DOCUMENT RESUME

ED 061 318 TM 001 546

TITLE	Radio Repairman (any ind.) 720.281; Television Service-and-Repairman (any ind.) 720.281 -- Technical Report on Development of USTES Aptitude Test Battery.
INSTITUTION	Manpower Administration (DOL), Washington, D.C. U.S. Training and Employment Service.
REPORT NO	TR-S-113R
PUB DATE	Jun 70
NOTE	20p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Aptitude Tests; *Cutting Scores; Evaluation Criteria; Job Applicants; *Job Skills; Norms; Occupational Guidance; *Personnel Evaluation; Radio Technology; *Television Repairmen; Test Reliability; Test Validity
IDENTIFIERS	GATB; *General Aptitude Test Battery; Radio Repairmen

ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)

S-113 R

June 1970

U.S. Training and Employment Service Technical Report S-113 R

Development of USTES

APTITUDE TEST BATTERY FOR

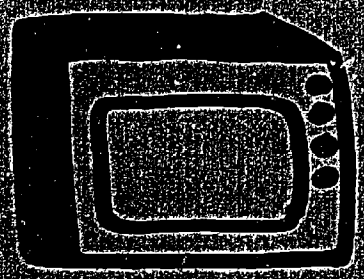
RADIO REPAIRMAN

(any ind.)
720.281

TELEVISION SERVICE-AND-REPAIRMAN

(any ind.)
720.281

U.S. DEPARTMENT OF LABOR
Manpower Administration



Technical Report on Development of USTES Aptitude Test Battery

For . . . . . .

Radio Repairman (any ind.) 720.281

Television Service-and-Repairman (any ind.) 720.281

S-113 R

(Developed in Cooperation with the California, Minnesota, and North Carolina State Employment Services)

U.S. Department of Labor
Manpower Administration

June 1970

FOREWORD

The United States Training and Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

GTAB Study #2776,619,2021,2152

DEVELOPMENT OF USTES APTITUDE TEST BATTERY

FOR

Television Service and Repairman (any ind.) 720.281-018

S-113 R

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Television Service and Repairman (any ind.) 720.281-018. The following norms were established.

GATB Aptitudes	Minimum Acceptable GATB Scores
N - Numerical Aptitude	80
S - Spatial Aptitude	95
F - Finger Dexterity	80

RESEARCH SUMMARY - VALIDATION SAMPLE

Sample:

66 male workers employed as Color Television Technicians in the Los Angeles metropolitan area. 25 minority group members were included in the sample. Of this group four were Negro, four were Oriental, and 17 were Spanish Americans. The sample distribution was 38% minority group and 62 % nonminority group members.

Criterion:

Supervisory ratings.

Design:

Concurrent (test and criterion data were collected at approximately the same time).

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analyses of aptitude mean scores, standard deviations, aptitude-criterion correlations and selective efficiencies.

Concurrent Validity:

Phi Coefficient = .43 ($P/2 < .0005$)

Effectiveness of Norms:

Only 68% of the nontest-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 87% would have been good workers. 32% of the nontest-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 13% would have been poor workers. The effectiveness of the norms is shown graphically in Table 1:

TABLE I

Effectiveness of Norms

	Without Tests	With Tests
Good Workers	68%	87%
Poor Workers	32%	13%

SAMPLE DESCRIPTION

Size:

N = 66

Occupational Status:

Employed workers

Work Setting:

Workers were employed by the following television service firms in the metropolitan Los Angeles area:

The Admiral Corp., Los Angeles
Associated Television Service Co., Los Angeles
General Electric Co., Los Angeles
Ken Crane Magnavox City, Television Service Dept., Hawthorne
Magnavox Corp., Los Angeles
Montgomery-Ward, Television Service Dept., Rosemead
Motorola Corp., Los Angeles
Packard-Bell Television Service Div., City of Commerce
Philco-Ford Div., Los Angeles
Sylvania Electric Products, Inc., Los Angeles
Universal Television Service Co., West Los Angeles
Zenith Television Service Co., Los Angeles

Employer Selection Requirements:

Education: None indicated, with exception of one employer in sample who prefers to accept top three graduates of each class of a major local television technical school.

Previous Experience: Most employers in sample prefer some journeyman experience. The local trade union considers television technical school as experience and classifies students with one year of television schooling as journeymen.

Tests: None, with exception of two employers in sample; one using the Thurstone Test of Mental Alertness along with a company-developed television theory questionnaire; the other using the Wonderlic Personnel Test and their own test, stressing set-malfunction-identification.

Other: Personal interview - several employers required references from former employers and the ability to communicate well.

Principal Activities:

The job duties of each worker are comparable to those shown in the job descriptions in the Appendix.

Minimum Experience:

All workers in the sample had at least twelve months total job experience.

Table 2

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience.

	Mean	SD	Range	r
Age (years)	35.9	8.2	19-53	.084
Education (years)	12.7	1.4	10-16	.029
Experience (months)	130.6	81.9	12-372	.282*

*Significant at .05 Level

Experimental Test Battery

All twelve tests of the GATB, B-1002B (NCS) were administered between August, 1967 and March, 1969.

Criterion

The criterion data consisted of two supervisory ratings of job proficiency made at approximately the same time as tests were administered with a time interval of at least two weeks between the two ratings. Each rater was given a list of job performance standards (see Appendix) to read, before completing the rating form to insure job comparability and to be used as a guideline in rating the workers.

Rating Scale:

Adaptation of USTES Form SP-21, Descriptive Rating Scale. This scale (see Appendix) consisted of seven items with five alternatives for each item. The alternatives indicate the different degrees of job proficiency.

Reliability:

A reliability coefficient of .947 was obtained between the two ratings. Therefore, the final criterion consists of the combined scores of the two ratings.

Criterion Score Distribution:

Possible Range:	14-70
Actual Range:	14-70
Mean:	50.6
Standard Deviation:	13.0

Criterion Dichotomy:

The criterion distribution was dichotomized into low and high groups by placing 32% of the sample in the low group to correspond with the percentage of workers considered unsatisfactory or marginal by management. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers". The criterion critical score is 46.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Aptitude Q which does not have a significant correlation with the criterion was included because of its high mean and low standard deviation. Aptitude F was included for consideration based on its importance in the performance of job duties. Tables 3, 4, and 5 show the results of the qualitative and statistical analyses.

TABLE 3

Qualitative Analysis

(Based on the job analysis, the aptitudes indicated appear to be important to the work performed)

Aptitude	Rationale
G - General Learning Ability	Required to learn electronic theory; to read and interpret schematics and know servicing theory and techniques; to diagnose defects and determine the methods and procedures necessary to repair a color television set.
P - Form Perception	Required to observe picture on tube and perceive differences in images and shadings on screen in comparison with required and desired purity and fidelity; to view test patterns on picture tubes and oscilloscopes; to discern fine shadings in color, and in widths and lengths of lines in patterns.
F - Finger Dexterity	Necessary to make precise, minute adjustments of controls on test equipment and television receiver to adjust picture; using twisting action of fingers to remove tubes and other small parts; connect test equipment; accurate placing and positioning of small delicate parts.
M - Manual Dexterity	Required to use hand tools for skillfully removing and replacing back of cabinet, chassis, and picture tube; to use soldering iron and other tools in cramped chassis areas; to move hands easily and skillfully in placing and turning motions and in handling of tools, test equipment, electronic tubes, and components while making repairs.

Table 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlation with the Criterion (r) for the Aptitudes of the GATB.

Aptitude	Mean	SD	Range	r
G - General Learning Ability	103.6	16.7	65-150	.318 **
V - Verbal Ability	100.5	14.4	72-135	.208
N - Numerical Aptitude	100.4	19.0	54-147	.296 *
S - Spatial Aptitude	108.6	17.5	68-147	.255 *
P - Form Perception	107.4	16.2	72-144	.275 *
Q - Clerical Perception	109.5	14.4	77-150	.156
K - Motor Coordination	104.3	16.8	60-142	.111
F - Finger Dexterity	99.6	19.4	60-160	.153
M - Manual Dexterity	104.1	20.8	56-152	.054

* Significant at the .05 Level

** Significant at the .01 Level

Table 5

SUMMARY OF QUALITATIVE AND QUANTITATIVE DATA

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data Important	X				X			X	X
Irrelevant									
Relatively High Mean				X	X	X			
Relatively Low Standard Dev.		X				X			
Significant Correlation with Criterion	X		X	X	X				
Aptitudes to be Considered for Trial Norms	G		N	S	P	Q		F	

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of aptitudes G,N, S, P and Q at trial cutting scores were able to differentiate between the 68% of the sample considered good workers and the 32% of the sample considered poor workers. Trial cutting scores at five point intervals approximately one standard deviation below the meanare tried because this will eliminate about one-third of the sample with three-aptitude norms. For two-aptitude trial norms, minimum cutting scores of slightly more than one standard deviation below the mean will eliminate about one-third of the sample. For four-aptitude trial norms, cutting scores of slightly less than one standard deviation below the mean will eliminate about one-third of the sample. The Phi Coefficient was used as a basis for comparing trial norms. The optimum differentiation for the occupation of Television Service and Repairman (any ind.) 720.281-018 was provided by norms of N-80, S-95, and P-80. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .43 (statistically significant at the .0005 level).

TABLE 6

Concurrent Validity of Test Norms
N-80, S-95, and P-80

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	12	33	45
Poor Workers	16	5	21
Total	28	38	66

Phi Coefficient = .43 Chi Square (X^2Y) = 12.4

Significance Level = P/2 less than .0005

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study met the requirements for incorporating the occupation into OAP-35 which is shown in the 1970 edition of Section II of the Manual for the General Aptitude Test Battery. A Phi Coefficient of .43 is obtained with the OAP-35 Norms of N-85, S-95, P-80.

GATB Study #619,2021 and 2152 S-113 R

Radio Repairman (any ind.) 720.281
Television Service and Repairman (any ind.) 720.281

Check Study #1 Research Summary

Sample:

This cross-validation sample is comprised of three subsamples:

Subsample I - 62 male students enrolled in a two year course in radio and television servicing at the North Dakota State School of Science, Wahpeton, North Dakota.

Subsample II - 30 male students enrolled in the radio trade course in 1951 at the Minneapolis Vocational High School, Minneapolis, Minnesota.

Subsample III - 35 male students enrolled in the radio trade courses in 1953 at the Minneapolis Vocational High School, Minneapolis, Minnesota.

This study was conducted prior to the requirement of providing minority group information. Therefore, minority group information is unknown.

Data for age, education and experience of the sample are incomplete.

TABLE 7

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB for each Sample Separately and for the Combined Sample.

	Sample I - North Dakota N=62				Sample II-Minn.(1951) N=30			
Aptitude	Mean	SD	Range	r	Mean	SD	Range	r
G - General Learning Ability	120	10	98-152	.400**	104	13	76-132	.325
V - Verbal Aptitude	107	11	80-133	.087	94	15	56-122	.216
N - Numerical Aptitude	118	10	91-136	.412**	98	11	67-120	.299
S - Spatial Aptitude	122	17	71-166	.233	120	16	78-151	.388*
P - Form Perception	112	12	88-141	.015	111	12	92-141	.402*
Q - Clerical Perception	108	11	79-137	.209	92	11	71-121	.007
K - Motor Coordination	101	15	64-132	.323*	99	19	53-137	.069
F - Finger Dexterity	110	16	71-143	.210	96	18	53-127	.402*
M - Manual Dexterity	110	16	68-148	.043	95	21	44-134	.548**

*Significant at the .05 level
**Sifnificant at the .01 level

Aptitude	Sample III-Minn. (1953) Mean	SD	range	r	Combined Samples Mean	SD	Range	r
G-General Learning Ability	112	15	76-138	.238	114	14	76-152	
V-Verbal Aptitude	101	12	74-127	.282	102	13	56-133	
N-Numerical Aptitude	106	12	74-132	.246	110	14	67-136	
S-Spatial Aptitude	126-	19	84-150	.218	123	18	71-166	
P-Form Perception	106	14	59-134	.209	110	13	59-141	
Q-Clerical Perception	101	10	86-123	.143	103	13	71-137	
K-Motor Coordination	97	16	70-132	.143	100	19	53-137	
F-Finger Dexterity	105	20	63-153	.063	105	19	53-153	
M-Manual Dexterity	104	18	63-142	.206	105	19	44-148	

Criterion: Course grades. The criteria were collected in 1951, 1953, and 1956.

Design: Concurrent (test and criterion data were collected at approximately the same time.

Concurrent Validity: Phi Coefficient = .23 ($p/2 < .0005$)

Effectiveness of Norms: Only 68% of the non-test-selected students in this sample were good students, if the students had been test-selected with the S-113R norms, 74% would have been good students. 32% of the non-test-selected students in this sample were poor students. If the students had been test-selected with the S-113R norms, only 26% would have been poor students. The effectiveness of the norms when applied to this independent sample is shown graphically in Table 9.

TABLE 8

Effectiveness of S-113R Norms on Check Study Sample #1

	Without Tests	With Tests
Good Students	68%	74%
Poor Students	32%	26%

TABLE 9

Concurrent Validity of Test Norms of S-113R Norms of N-80, S-95, and F-80 on Check Study #1

	Nonqualifying Test Scores	Qualifying Test Scores	total
Good Students	8	79	87
Poor Students	12	28	40
Total	20	107	127

Phi Coefficient (ϕ) = .34
Significance Level - $P/2 < .0005$

Chi Square (K^2Y) = 7.5

On the following page is a list of duties and responsibilities connected with the occupation of TELEVISION SERVICE-AND-REPAIRMAN or TELEVISION TECHNICIAN.

This list was approved by a group of Service Managers as the general requirements necessary to be a journeyman in the occupation.

Please keep these items in mind when answering the questions on the Performance Rating form.

PERFORMANCE STANDARDS
FOR
COLOR TV TECHNICIAN

Be able to diagnose and repair color television sets accurately and with a minimum of time, while exercising extreme care to prevent damage and breakage. Use care in working with high voltage, and leave set in safe operating condition for customer.

Able to create and maintain good customer relations, satisfying customer that proper and sufficient repairs have been made. Be able to instruct customer in function and use of various operating controls.

Know how to apply electronic theory to practical job situations, and keep himself informed of current changes and improvements.

Know how to read, interpret, and use schematic drawings, use and operate various testing equipment.

Be able to work with a minimum degree of supervision.

Be adaptable to different assignments as consecutive repair jobs will not be identical.

Be able to distinguish colors and shades of color accurately.

Be able to make precise, minute adjustments of controls on test equipment and receiver, while simultaneously looking into mirror-stand and observing presentation on picture tube.

Have good finger and manual dexterity to fit small parts into crowded spaces and manipulate hand tools.

Be accurate and legible when writing service tickets.

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATING SCALE FOR TELEVISION SERVICE-AND-REPAIRMAN (any ind.) 720.281
D. O. T. Title and Code

Directions: Please read Form SP-20, "Suggestions to Raters", and then fill in the items listed below. In making your ratings, only one box should be checked for each question.

Name of Worker (print) _____
(Last) (First)

Sex: Male X Female ____

Company Job Title: Television Technician

How often do you see this worker in a work situation?

- [ ] See him at work all the time.
- [ ] See him at work several times a day.
- [ ] See him at work several times a week.
- [ ] Seldom see him in work situation.

How long have you worked with him?

- [ ] Under one month.
- [ ] One to two months.
- [ ] Three to five months.
- [ ] Six months or more.

_____
Signature

A. How much work can he get done? (Worker's ability to make efficient use of his time by diagnosing and repairing sets in a minimum length of time.)

- ☐ Capable of very high work output.
- ☐ Capable of high work output.
- ☐ Capable of above average output.
- ☐ Capable of average work output.
- ☐ Capable of below average work output.

B. How good is the quality of his work? (Worker's ability to do work which meets manufacturers standards and customer satisfaction regarding color and performance.)

- ☐ Performance is usually excellent in quality.
- ☐ Performance is almost always of high quality.
- ☐ Performance is above average.
- ☐ Performance is acceptable.
- ☐ Performance could stand improvement.

C. How much does he know about his job? (Worker's understanding of the application of electronic theory, interpreting schematic drawings; use and operation of testing equipment.)

- ☐ Has complete knowledge. Knows his job thoroughly.
- ☐ Has broad knowledge. Knows enough to do good work.
- ☐ Has above average knowledge. Knows enough to do average work.
- ☐ Has moderate amount of knowledge. Knows enough to do fair work.
- ☐ Has little knowledge. Knows enough to "get by".

D. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations such as alignment, audio, mechanical corrections, etc.)

- ☐ Can perform an unusually large variety of different operations efficiently.
- ☐ Can perform many different operations efficiently.
- ☐ Can perform several different operations with reasonable efficiency.
- ☐ Can perform an average number of different operations with efficiency.
- ☐ Can perform a limited number of different operations efficiently.

E. How well is he able to figure out what to do when something different comes up or something out of the ordinary occurs? (Worker's ability to adapt and use various tools, equipment, and methods to repair unusual or problem areas.)

- [ ] Practically always figures out what to do himself. Rarely needs help, even on complex problems.
- [ ] Usually able to handle new situations. Needs help on only complex problems.
- [ ] Can solve new problems of average complexity. May or may not need assistance.
- [ ] Sometimes knows what to do, sometimes doesn't. Can deal with problems that are not too complex.
- [ ] Often has difficulty handling new situations. Needs help on all but simple problems.

F. Ability to learn. (How quickly does this person learn new models, new methods and procedures, and keep himself informed.)

- [ ] Very quick to learn new job duties.
- [ ] Learns new job duties much faster than most workers.
- [ ] Learns new job duties a little faster than most workers.
- [ ] Learns new job duties in average length of time.
- [ ] Learns new job duties a little more slowly than most workers.

G. Considering all the factors already rated, and only these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

- [ ] An unusually competent worker. Performance usually excellent.
- [ ] A valuable worker. Performance generally very good.
- [ ] A fairly proficient worker. Performance above average.
- [ ] An average worker. Performance generally acceptable.
- [ ] Of limited value to the organization. Performance somewhat inferior.

FACT SHEET

Job Title: (Validation Sample)
TELEVISION SERVICE AND REPAIRMAN (any ind.) 720.281-018

Job Summary: Tests, adjusts, and repairs color television receivers in customers' homes or in shop. Corrects malfunctions and obtains proper color rendition on customers' sets, using knowledge of electronics theory, testing equipment, and hand tools.

Work Performed: Performs purity alignment on new sets: Positions portable mirror in front of screen to enable simultaneous adjustment of picture and observation of set. Observes picture tube and ascertains that controls are correctly set to produce proper picture. Adjusts controls with fingers to remove distortions and impurities from the picture. Disconnects set and removes back panel. Connects set to electrical power by means of special line cords. Turns on and tunes set to color program, and examines picture for color impurities. Plugs degaussing ring power cord into wall socket, holds ring in hand, and moves ring slowly around picture tube and mounting hardware to remove stray magnetic fields that cause color impurities from picture tube. Withdraws degaussing ring slowly, so as to render it de-magnetized.

Observes set to see if color impurities are eliminated. Turns controls to reduce green and blue colors and obtains pure red screen. Loosens clamp holding deflection yoke on neck of picture tube with screwdriver and pulls deflection yoke back until fireball appears on screen. Slides adjustment tabs on circular deflection yoke to center fireball on screen. Turns to check for pure green and pure blue fields. Returns color control to normal position.

Performs grey-scale set up: Turns background control to obtain steady prescribed white background. Turns brightness control shaft from dim through bright position and observes screen to verify that white background remains steady.

Performs color convergence: Tunes television set to nonbroadcasting channel to remove picture from screen. Connects color bar generator with spring clamp leads to antenna connections on back of set to aid in convergence. Turns color bar generator selection knob to appropriate pattern to be displayed on screen. Moves static convergence magnets, closer to or away from neck to converge red, blue, and green colors at center of screen to form white pattern.

Isolates defective circuit on malfunctioning sets, using theory, experience, and test equipment: Reads service manual schematic drawing to determine where to attach volt-ohm-milliameter to check voltages across test points and resistances of circuits. Attaches volt-ohm-milliameter to prescribed points and observes volt-ohm-milliameter to determine effectiveness of circuit. Attaches oscilloscope to prescribed points, using test-leads, and observes oscilloscope to check progress of signal through set.

Replaces defective parts: Removes suspected tubes from set and inserts them into tube tester. Replaces defective tubes, noting type number. Attaches volt-ohm-milliameter at prescribed points to check performance of variable controls. Observes volt-ohm-milliameter and monitors performance while turning control to determine if control is defective or dirty. Removes dirt from control using spray solvent. Observes screen to determine if cleaning was effective, while manipulating control. Removes defective controls, transistors, resistors, capacitors, and transformers, using soldering iron. Examines suspected printed circuit boards with eye and magnifying glass to determine if any circuits have been broken or damaged.

Replaces picture tube: Dons protective gloves and goggles in case picture tube breaks. Pulls plugs to disconnect leads from chassis to picture tube. Unhooks spring connections from shield to cabinet and removes protective shield from tube. Unscrews tube mounting bracket and lifts tube from cabinet. Places tube on pad and lifts collar-like mounting bracket from around tube. Peels off protective adhesive pads between surface of picture tube and mounting bracket and places them in position on new tube. Fits mounting bracket over new tube and supports tube while securing bracket to cabinet. Reinstalls protective shield and hooks springs connects from shield to cabinet. Performs purity, grey-scale, and convergence operations.

Aligns color: Turns on set and attached color bar generator leads to prescribed points. Allows generator and set to run until specified operating temperature is reached. Observes picture tubes to determine if colors are displayed in correct order, and for bending of color bars, unstable colors, no color presentation, or one color only. Turns various color controls to achieve desired effect. Uses oscilloscope to aid in alignment. Inserts non-metallic alignment tool into prescribed openings and rotates tuning-slug inside, while observing oscilloscope to attune transformers for desired color presentation.

Job Title: (Cross-Validation)
Radio Repairman (any ind.) 720.28.-010
Television Service and Repairman (any ind.) 720.281-018

Job Summary: Tests, repairs and adjusts radio and black and white television receivers and related electronic-audio equipment, using circuit diagrams, testing instruments and hand tools. Solders connections and replaces parts.

Work Performed: Tunes in receiver and observes characteristics to locate source of trouble. Test wiring, tubes, resistors, voltages, and resistance of circuits to isolate defect following schematic diagram and using voltmeter, oscilloscope, signal generator and other electronic testing instruments. Examines chassis for defects. Tests and changes tubes. Solders loose connections and repairs or replaces defective parts, using hand tools and soldering gun. May install radios in automobiles, television sets, antennas and aerials. May compute charges for labor and material. May sell television and radio receivers and other audio-electronic equipment.

Effectiveness of Norms: Only 68% of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the S-113R norms, 87% would have been good workers. 32% of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the S-113R norms, only 13% would have been poor workers.

Only 68% of the non-test-selected students used for this study were good students; if the students had been test-selected with the S-113R norms, 73% would have been good students. 32% of the non-test-selected students used for this study were poor students; if these students had been test-selected with the S-113R norms, only 27% would have been poor students.

Applicability of S-113R Norms: The aptitude test battery is applicable to jobs which include a majority of duties described above.

GPO 899-076

U.S. DEPARTMENT OF LABOR
MANPOWER ADMINISTRATION
WASHINGTON, D.C. 20210

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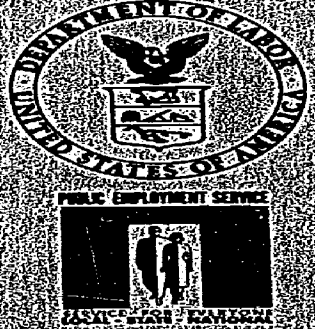

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