	24	G24	0,35–8,0	240–280	160–240	10	73	2,0
	26	G27	0,35–4,0	265–305	≥ 190	7	80	3,5
	18	F29	0,35–3,0	≥ 290	≥ 250	3	85	–
Peraluman-260 **AlMg2,7Mn**	**01/02**	**–**	**0,6 –25**	**215–260**	**100–180**	**17**	**55**	**1,0**
	95	**F22**	**4,0 –25**	**215–280**	**≥ 100**	**17**	**55**	**–**
	95	**F22**	**25 –50**	**≥ 215**	**≥ 100**	**12**	**95**	**–**
	22	**G25**	**4,0 –6,0**	**245–305**	**180–270**	**10**	**75**	**2,0**
	22	**G25**	**6,0 –8,0**	**245–305**	**180–270**	**8**	**75**	**–**
	24	**G27**	**4,0 –6,0**	**270–325**	**200–290**	**9**	**85**	**2,0**
	24	**G27**	**6,0 –8,0**	**270–325**	**≥ 200**	**7**	**85**	**–**
	26	**–**	**0,6 –6,0**	**≥ 290**	**≥ 210**	**6**	**90**	**4,0**
Peraluman-410[11] AlMg4Mn	01/02	W24	1,0 –6,0	240–310	100–190	18	65	1,2
	01/02	W24	6,0 –50	240–310	≥ 95	17	60	–
	22	G28	1,0 –6,0	275–330	190–280	12	80	1,6
	24	G30	1,0 –6,0	300–360	230–320	8	90	2,5
Peraluman-450[11] AlMg4,5Mn	01/02	W28	0,35–50	275–350	125–195	12	75	1,2
	95	F28	4,0 –50	≥ 275	≥ 125	12	70	–
	22	G31	2,0 –8,0	310–380	205–310	10	85	2,0
	24	G35	1,0 –6,0	345–405	270–340	6	100	3,5

Facteur f pour rayon de pliage minimum:
Le facteur de pliage a été établi pour des tôles de 3 mm d'épaisseur. Le rayon minimum pour pliage 90 degrés est f × épaisseur. Des données plus précises se trouvent dans notre prospectus «Pliage et cintrage de

PREPARD BY:- 15/7/2000

CHEKD BY:-

APPROVED BY:-

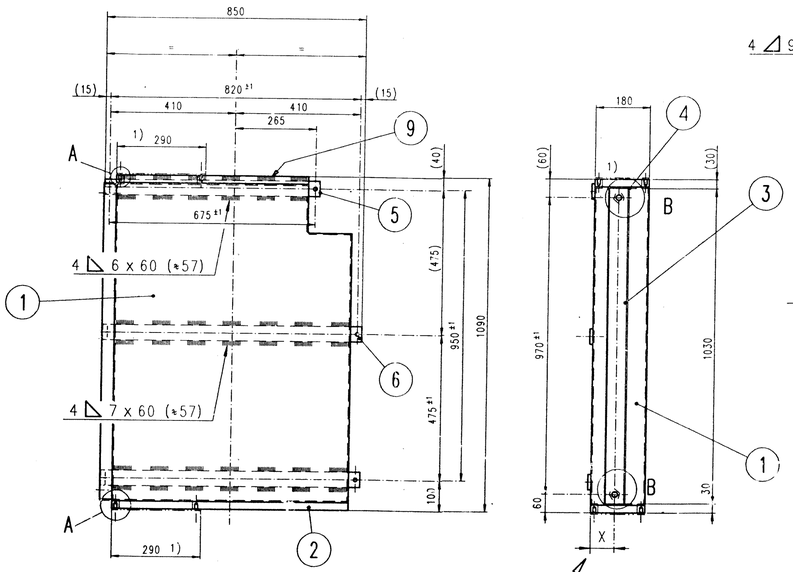
Marque de base Symbole[2]	Etat		Epaisseur[3]	Résistance à la traction R_m	Limite d'élasticité à 0,2% R_p 0,2	Allongement de rupture min. A_5	Dureté Brinell approx	Rayon de pliage pour angle de pliage min.[4]
	Alusuisse	DIN	mm	N/mm²	N/mm²	%	HB	
Alliages trempants[30]								
Anticorodal-080	07	W	0,35–6,0	≤150	≤80	18	40	1,0
AlMg1SiCu	07	W	6,0 –12	≤150	≤80	17	40	–
	41	F21	0,35–3,0	≥205	≥110	14	60	1,5
	41	F21	3,0 –12	≥205	≥110	12	60	–
	61	F29	0,35–3,0	≥290	≥240	10	90	3,5
	61	F29	3,0 –12	≥290	≥240	9	90	–
	61	F29	12 –60	≥290	≥240	8	90	–
Anticorodal-110[19]	**07**	**W**	**0,35–10**	**90–150**	**35– 85**	**18**	**35**	**1,0**
AlMgSi1	**41**	**F21**	**0,35–3,0**	**205–280**	**110–180**	**16**	**65**	**2,0**
	41	**F21**	**3,0 –20**	**205–280**	**110–180**	**14**	**65**	**–**
	51	**F28**	**0,35–3,0**	**≥275**	**≥200**	**14**	**85**	**2,5**
	51	**F28**	**3,0 –60**	**≥275**	**≥200**	**12**	**85**	**–**
	61	**F30**	**0,35–20**	**≥295**	**≥245**	**9**	**95**	**3,5**
	61	**F30**	**20 –100**	**≥295**	**≥240**	**8**	**90**	**–**
	61	**F32**	**0,35–10**	**≥315**	**≥255**	**10**	**95**	**3,5**
Avional-100[20]	07	W	0,35–12	≤215	≤140	13	50	1,0
AlCuMg1	41	F40	0,35–3,0	395–450	265–320	13	100	4,0
	41	F39	3,0 –12	≥390	≥265	13	100	–
	41	F39	12 –60	≥385	≥245	12	95	–
Avional-150[20]	07	W	0,35–12	≤220	≤140	13	55	1,0
AlCuMg2	41	F44	0,35–12	440–520	290–380	13	110	–
Unidur-102	61	F35	2,0 –15	350–410	275–350	10	105	–
AlZn4,5Mg1	61	F34	15 –60	340–410	270–350	9	105	–
Perunal-212	61	F45	6 –25	450–590	370–540	8	125	–
AlZnMgCuCr	61	F45	25 –50	450–590	370–540	7	140	–
	61	F43	50 –100	430–590	350–540	5	110	–
Perunal-215[20]	61	F53	6 –12	530–650	450–570	8	140	–
AlZnMgCu1,5	61	F53	12 –25	530–650	450–570	5	140	–
	61	F53	25 –50	530–650	450–570	3	140	–
	61	F50	50 –63	500–650	430–570	2	130	–
Métal pour conducteurs électriques, non trempant								
Aluminium pur 99,5E[21]	01/02	W7	bis 6	65– 95	≤55	40	18–26	0,5
E-Al	22	F9	bis 6	90–130	≥60	9	25–35	0,8
	24	-	bis 5	100–140	≥80	7	28–38	1,0
	26	F13	bis 3	130–170	≥110	4	32–48	1,5
	18	F16	bis 2	≥160	≥140	3	≥40	3,5
	95	-	5–100	≥ 65	≥20	20	18–35	-

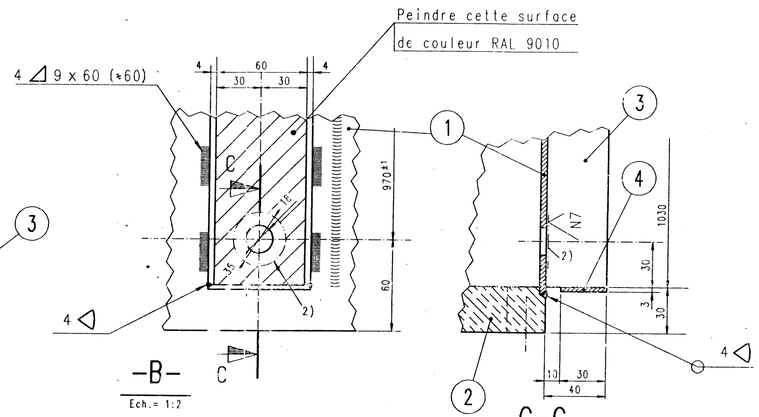
Facteur f pour rayon de plage minimum: Le facteur de plage a été déterminé sur tôles de 3 mm d'épaisseur. Le rayon minimum pour plage 90 degrés est f x épaisseur. Des données plus précises se trouvent dans notre prospectus «Plage et cintrage de demi-produits en aluminium».

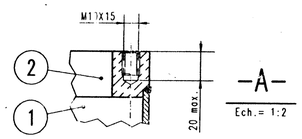
PREPARD BY: 15/7/2000

CHECKD BY:

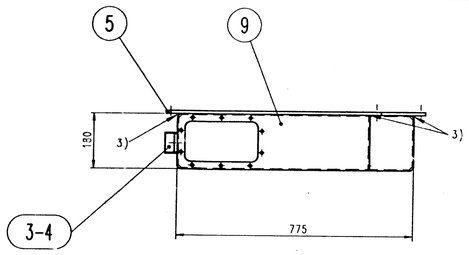
APPROVED BY:







X= N°de la Rubrique (Ex:HSTN 205395R65 soit X=65mm)
X= Rubric number (Ex:HSTN 205395R65 so X=65mm)



(7) Traitement de surface et peinture selon HSTN 612012 P2 à 7
Surfacing and painting according to HSTN 612012 P2 to 7

(8) Limite de la peinture selon HSTN 422179
Painting limits according to HSTN 422179

1) – Portée de joint N9
– Gasket seating on N9
2) – Portée de joint torique N7
– O'ring seating on N7
3) – Pas de soudure
– no weld

Masse (kg.) Weight	Rmb.
Peraluman-260	21
Extrudal-043	4,3
Anticorodal-110	17,2
Heli-Coil inx.	0,1
Total	42,6

Tolérances soudures selon HZN 403 254 degré A et HZN 403 255 degré E
Welding tolerances HZN 403 254 degree A and HZN 403 255 degree E

Soudures étanches à l'huile chaude
Warmoil-tight welds

ALL DIMENSION ARE IN MM.

HSTN 205395

REF. NO.	PART DRG. NO.	DESCRIPTION	NO./ LOCO	MATL	SPECN	WT. KG.
9.	HSTN 310823 R0001	CONSERVATOR FLANGE	2	ALUMI-NIUM	ANTICORODAL -110	14·000
6.	HSTN 423346 P0001	MOUNTING 850X50X10	4	ALUMI-NIUM	EXTRUDAL -043	4·600
5.	HSTN 424038 P0001	MOUNTING 705 X 50 X 10	2	ALUMI-NIUM	EXTRUDAL 043	1·900
4.	HSTN 205395 P0004	STIFFENER 68 X 30 X 3	4	ALUMI-NIUM	PERALUMAN 260	0·160
3.	HSTN 205395 P0003	STIFFENER 1030X40X4	4	ALUMI-NIUM	PERALUMAN 260	3·520
2.	HSTN 310592 R0001	CONSERVATOR FLANGE	2	ALUMI-NIUM	ANTICORODAL 110	14·400
1.	HSTN 205396 R0001	TANK BODY	2	SEE PART DRAWING		41·940

REF. ASSLY DRG. NO.
HSTN 205 395 R0065

CONSERVATOR TANK
FOR MAIN TRASFORMER

DED CENTRE
CHITTARANJAN LOCOMOTIVE WORKS

1ST ANGLE PROJECTION

WAG-9

DRAWING NO.
CLW/ES/3/SK-1/0508

WELDING SYMBOLS TO IS: 813

UNSPECIFIED TOLERANCE TO IS: 2102

DESCRIPTION

FORMAT NO :- D

R1

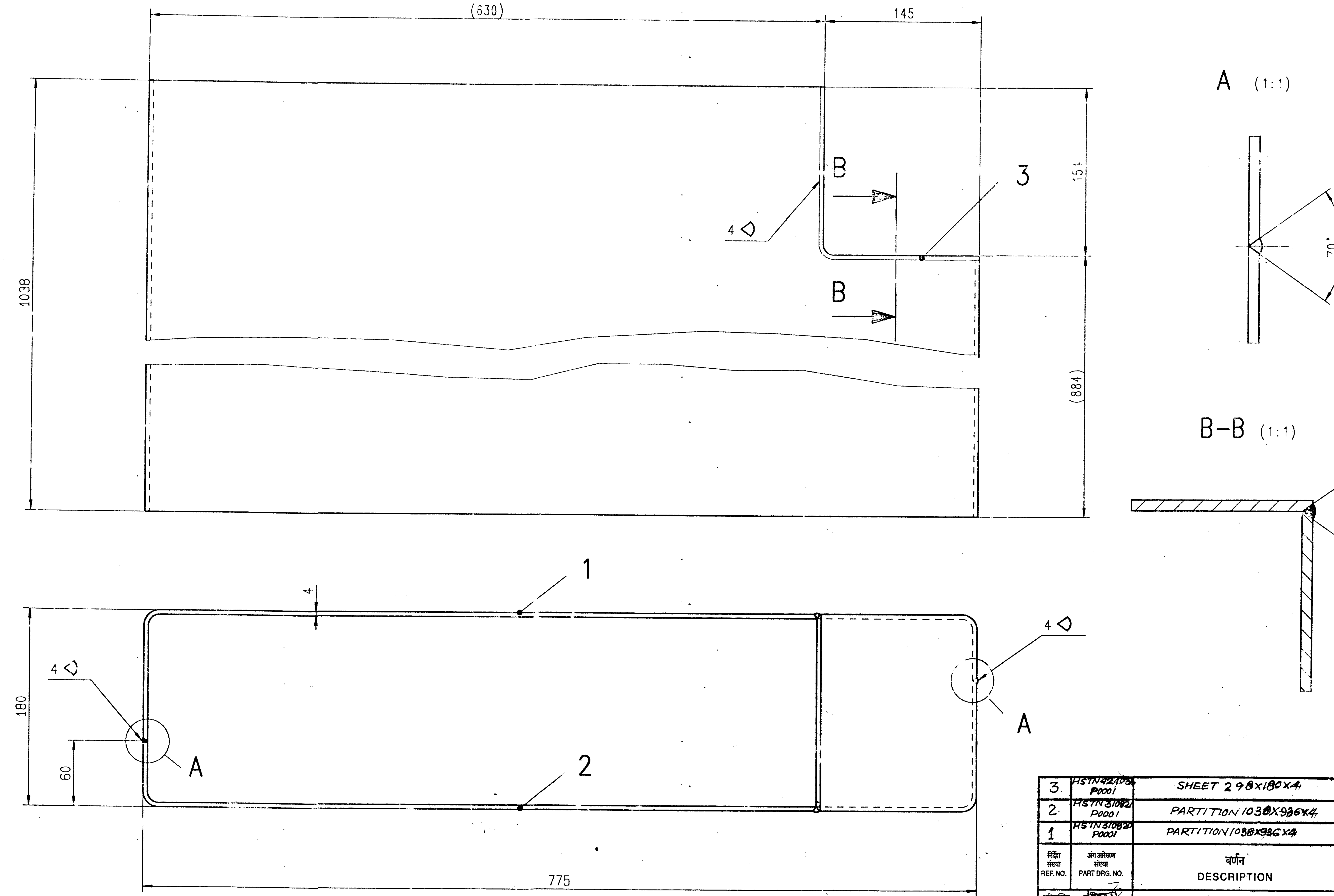


ABB IDENT NO. HSTN 205396

ALL DIMENSION ARE IN M.M.

निर्देश संख्या REF. NO.	अंग आरेखण संख्या PART DRG. NO.	वर्णन DESCRIPTION	संख्या / रेलइंजन NO./LOCO	पदार्थ MATL	विशिष्टि SPECN	प्रति भार कि. ग्रा. WT. EACH IN K.G.
3.	HSTN424988 P0001	SHEET 298X180X4	2	ALLUMINIUM	PERALUMAN 260	1.140
2.	HSTN310821 P0001	PARTITION 1038X936X4	2	ALLUMINIUM	ANTI CORODAL 260	20.400
1	HSTN310820 P0001	PARTITION 1038X936X4	2	ALLUMINIUM	ANTI CORODAL 260	20.400

अभिकल्पित DGN	18.7.2000
जाँचा CHD	
अधीक्षक SUPDT.	
समीक्षित व.अ (या/वि) REVIEWED SEE-D&D	
अनुमोदित (अ.वि.) APPROVED उ.मु. वि.अ DYCEE	
दिनांक DATE	
रैखिक अनुपात SCALE	
संदर्भ/REF.	

आरेखण संदर्भ
REF. ASSLY DRG. NO. HSTN 205396 R0001

TANK BODY
FOR MAIN TRANSFORMER

अभिकल्प एवं विकास केन्द्र
D & D CENTRE
चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS

संस्वरे क. C & D NO.

प्रयोग में
USED FOR LOCOS WAG 9

1ST. ANGLE PROJECTION

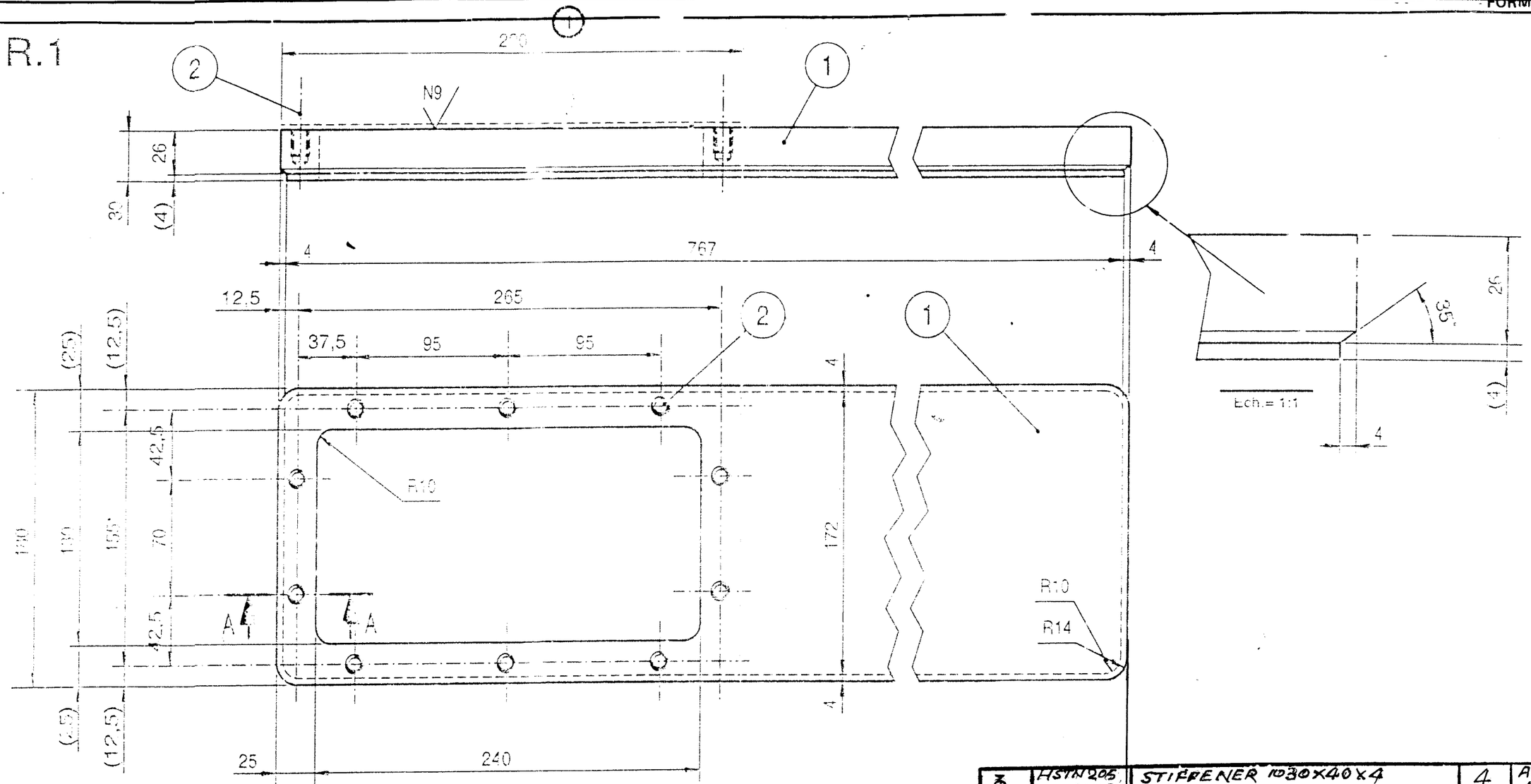
आरेखण संख्या DRAWING NO.
CLW/ES/3/SK-2/0508

धातु-वेल्डन चिह्न भा. मा. 813 के अनुसार / WELDING SYMBOLS TO IS : 813

अनिर्दिष्ट सह्य-सीमा भा. मा 2102 के अनुसार UNSPECIFIED TOLEARANCE TO IS : 2102	सतह-रूक्षता का मान भा.मा 3073 के अनुसार SURFACE ROUGHNESS VALUE TO IS : 3073	पदांक GRADE NUMBER	सं1 N1	सं2 N2	सं3 N3	सं4 N4	सं5 N5	सं6 N6	सं7 N7	सं8 N8	सं9 N9	सं10 N10	सं11 N11	सं12 N12
		Raum	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50
		चिह्न SYMBOL												

परिवर्तन संख्या ALT. NO	प्राधिकार AUTHY	वर्णन DESCRIPTION	दिनांकित आद्यक्षर DATED INITIAL

R.1



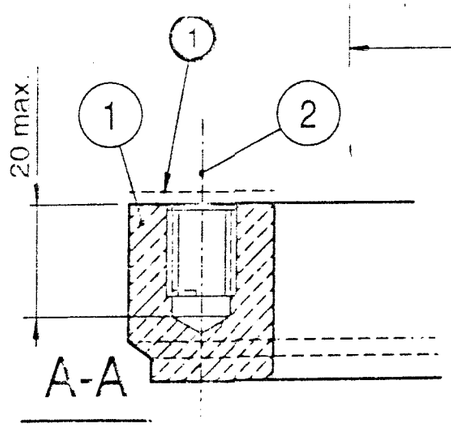


ABB IDENT NO. HSTN 310592 R0001

ALL DIMENSION ARE IN M/M.

परिवर्तन संख्या ALT. NO	प्राधिकार AUTHY	वर्णन DESCRIPTION	दिनांकित आद्यक्षर DATED INITIAL

धातु-वेल्डन चिह्न भा. मा. 813 के अनुसार / WELDING SYMBOLS TO IS : 813

अनिर्दिष्ट सह्य-सीमा भा. मा 2102 के अनुसार UNSPECIFIED TOLEARANCE TO IS : 2102	सतह-रूक्षता का मान भा.मा 3073 के अनुसार SURFACE ROUGHNESS VALUE TO IS : 3073	पदांक GRADE NUMBER	सं1 N1	सं2 N2	सं3 N3	सं4 N4	सं5 N5	सं6 N6	सं7 N7	सं8 N8	सं9 N9	सं10 N10	सं11 N11	सं12 N12
		Raum	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50
		चिह्न SYMBOL	▼▼▼			▼▼▼			▼▼▼			▼		≈

निर्देश संख्या REF. NO.	अंग आरेखण संख्या PART DRG. NO.	वर्णन DESCRIPTION	संख्या / रेलइंजन NO./ LOCO	पदार्थ MATL	विशिष्टि SPECN	प्रति भार कि. ग्रा. WT. EACH IN K.G.
3.	HSTN 205 395 P0003	STIFFENER 1030X40X4	4	ALUMI NIUM	EXTRU DAL.045	35.2
2.	HSTN 200824 P0015	THREAD RAP STAN M10X15	20	INX	Steel	
1	HSTN 310592 P0001	FLANGE 775 X 180 X 30	2	ALUMI NIUM	ANTI CORO DAL-LO	17.2

अभिकल्पित DGN	
जाँचा CHD	
अधीक्षक SUPDT.	
समीक्षित व.अ (या/वि) REVIEWED	
अनुमोदित (अ.वि.) APPROVED उ.मु. वि.अ DYCEE	
दिनांक DATE	
रेखिक अनुपात SCALE	

संदर्भ/REF.

आरेखण संदर्भ
REF. ASSLY DRG. NO.

HSTN 310592 R0001

CONSERVATOR FLANGE

FOR MAIN TRANSFORMER

अभिकल्प एवं विकास केन्द्र
D & D CENTRE
चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS

संस्वरे क.
C A D NO.

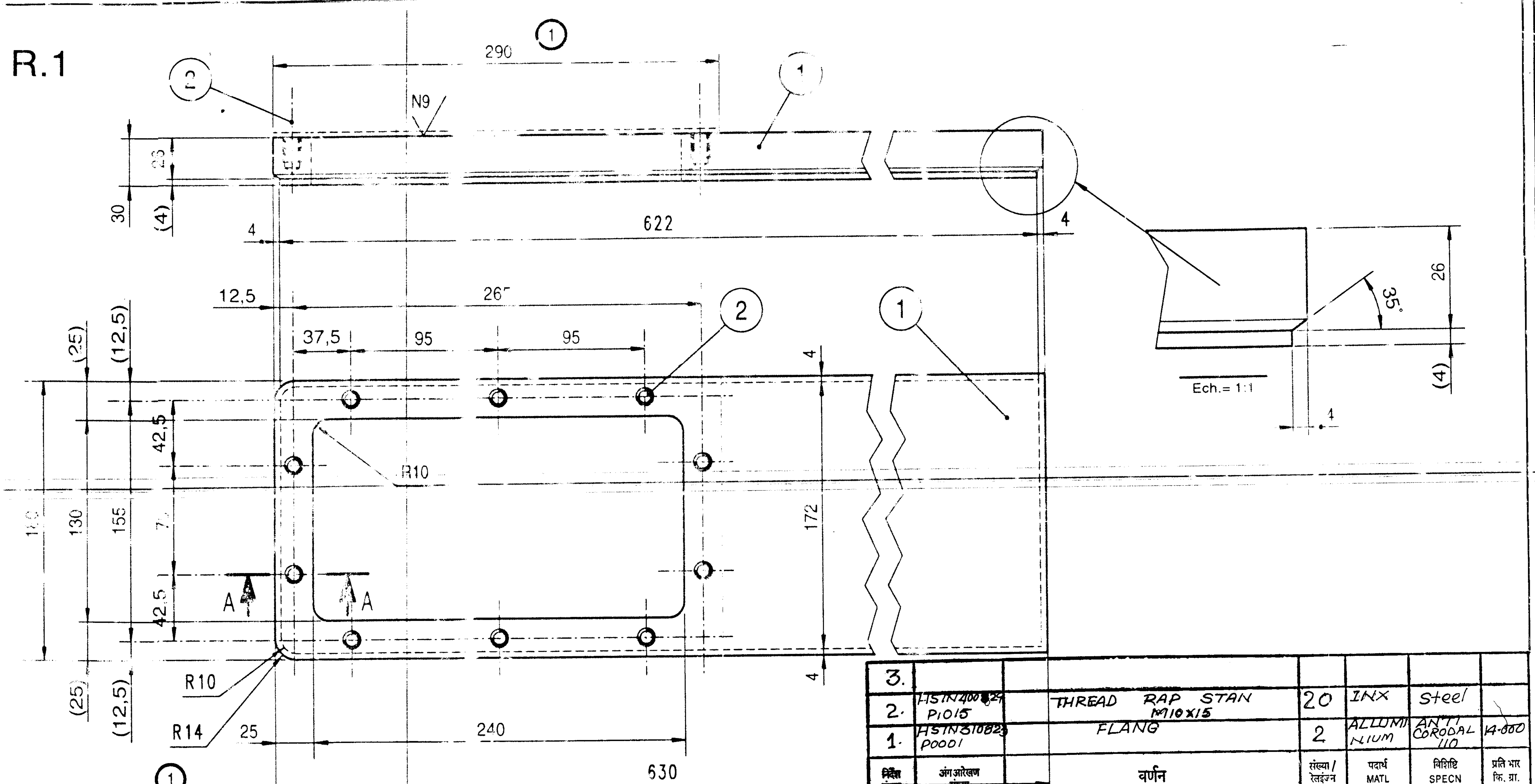
प्रयोग में
USED FOR LOCOS WAG-9

1ST. ANGLE PROJECTION

आरेखण संख्या DRAWING NO.
CLW/ES/3/SK-3/0508

FORMAT NO : DSED003

R.1



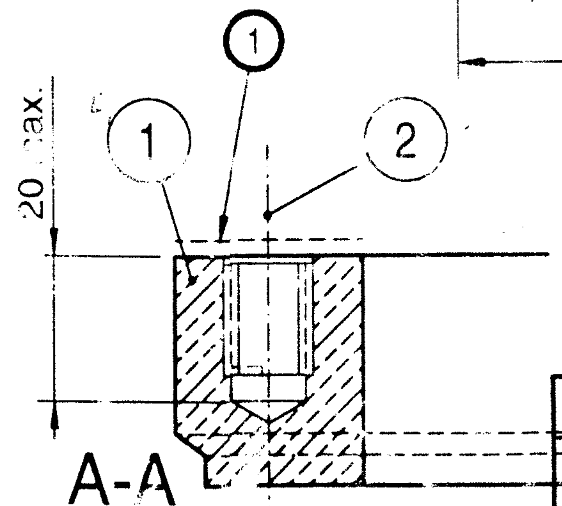


ABB IDENT NO. HSTN 310823 R0001

ALL DIMENSION ARE IN M.M.

निर्देश संख्या REF.NO.	अंग आरेखण संख्या PART DRG. NO.	वर्णन DESCRIPTION	संख्या / रेलइंजन NO / LOCO	पदार्थ MATL	विशिष्टि SPECN	प्रति भार कि. ग्रा. WT. EACH IN K.G.
3.						
2.	HSTN 400 ... P1015	THREAD RAP STAN M10X15	20	INX	Steel	
1.	HSTN 310823 P0001	FLANG	2	ALLUMINIUM	ANTI CORODAL 110	14.000

धातु-वेल्डन चिह्न भा. मा. 813 के अनुसार / WELDING SYMBOLS TO IS : 813													
अनिर्दिष्ट सह-सीमा भा. मा. 2102 के अनुसार UNSPECIFIED TOLEARANCE TO IS : 2102	सतह-रूक्षता का मान भा मा 3073 के अनुसार SURFACE ROUGHNESS VALUE TO IS : 3073	पदांक GRADE NUMBER	सं 1 N1	सं 2 N2	सं 3 N3	सं 4 N4	सं 5 N5	सं 6 N6	सं 7 N7	सं 8 N8	सं 9 N9	सं 10 N10	सं 11 N11	सं 12 N12
		Raum	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50
		चिह्न SYMBOL	▽▽▽▽			▽▽▽			▽▽			▽		~

परिवर्तन संख्या ALT. NO	प्राधिकार AUTHY	वर्णन DESCRIPTION	दिनांकित आद्यक्षर DATED INITIAL

अभिकल्पित DGN	15.7.2000
जाँचा CHD	
अधीक्षक SUPDT.	
समीक्षित व.अ (या/वि) REVIEWED SEE-C-D&D	
अनुमोदित (अ.वि.) APPROVED उ.मु. वि.अ DYCEE	
दिनांक DATE	
रैखिक अनुपात SCALE	
संदर्भ/REF.	

आरेखण संदर्भ REF. ASSLY DRG. NO. HSTN 310823 R0001

CONSERVATOR FLANGE FOR MAIN TRANSFORMER

अभिकल्प एवं विकास केन्द्र D & D CENTRE
चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS

संस्करे क. C A D NO.

प्रयोग में USED FOR LOCOS WAG-9

1ST. ANGLE PROJECTION

आरेखण संख्या DRAWING NO. CLW/ES/3/SK-4/0508

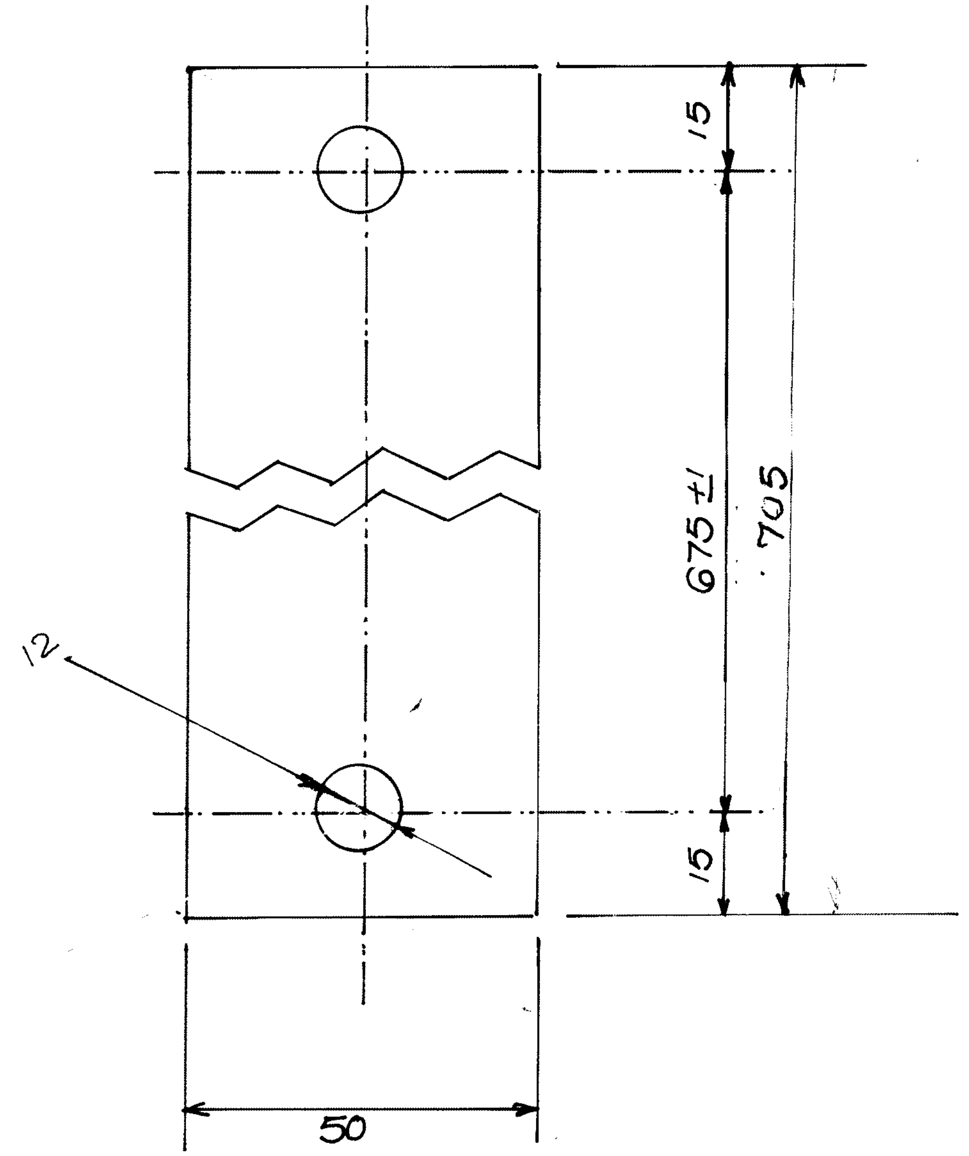


ABB IDENT NO. HSTN 424038 P0001

ALL DIMENSION ARE IN M.M.

निर्देश संख्या REF. NO.	अंग आरेखण संख्या PART DRG. NO.	वर्णन DESCRIPTION	संख्या / रेलइंजन NO./LOCO	पदार्थ MATL	विशिष्टि SPECN	प्रति भार कि. ग्रा. WT. EACH IN K.G.

सतह-रुक्षता का मान भा.मा. 3073 के अनुसार SURFACE ROUGHNESS VALUE TO IS : 3073

पदांक GRADE NUMBER	सं1 N1	सं2 N2	सं3 N3	सं4 N4	सं5 N5	सं6 N6	सं7 N7	सं8 N8	सं9 N9	सं10 N10	सं11 N11	सं12 N12
	025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50

चिह्न SYMBOL

दिनांकित आद्यक्षर DATED INITIAL

वर्णन DESCRIPTION

प्राधिकार AUTHY

परिवर्तन संख्या ALT. NO.

अनिर्दिष्ट सह्य-सीमा भा.मा. 2102 के अनुसार UNSPECIFIED TOLERANCE TO IS : 2102

अभिकल्पित DGN — 15.7.2008

जाँचा CHD

अर्धक्षिक SUPDT.

समीक्षित व.अ (या/वि) REVIEWED SSE C-D&D

अनुमोदित (अ.वि.) APPROVED उ.मु. बि.अ DYCEE

दिनांक DATE

रैखिक अनुपात SCALE

संदर्भ/REF.

आरेखण संदर्भ

HSTN 424038 P0001

MOUNTING

705 × 50 × 10

FOR MAIN TRANSFORMER

अभिकल्प एवं विकास केन्द्र
D & D CENTRE
चित्तरंजन रेलइंजन कारखाना
CHITTARANJAN LOCOMOTIVE WORKS

संस्वरे क.
C A D NO.

प्रयोग में
USED FOR WAG-9 LOCOS

1ST. ANGLE PROJECTION

आरेखण संख्या
DRAWING NO.
CLW/ES/3/SK-5/0508