

List of measuring equipment

Quantity of electric

| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|----------------------------------|----------------------|--|---|
| 1 | | | | |
| 11 | | | | |
| 111 | Standard Cell | 標準電池 | Electromotive Force: 1.0193V at 20°C Accuracy: ± 50ppm | with Thermal control water Bath 4 sets |
| 112 | Channel Switch for Standard Cell | 標準電池切換器 | Max. Generation of Terminal EMFs: $\geq 0.01 \mu V$ | |
| 113 | Voltage Standard | 電圧標準 | Voltage: 10V, 1.018V, 1V Stability: $\pm 0.5 \sim \pm 12.0$ ppm | |
| 114 | Multimeter | マルチメーター | DC V: ± 100 mV $\sim \pm 1000$ V Accuracy: 0.01% | 2 sets |
| 12 | | | | |
| 121 | Stabilized Source | 安定化電源 | Output: 0 to 35VDC, 0 to 500ADC Stability(A): 0.05% | |
| 122 | Standard Shunt | 標準抵抗 | Current Rating: 300A(0.333mΩ) 0.01mA(10kΩ) | |
| 123 | Differential Voltmeter | 差動電圧計 | Range: 1V to 1000VDC Accuracy: ± 25ppm | |

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| 13 | | | | |
| 131 | High Voltage Source | 高電圧電源 | Output: 0 to 60kV, 0 to 50mA DC Stability(A): $\pm 0.01\%$ | |
| 132 | High Voltage Divider | 高電圧分圧器 | Input Resistance: 2000 M Ω Readability: 10,000 to 1 | |
| 133 | Differential Voltmeter | 差動電圧計 | Range: 1V to 1000VDC Accuracy: ± 25 ppm | |
| 2 | | | | |
| 21 | | | | |
| 211 | AC/DC Voltage and Current Supply | 交流/直流電圧電流電源 | Output(V): 0 to 1100V (AC, DC) Output(A): 0 to 2A(DC) 0 to 2A(AC 10Hz to 50kHz) | |
| 212 | Power Amplifier | 電力増幅器 | Output: 20A (AC, DC) Accuracy: 0.025% | |
| 213 | Current Shunt | 電流抵抗 | Range: 200 μ A to 100A(AC/DC) Accuracy: $\pm 0.01\%$ | |
| 214 | Differential Voltmeter | 差動電圧計 | Range: 1V to 1000VDC Accuracy: ± 25 ppm | |

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|----------------------------------|----------------------|--|---------|
| 22 | | | | |
| 221 | AC Standard Voltage Source | 交流電圧標準 | Max. Voltage: 120V(10Hz-1MHz) Accuracy: 1 nV to 100 μ V | |
| 222 | Power Amplifier | 電力増幅器 | Output: 100 to 1099.99V Resolution: 1mV | |
| 223 | AC/DC Comparator | 交流直流比較器 | Range(V): 225mV to 1100V(RMS) Range(F): DC, 10Hz to 100MHz | |
| 224 | Digital Voltmeter | デジタル電圧計 | Range: 200mV to 1000V Resolution: 1 μ V | |
| 23 | | | | |
| 231 | AC/DC Voltage and Current Supply | 交流/直流電圧電流電源 | Output(V): 0 to 1100V (AC,DC) Output(A): 0 to 2A(DC) 0 to 2A(AC 10Hz to 50kHz) | |
| 232 | Power Amplifier | 電力増幅器 | Output: 20A (AC,DC) Accuracy: 0.025% | |
| 233 | Current Shunt | 電流抵抗 | Range: 200 μ A to 100A(AC/DC) Accuracy: \pm 0.01% | |
| 234 | Differential Voltmeter | 差動電圧計 | Range: 1V to 1000VDC Accuracy: \pm 25ppm | |

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|----------------------|----------------------|--|---------|
| 3 | | | | |
| 311 | Standard Resistor | 標準抵抗 | Resistance: 1 Ω Accuracy: 0.0005% | 3 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 10 k Ω Accuracy: \pm 1ppm | 3 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 0.001 Ω Accuracy: \pm 0.02% | 2 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 0.01 Ω Accuracy: \pm 0.02% | 2 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 0.1 Ω Accuracy: \pm 0.002% | 2 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 100k Ω Accuracy: \pm 0.002% | 2 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 10 Ω Accuracy: \pm 0.02% | 1 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 100 Ω Accuracy: \pm 0.002% | 1 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 10 k Ω Accuracy: \pm 0.005% | 1 sets |
| 312 | Oil Bath | 油槽 | Range: 0 to 65 $^{\circ}$ C Stability: 0.002 $^{\circ}$ C | 2 sets |

Quantity of electric

List of measuring equipment

| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|---|----------------------|--|---------|
| 313 | Resistance Transfer Standard | 抵抗交換標準 | Standard Value: 1k Ω /step Transfer Accuracy: \pm 1ppm | 2 sets |
| | Resistance Transfer Standard | 抵抗交換標準 | Standard Value: 10 k Ω /step Transfer Accuracy: \pm 1ppm | 2 sets |
| | Resistance Transfer Standard | 抵抗交換標準 | Standard Value: 100k Ω /step Transfer Accuracy: \pm 1ppm | 2 sets |
| 314 | High Resistance Measurement Set | 高抵抗測定装置 | Measuring range: 1k Ω to 100M Ω Resolution: 20 μ Ω | |
| 4 | | | | |
| 411 | Current Source | 電流電源 | Output Range: 0 to 200A Drift: 0.03% | |
| 412 | Switch | 切換器 | Max. Current: 100A Max. Switching Frequency: 0.5Hz | |
| 413 | Direct Current Comparator Resistance & Temperature Bridge(DCCB) | D C C B | Range: 10 ⁻⁸ to 10 ⁹ Ω Accuracy: \pm 0.2ppm Stability: \pm 0.2ppm | |
| 414 | Standard Resistor | 標準抵抗 | Resistance: 1 Ω Accuracy: 0.0005% | 3 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 10 k Ω Accuracy: \pm 1ppm | 3 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 0.001 Ω Accuracy: \pm 0.02% | 2 sets |

Quantity of electric

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|----------------------|----------------------|---|---|
| 5 | | | | |
| 511 | Power Source | 電力電源 | Output(V): 0.01mV to 1200V Output(A): 5mA to 0.5A | 3 sets |
| 512 | Digital Power Meter | デジタル電力計 | Range(V): 3 to 600V Range(A): 100mA to 30A | 2 sets(single phase) 2 sets(three phase) |
| 513 | Digital Multimeter | デジタルマルチメーター | Range: ±100mV to ±1000V(DC) Range: 1V to 500V(AC) | 2 sets |
| 6 | | | | |
| 611 | Digital LCR Meter | デジタルLCRメーター | Range(L): 100nH to 1000H Range(C): 1pF to 1F | 3 sets |
| 612 | Standard Capacitance | 標準容量 | Capacitance: 1pF, 10pF, 100pF, 1000pF | |
| 613 | Standard Capacitance | 標準容量 | Capacitance: 0.01μF, 0.1μF, 1μF | |
| 7 | | | | |
| 71 | | | | |
| 711 | Measuring Receiver | レシーバー | RF Power Range: +30dBm ~ -20dBm Frequency Range: 0.1MHz ~ 2.6GHz | |
| 712 | Distortion Meter | ひずみ計 | | |

Quantity of electric

List of measuring equipment

| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|---------------------------|----------------------|--|---------|
| 713 | Impedance Transformer | インピーダンストランス | Frequency Range:DC to 1,000MHz Impedance: 50 Ω --- 75 Ω | 3 sets |
| 714 | Measuring Receiver | レシーバー | | |
| 715 | Distortion Meter | ひずみ計 | | |
| 72 | | | | |
| 721 | Impedance Transformer | インピーダンストランス | Frequency Range:DC to 1,000MHz Impedance: 50 Ω --- 75 Ω | 3 sets |
| 722 | Selective Level Meter | 選択性レベルメーター | Frequency: 200Hz to 6.4MHz Level Range: -120 to +30dBm | |
| 723 | Selective Level Meter | 選択性レベルメーター | Frequency: 200Hz to 6.4MHz Level Range: -120 to +30dBm | |
| 73 | | | | |
| 731 | Standard Signal Generator | 標準信号発生器 | Frequency: 100kHz ~ 1040MHz Resolution: 10Hz | |
| 732 | Precision Attenuator Set | 精密アッテネータセット | Standard Value: 3,6,10,20dB Impedance: 50Ω | 2 sets |
| 733 | Precision Attenuator Set | 精密アッテネータセット | Standard Value: 3,6,10,20dB Impedance: 50Ω | 2 sets |

Quantity of electric List of measuring equipment

| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|---------------------------|----------------------|--|---------|
| 734 | Measuring Receiver | レシーバー | | |
| 735 | Impedance Transformer | インピーダンストランス | Frequency Range:DC to 1,000MHz Impedance: 50 Ω --- 75 Ω | 3 sets |
| 736 | Impedance Transformer | インピーダンストランス | Frequency Range:DC to 1,000MHz Impedance: 50 Ω --- 75 Ω | 3 sets |
| 74 | | | | |
| 741 | Standard Signal Generator | 標準信号発生器 | Frequency: 100kHz ~ 1040MHz Resolution: 10Hz | |
| 742 | Precision Attenuater Set | 精密アッテネータセット | Standard Value: 3,6,10,20dB Impedance: 50Ω | 2 sets |
| 743 | Precision Attenuater Set | 精密アッテネータセット | Standard Value: 3,6,10,20dB Impedance: 50Ω | 2 sets |
| 744 | Impedance Transformer | インピーダンストランス | Frequency Range:DC to 1,000MHz Impedance: 50 Ω --- 75 Ω | 3 sets |
| 745 | Selective Level Meter | 選択性レベルメーター | Frequency: 200Hz to 6.4MHz Level Range: -120 to +30dBm | |
| 75 | | | | |
| 751 | Frequency Synthesizer | 周波数シンセサイザ | Frequency: 1μHz ~ 50MHz Accuracy: 5ppm | |

Quantity of electric List of measuring equipment

| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|---------------------------|----------------------|--|---------|
| 752 | Thermal Converter | 熱変換器 | Frequency Range: 5Hz to 50MHz Voltage Range: 0.5 to 1000V | 6 sets |
| 753 | Thermal Transfer Standard | 熱変換標準 | | |
| 754 | Level Meter | レベルメーター | | |
| 755 | DC Reference Standard | 直流標準 | | |
| 76 | | | | |
| 761 | Frequency Synthesizer | 周波数シンセサイザ | Frequency: 1 μ Hz \sim 50MHz Accuracy: 5ppm | |
| 762 | Electronic Volt Meter | 電子電圧計 | | |
| 77 | | | | |
| 771 | Selective Level Meter | 選択性レベルメーター | Frequency: 200Hz to 6.4MHz Level Range: -120 to +30dBm | |
| 81 | | | | |
| 811 | Frequency Synthesizer | 周波数シンセサイザ | Frequency: 1 μ Hz \sim 50MHz Accuracy: 5ppm | |

Quantity of electric

List of measuring equipment

| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|----------------------------|----------------------|--|---------|
| 812 | Variable Resistor | 可変抵抗 | Range: 0.100 to 1,111,210 Ω | 3 sets |
| | Variable Resistor | 可変抵抗 | Range: 0 to 1,111,110M Ω | |
| | Variable Resistor | 可変抵抗 | Range: 0.1 to 111,111 Ω | 3 sets |
| | Variable Resistor | 可変抵抗 | Range: 1 to 1,111,110 Ω | 3 sets |
| 813 | Thermal Convector | 熱変換器 | Frequency Range: 5Hz to 50MHz Voltage Range: 0.5 to 1000V | 6 sets |
| 814 | Thermal Transfer Standard | 熱変換標準 | | |
| 82 | | | | |
| 821 | RF Power Transfer Standard | 高周波電力変換標準 | Frequency: 0.01 ~ 18GHz Impedance: 50 Ω | 2 sets |
| 822 | Power Meter | 電力計 | Range: 10 μ W to 25mW Accuracy: \pm 0.3% | 3 sets |
| 823 | Digital Voltmeter | デジタル電圧計 | Range(DC V): 200mV to 1000V Range(AC V): 200mV to 1000V | |
| 83 | | | | |

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|------------------------------|----------------------|--|---------|
| 831 | RF Power Level Control Unit | 高周波電力コントロールユニット | Level Range: 0.5 to 10mW Accuracy: $\pm 0.1\%$ | |
| 832 | RF Power Transfer Standard | 高周波電力変換標準 | Frequency: 0.01 ~ 18GHz Impedance: 50 Ω | 2 sets |
| 833 | Synthesized Signal Generator | シグナルシンセサイザ | Range: 10MHz to 8GHz Accuracy: $\pm 5\text{MHz}$ | |
| 834 | RF Power Transfer Standard | 高周波電力変換標準 | Frequency: 0.01 ~ 18GHz Impedance: 50 Ω | |
| 91 | | | | |
| 911 | RF Impedance Analyzer | 高周波インピーダンス・アナライザ | Frequency Range: 1MHz to 1GHz Accuracy: $\pm 3\text{ppm}$ | |
| 912 | Converter | コンバーター | | |
| 92 | | | | |
| 921 | LF Impedance Analyzer | 低周波インピーダンス・アナライザ | Frequency Range: 5 Hz to 13MHz Accuracy: $\pm 50\text{ppm}$ | |
| 93 | | | | |
| 931 | Sweep Generator | スイープ・ジェネレータ | Frequency Range: 10MHz to 8GHz Accuracy: $\pm 3\text{ppm}$ | |

Quantity of electric List of measuring equipment

| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|---------------------------------------|----------------------|-----------------------------------|---------|
| 932 | D.U.T | D.U.T | | |
| 933 | Adaptor | アダプター | | |
| 934 | RF Detector | 高周波デテクター | | |
| 935 | Scalar Network Analyzer Horizontal | スカラネットワーク | Dynamic Range: 76dB Channel: 2 | |
| 936 | Ink Jet Printer | プリンター | | |
| a1 | | | | |
| a11 | Calibration Generator | キリブローシヨウ・ジエネレータ | | |
| a12 | Time Mark Generator | タイムマーク・ジエネレータ | | |

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|----------------------|----------------------|---|---------|
| | Standard Resistor | 標準抵抗 | Resistance: 0.01Ω Accuracy: ±0.02% | 2 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 0.1 Ω Accuracy: ±0.002% | 2 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 100kΩ Accuracy: ±0.002% | 2 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 10Ω Accuracy: ±0.02% | 1 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 100 Ω Accuracy: ±0.002% | 1 sets |
| | Standard Resistor | 標準抵抗 | Resistance: 10 kΩ Accuracy: ±0.005% | 1 sets |
| 415 | Extender | エクステンダー | Ratio: 1000:1/100:1/10:1 Max. Input Current:100A(1000:1) | |

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|------------------------------|----------------------|---|---------|
| a13 | Leveled Sine Wave Generator | 正弦波発生器 | Frequency Range: 250kHz-250MHz | |
| a14 | 75Ω TEE Adaptor | 75Ω TEE アダプター | | |
| a15 | 75Ω BNC Adaptor | 75Ω BNC アダプター | | |
| a16 | Probe | プローブ | | |
| a17 | RF Voltmeter | 高周波電圧計 | Voltage Range: 200μV to 3V Frequency range: 10Hz to 2.5GHz | |
| a2 | | | | |
| a21 | Synthesizer | シンセサイザー | Frequency: 5 Hz to 109.9kHz Frequency Accuracy: ±1% | |
| a22 | Differential Voltmeter | 差動電圧計 | | |
| a3 | | | | |
| a31 | Wow Flutter Meter Calibrator | ワウメーター校正装置 | Center Frequency: 3000, 3150Hz | |
| a32 | Wow Flutter Meter | ワウメーター | Frequency range: 10Hz-300kHz | |

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|--------------------------------|----------------------|---|---------|
| a4 | | | | |
| a31 | Distortion Meter Calibrator | ひずみ率計校正装置 | Frequency range: 20kHz to 20kHz Distortion Range: -90 to -10dB | |
| a32 | Wow Flutter Meter | ワウメーター | Fundamental Frequency: 10Hz to 159.9kHz | |
| b1 | | | | |
| b11 | Standard Signal Generator | 標準信号発生器 | Frequency: 100kHz ~ 1040MHz Resolution: 10Hz | |
| b12 | Precision Attenuator Set | 精密アッテネータセット | Standard Value: 3, 6, 10, 20dB Impedance: 50Ω | 2 sets |
| b13 | Precision Attenuator Set | 精密アッテネータセット | Standard Value: 3, 6, 10, 20dB Impedance: 50Ω | 2 sets |
| b14 | Measuring Receiver | レシーバー | | |
| c | | | | |
| c1 | | | | |
| c11 | Rubidium Frequency Standard | 周波数標準 | Frequency: 5MHz Stability: $\leq 1 \times 10^{-6}$ /month | |

Quantity of electric List of measuring equipment

| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|---------------------------|----------------------|---|---------|
| c12 | Power Unit | パワーユニット | Output: 23V | |
| c13 | Frequency Converter | 周波数変換器 | Output Frequency: 0.1, 1, 5, 10MHz Output Voltage: 1Vrms | |
| c14 | Frequency Counter | 周波数カウンタ | Frequency: 10MHz to 550MHz | |
| c2 | | | | |
| c21 | Standard Signal Generator | 標準信号発生器 | Frequency: 100kHz ~ 1040MHz Resolution: 10Hz | |
| c22 | Precision Attenuator Set | 精密アッテネータセット | Standard Value: 3, 6, 10, 20dB Impedance: 50Ω | 2 sets |
| c23 | Step Attenuator | ステップアッテネータ | Frequency: DC to 1000MHz Impedance: 50Ω | 2 sets |
| c24 | Precision Attenuator Set | 精密アッテネータセット | Standard Value: 3, 6, 10, 20dB Impedance: 50Ω | 2 sets |
| c25 | Oscilloscope | オシロスコープ | Frequency Range: 1GHz | 3 sets |
| c26 | Measuring Receiver | レシーバー | | |
| c3 | | | | |

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|---------------------------|----------------------|--|---------|
| c31 | Standard Signal Generator | 標準信号発生器 | Frequency: 100kHz ~ 1040MHz Resolution: 10Hz | |
| c32 | Low Frequency Generator | 低周波数信号発生器 | | |
| c33 | Spectrum Analyzer | スペクトラムアナライザー | Frequency: 100MHz to 1.5GHz | |
| c34 | Measuring Receiver | レシーバー | | |
| d1 | | | | |
| d11 | Standard Signal Generator | 標準信号発生器 | Frequency: 100kHz ~ 1040MHz Resolution: 10Hz | |
| d12 | Precision Attenuator Set | 精密アッテネータセット | Standard Value: 3,6,10,20dB Impedance: 50Ω | 2 sets |
| d13 | Impedance Transformer | インピーダンストランス | Frequency: DC to 1000MHz Impedance: 50Ω---75Ω | 3 sets |
| d14 | Impedance Transformer | インピーダンストランス | Frequency: DC to 1000MHz Impedance: 50Ω---75Ω | 3 sets |
| d15 | Precision Attenuator Set | 精密アッテネータセット | Standard Value: 3,6,10,20dB Impedance: 50Ω | 2 sets |
| d16 | Measuring Receiver | レシーバー | | |

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|---------------------------------|----------------------|--|---------|
| d2 | | | | |
| d21 | Frequency Synthesizer Generator | 周波数シンセサイザー | Frequency: 1 μ Hz to 50MHz Accuracy: 5 ppm | |
| d22 | Selective Level Meter | 選択性レベルメーター | Frequency: 200Hz to 6.4MHz Level Range: -120 to +30dBm | |
| d23 | DC Reference Standard | 直流標準 | | |
| d24 | Thermal Converter | 熱変換器 | Frequency Range: 5Hz to 50MHz Voltage Range: 0.5 to 1000V | 6 sets |
| d25 | Thermal Transfer Standard | 熱変換標準 | | |
| d3 | | | | |
| d31 | Standard Signal Generator | 標準信号発生器 | Frequency: 100kHz ~ 1040MHz Resolution: 10Hz | |
| d32 | Precision Attenuator Set | 精密アッテネータセット | Standard Value: 3,6,10,20dB Impedance: 50 Ω | 2 sets |
| d33 | Step Attenuator | ステップアッテネータ | Frequency: DC to 1000Mhz Impedance: 50 Ω | 2 sets |
| d34 | DC Reference Standard | 直流標準 | Standard Value: 3,6,10,20dB Impedance: 50 Ω | 2 sets |

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| No | Equipment Name(Eng.) | Equipment Name(Jpn.) | Specification | Remarks |
|-----|------------------------|----------------------|---|---------|
| d36 | Differential Voltmeter | 差動電圧計 | | |
| d37 | DC Reference Standard | 直流標準 | Standard Value: 3,6,10,20dB Impedance: 50Ω | 2 sets |
| d38 | Impedance Transformer | インピーダンストランス | Frequency: DC to 1000MHz Impedance: 50Ω---75Ω | 3 sets |
| d39 | Selective Level Meter | 選択性レベルメーター | Frequency: 200Hz to 6.4MHz Level Range: -120 to +30dBm | |

The following table shows the estimated cost for materials and equipment by quantity in physical state.

(Unit: thousand yen)

| Quantity in physical state | Estimated cost of materials and equipment |
|----------------------------|---|
| Length | 93,000 |
| Mass | 62,000 |
| Volume | 62,000 |
| Force | 54,000 |
| Pressure | 18,000 |
| Temperature | 68,000 |
| Luminous intensity | 150,000 |
| Quantity of electric | 281,000 |
| Total | 788,000 |

ANNEX 7-1

EFFECTS OF STANDARDIZATION IN EACH DEPARTMENT OF A COMPANY

1. Procuring department

(1) The following effects can be expected by reducing the number of types of materials to be purchased;

- * Increase of a quantity of materials purchased at once, and reduction of purchase price
- * Reduction of material stock
- * Reduction of dead stock
- * Reduction of area for storing stock and required facilities
- * Reduction of need to transport materials
- * Expansion of a range of users' option
- * Reduction of a volume of expensive and special products to be purchased
- * Easiness in planning for purchase
- * Reduction of waiting time for articles out of stock
- * Simplification of format of forms and slits
- * Higher efficiency in works for placing orders, purchase and acceptance

(2) The following effects can be expected by standardizing works for purchase and placing orders to external vendors

- * Easiness in planning for purchase
- * Reduction of works for communications because of well communications with external vendors
- * Reduction of waiting time for articles out of stock
- * Reduction of returned articles
- * Simplification of format of forms and slits

2. Designing department

(1) The following effects can be expected by reducing the number of products and parts to be purchased;

- * Improvement in designing technique standard
- * Reduction of designing misses and faulty products
- * Reduction of time required for completion of a design package and a smooth production plan
- * Timely allowance in designing jobs, which allows improvement of existing products and development of new products
- * Easiness in management of drawings and designing documents
- * High efficiency in designing jobs

(2) The following effects can be expected by standardizing designing jobs;

- * Reduction of designing misses and defective products

- * Reduction of time required for completion of a design package and a smooth production plan
- * Easiness in management of drawings and designing documents
- * High efficiency in designing jobs

3. Manufacturing department

(1) The following effects can be expected by reducing the number of types of products and parts to be purchased;

- * Longer production period and higher production rate
- * Mechanization and automation of facilities, and improvement in product quality and efficiency
- * Employment of dedicated facilities and processes, which insures improvement in product quality and efficiency
- * Reduction of semi-finished articles
- * Reduction of tools and measurement equipment to be owned and stored
- * Easiness in training employees, which insures better skill of and higher safety for workers
- * Easiness in production management, which contributes to improvement in product quality and realization of stable production

(2) The following effects can be expected by standardizing manufacturing works;

- * Easiness in training workers, which contributes to improvement of workers' skill and higher safety for them

- * Reduction of defective products
- * Easiness in improvement of works
- * Easiness in production management, which contributes to improvement of product quality and stable production
- * Reduction time required for adjusting production facilities and reduction of down time
- * Reduction of failure frequency in production facilities
- * Reduction of waiting time
- * Higher efficiency in production

4. Inspecting department

(1) The following effects can be expected by reducing the number of types of products and parts;

- * Increase of inspection lot size and relative reduction of a number of inspection processes
- * Reduction of time required for adjusting facilities for testing and measurement and reduction of down time of facilities
- * Employment of dedicated facilities for testing and measurement, which insures improvement in measurement precision and efficiency
- * Reduction of inspection misses
- * Reduction of stocks waiting for inspection
- * Easiness in training examiners, which contributes to improvement of examiners' skill and realization of higher safety for workers

(2) The following effects can be expected by standardizing the inspection jobs;

- * Easiness in training inspectors, which contributes to improvement of inspectors' skill and realization of higher safety for workers
- * Reduction of inspection misses
- * Easiness in improving measuring method
- * Correct criteria for inspection and easy management
- * Reduction of time required for adjusting facilities for testing and measurement and reduction of down time
- * Improvement in management of precision of facilities for testing and measurement
- * Reduction of waiting time

5. Facility maintenance department

(1) The following effects can be expected by employing dedicated facilities or reducing the number of types of facility;

- * Improvement in product quality
- * Higher efficiency in works
- * Reduction of disasters and accidents in plants
- * Reduction of facilities to be owned
- * Reduction of stocked spare parts such as units for services
- * Easiness in maintenance work

- * Reduction of cost and labor required for maintenance

- * Improvement of maintenance personnel's skill

- * Reduction of failures

- * Reduction of down time due to failures

(2) The following effects can be expected by standardizing the works for facility maintenance:

- * Possibility to systematically carry out maintenance work

- * Correct selection of facilities

- * Easiness in maintenance work, which allows efficient performance of works

- * Easiness in management of spare parts

- * Reduction of time and labor required for maintenance

- * Easiness in training maintenance personnel

- * Reduction of failures

- * Reduction of down time due to failures

- * Reduction of troubles due to poor maintenance

- * Improvement of product quality

- * Higher efficiency in works

- * Reduction of accident in plants

6. Marketing department

(1) The following effects can be expected by reducing the number of types of products and parts:

- * Rapid delivery
- * Reduction of stocked products
- * Reduction of area and facilities required for storing stocks
- * Rationalization in packing
- * Rationalization in transportation
- * Concentrated efforts for marketing and sales
- * Efficient advertisement
- * Easiness in treatment of claims by customers and better services
- * Reduction of troubles and misunderstandings in transaction
- * Easiness in training sales people
- * Easiness in evaluation of sales performance record
- * Simplification of marketing and higher efficiency

(2) The following effects can be expected by standardizing jobs for marketing and selling:

- * Reduction of troubles and misunderstandings in transaction
- * Easiness in treatment of claims by customers and better services
- * Easiness in training sales people

- * Easiness in evaluation of sales performance record
- * Simplification of jobs for marketing and higher efficiency in the jobs

7. Managing department

The following effects can be expected by standardizing jobs for management;

- * Managers can be liberated from routine jobs and devote themselves to important works requiring decision making by managers.
- * Better communications for direction of management policies and development of team work spirit in a company, which contribute realization of better human relations in the company
- * Clarification of responsibility and power, and reduction of redundant efforts by each person in the company
- * Reduction of troubles, misunderstandings and misses in jobs
- * Higher job efficiency
- * Simplification of forms and slits

ANNEX 8-1-(1)

RESULTS OF QUESTIONNAIRE TO INDUSTRIES

1. Outline of the Survey

1.1 Purpose of the Survey

As part of the industrial standard consolidation plan in the Republic of Chile, and in order to grasp the actual situation of application of national standards in local industries, actual situation of quality control, and needs for certification and measurement systems, we carried out questionnaire to industries using a questionnaire sheet in the first survey at the site, in addition to the survey through interview.

1.2 Method for Carrying Out the Survey and The Period of Implementation

Object: 300 manufacturers in Chile

Sampling: Industries listed in the industry directory owned by INN were classified to the following 8 types, and the 300 industries were proportionately allocated to the job types.

Method for implementation: The questionnaire was mailed to each industry. Respondents were asked to enter necessary information in the questionnaire and send it back.

Period of Implementation:

Start of distribution - Middle of March, 1991

End of recovery - End of June, 1991

Percentage of recovery: 38% (115 sheets recovered)

1.3 Contents of the Questionnaire

The survey items are as described below.

- (1) Attribute of industry (Questions from No. 100 to No.109 in the attached questionnaire)
- (2) For national standards in Chile (2000 Norma Chilenas) (Questions from No. 200 to No. 206)
- (3) Unified certification system (Questions from No. 300 to No.309)
- (4) TQC (Questions from No. 400 to No. 410)
- (5) Testing and inspection (No. 500 to No.508)

2. Outline of the Results

2.1 Attributes of Industries

Attributes of the industries were as described below. About 70% of the respondent companies have their head quarters in the Capital, and also nearly 70% of the industries were founded in 1970 or before. Percentages of industries employing 300 or more workers, those with the capital of more than 300 million peso, and those with the annual production of 2 billion peso are more than 50%, so there are many large scale industries among the respondent industries.

60% of all industries are exporting at least a portion of their products, while percentage of companies exporting more than half of their products is somewhat less than 10%.

(1) Types of industry

| | |
|---------|------------------------|
| Total | 111 companies (100.0%) |
| Textile | 9 companies (8.1%) |
| Cement | 6 companies (5.4%) |
| Foods | 28 companies (25.2%) |

| | | |
|-------------|--------------|---------|
| Chemicals | 28 companies | (25.2%) |
| Metal | 17 companies | (15.3%) |
| Electricity | 3 companies | (2.7%) |
| Paper | 4 companies | (3.6%) |
| Others | 16 companies | (14.4%) |

(2) Region where the respondents industries are located

| | | |
|--------------------|--------------|---------|
| Capital Region | 76 companies | (68.5%) |
| 1st to 7th Region | 16 companies | (14.4%) |
| 8th and 9th Region | 12 companies | (10.8%) |
| No answer | 7 companies | (6.3%) |

(3) Year of foundation

| | | |
|----------------|--------------|---------|
| 1979 or before | 76 companies | (68.5%) |
| 1971 - 1980 | 21 companies | (18.9%) |
| 1981 - 1985 | 8 companies | (7.2%) |
| 1986 and after | 6 companies | (5.4%) |

(4) Number of employees

| | | |
|------------------|--------------|---------|
| up to 50 people | 16 companies | (14.4%) |
| 51 - 100 people | 15 companies | (13.5%) |
| 101 - 300 people | 29 companies | (26.1%) |
| 301 and over | 51 companies | (45.9%) |

(5) Capital

| | | |
|------------------------|--------------|---------|
| - 150 million peso | 18 companies | (16.2%) |
| 150 - 300 million peso | 7 companies | (6.3%) |
| 300 million peso | 75 companies | (67.6%) |
| No answer | 11 companies | (9.9%) |

(6) Annual production

| | | |
|------------------------------|--------------|---------|
| up to 400 million peso | 19 companies | (17.1%) |
| 400 million - 2 billion peso | 27 companies | (24.3%) |

| | |
|-------------------------|----------------------|
| 2 billion peso and over | 52 companies (46.8%) |
| No answer | 13 companies (11.7%) |

(7) Profit rate against sales

| | |
|--------------|----------------------|
| up to 5% | 24 companies (21.6%) |
| 5 - 10% | 36 companies (32.4%) |
| 10% and over | 24 companies (21.6%) |
| No answer | 27 companies (24.3%) |

(8) Export vs production ratio

| | |
|--------------|----------------------|
| No export | 36 companies (32.4%) |
| up to 50% | 57 companies (51.4%) |
| 50% and over | 9 companies (8.1%) |
| No answer | 9 companies (8.1%) |

2.2 National Standards in Chile)

(1) Recognition

Responses to the question concerning recognition of national standards in Chile are as follows.

| | |
|--|----------------------|
| "Know well" | 81 companies (73.0%) |
| "Know a portion of it, or only the name" | 24 companies (21.6%) |
| "Don't know" | 2 companies (1.8%) |

So it can be said that their recognition is very high. Especially, the recognition in the foods industry is very high.

(2) Usage

Responses to the question concerning usage of the national standards are as shown below. This result shows that about three quarters of all industries are more or less dependent on the national standards. Usage of the national standards in the foods industry is far higher than that in other industries.

| | |
|-----------------------|----------------------|
| "Using as standards" | 34 companies (30.6%) |
| "Using as references" | 48 companies (43.2%) |
| "Not using" | 25 companies (22.5%) |

To the companies not using the national standards, the reason was asked, and the result was as follows.

| | |
|---|---------------------|
| "Don't know the existence of the national standards itself" | 2 companies (8.0%) |
| "Didn't know the national standards applicable to our products" | 7 companies (28.0%) |
| "Level of the contents of the national standards is too low" | 4 companies (16.0%) |

(3) Evaluation

82 companies answered that they were using the national standards, and these companies were asked to evaluate the national standards. As a general impression, most of the companies think that the national standards are "useful" and also their evaluation of applicability of the national standards to industries in Chile is very high. On the other hand, some complaints concerning the range and easiness-to-use of the national standards are observed. As for the level, most of the companies using the national standards answered that the level was "appropriate". As for accessibility of information on the national standards, about 90% of the respondent companies answered that they could get the information easily. So it can be said that at least companies using the national standards now are generally satisfied with the standards. No large difference between types of industry can not be observed.

| | |
|-----------------------|----------------------|
| A. General impression | |
| "Useful" | 79 companies (96.3%) |
| "A little useful" | 3 companies (3.7%) |
| "Not useful at all" | 0 company (0.0%) |

| | | |
|---|--------------|---------|
| B. Applicability to the current Chilean industries | | |
| "Appropriate" | 76 companies | (92.7%) |
| "Not appropriate" | 5 companies | (6.1%) |
| C. Range | | |
| "Wide" | 63 companies | (76.8%) |
| "A little narrow" | 16 companies | (19.5%) |
| "Too narrow" | 1 company | (1.2%) |
| D. Easiness-to-use | | |
| "Easy to use" | 68 companies | (82.9%) |
| "A little difficult" | 14 companies | (17.1%) |
| "Too difficult" | 0 company | (0.0%) |
| E. Level | | |
| "High" | 13 companies | (15.9%) |
| "Appropriate" | 69 companies | (84.1%) |
| "Low" | 0 company | (0.0%) |
| F. Accessibility to information on national standards | | |
| "Easy" | 71 companies | (86.6%) |
| "Difficult" | 10 companies | (12.2%) |
| "Very difficult" | 1 companies | (1.2%) |

2.3 Unified Certification System

(1) Recognition of a national certification system of INN

Responses to the question concerning recognition of a national certification system are as follows.

| | | |
|-----------------|--------------|---------|
| "Know well" | 11 companies | (9.9%) |
| "Know a little" | 52 companies | (46.8%) |
| "Don't know" | 43 companies | (38.7%) |

So the certification system is known to somewhat more than half of all industries. The recognition is relatively low in textile, metal and paper industries.

14 companies actually made an application for the conformity to the national certification system (3 companies in chemical and metal industries respectively, and 1 company in cement and foods industry respectively, and 4 companies in other industries).

(2) Certification system, evaluation of examination

A question as to procedure of examination was asked to the 14 companies which made an application for the mark, and 13 companies answered that "the criteria and procedure for the examination is appropriate". On the other hand, only 9 companies said "Good" to knowledge and experience of auditors, 3 companies said "Not so good", and 2 companies said "Not good at all". For examination fee, only 2 companies said "Appropriate", 8 companies said "A little high", and 4 companies said "Too high".

For the certification system itself and its administration, 7 of 14 companies said "The system and its administration are good", 6 companies said "The system is good, but its administration is bad", and 1 company said "Both of the system and administration are bad".

2.4 TQC and Quality Control

(1) Introduction of TQC

How TQC has been introduced was studied, and the following results were obtained.

| | |
|---|----------------------|
| "Generally or partially introduced" | 81 companies (73.0%) |
| "Aware of the importance, but not introduced yet" | 29 companies (26.1%) |
| "Not necessary, so not introduced" | 0 company (0.0%) |

Thus, all industries are aware of the importance of TQC, and more than 70% of the industries have actually introduced TQC. The introduction ratio are high in textile, foods and paper

industries.

To the industries which are aware of the necessity of TQC but have not introduced it yet, the reasons were asked, and the result is as follows.

| | |
|--|----------------------|
| "No knowledge and capability for TQC" | 7 companies (24.1%) |
| "Scare equipment and facilities for introduction of TQC" | 12 companies (41.4%) |
| "Increase of cost due to introduction of QC" | 6 companies (20.7%) |

Many companies in the chemical industry answered that "equipment and facilities for TQC are scarce".

(2) Result of TQC

To 81 companies which have already introduced TQC, the questions as to what effects they expected before introduction of TQC and how the effects were achieved were asked, and the result is as follows. 4 choices of "Good", "Not good", "Rather worse" and "Not clear" were prepared for evaluation of improvement because of introduction of TQC, and 3,2,1, and 0 points were assigned to each choice respectively for calculating the weighted mean.

The result show that all of the respondent industries introduced QC expecting "improvement of product quality" and achieved fully satisfactory results. In addition, the percentages of companies which expected repercussion effects of improvement in product quality such as "stabilization of product quality", "reduction of rejected products", and "reduction of claims" are high, and the companies have achieved satisfactory results. The only item in which the company has not achieved any good results is "reduction of employees", but the percentage of companies which expected the effect before introduction of TQC is rather low.

| Expected effects | Result (3 point for the best) | |
|--|-------------------------------|------------|
| a. Improvement in product quality | 81 companies (100.0%) | 2.9 points |
| b. Stabilization of product quality | 78 companies (96.3%) | 2.7 |
| c. Resource saving | 54 companies (66.6%) | 2.6 |
| d. Reduction of rejected products | 71 companies (87.7%) | 2.8 |
| e. Reduction of production cost | 67 companies (82.7%) | 2.7 |
| f. Reduction of time required for shipment | 45 companies (55.6%) | 2.6 |
| g. Reduction of claims | 71 companies (87.7%) | 2.8 |
| h. Reduction of employees | 33 companies (40.7%) | 1.6 |
| i. Increase of sales | 65 companies (80.2%) | 2.8 |

(3) Current situation of implementation of QC

Main bodies responsible for introduction of QC in companies which have already introduced QC are as follows.

| | |
|-----------------------------|----------------------|
| "Top management" | 21 companies (25.9%) |
| "Middle management" | 58 companies (71.6%) |
| "Quality control engineers" | 46 companies (56.8%) |
| "Groups such as QC circles" | 28 companies (34.6%) |

So, it may be said that QC in Chile is, different from that in Japan, carried out mainly by management.

Standards used in QC are as follows.

| | |
|----------------------------------|----------------------|
| "Chilean national standards" | 51 companies (63.0%) |
| "Specification of clients" | 41 companies (50.6%) |
| "Standards of foreign countries" | 53 companies (65.4%) |
| "In-house standards" | 61 companies (75.3%) |

So it may be said that many companies are using their in-house standards.

The QC technique used most frequently is use of check sheets as shown below, and about 90% of industries have introduced this method. Then, control charts are used. No difference is observed between types of industries.

| | |
|----------------------------|----------------------|
| "Check sheet" | 73 companies (90.1%) |
| "Histogram" | 20 companies (24.7%) |
| "Control chart" | 58 companies (71.6%) |
| "Scatter diagram" | 19 companies (23.5%) |
| "Pareto diagram" | 6 companies (7.4%) |
| "Cause and effect diagram" | 6 companies (7.4%) |
| "Stratification" | 4 companies (4.9%) |
| "Others" | 8 companies (9.9%) |

(4) Education of employees

Responses to the question concerning the method for implementation of QC education in companies are as follows.

| | |
|---|----------------------|
| "Training in each job shop" | 36 companies (44.4%) |
| "Invitation of tutors from outside" | 16 companies (19.8%) |
| "Participation in seminars outside the companies" | 64 companies (79.0%) |
| "No specific method" | 21 companies (25.9%) |

The percentage of industries which have introduced QC but do not provide their employees with any specific education amounts to a quarter.

(5) Requests to the government

A question as to requests each company has to the Chilean Government in relation to QC was made, and the following responses were obtained. Not direct assistance to industries, but initiative by the government to diffuse QC throughout the country is expected more strongly by the industries.

| | |
|--|----------------------|
| "Financial assistance for introduction of equipment for testing" | 19 companies (17.1%) |
| "Improvement of level of seminars for training" | 34 companies (30.6%) |
| "Nation-wide campaign for improvement of product quality" | 87 companies (78.4%) |

| | |
|---|----------------------|
| "Improvement of level of national standards" | 24 companies (21.6%) |
| "Consolidation and improvement of a certification system" | 23 companies (20.7%) |

2.5 Testing and Inspection

(1) Testing and inspection systems

A question was made for availability of specialists for testing and inspection in respondent companies, and the following results were obtained. The table below shows the number of companies in each type of industry which answered that they have specialists in each job type for testing and inspection.

| | | Specialists | Engineers | Skilled workers |
|----------------------------|----------|---------------|---------------|-----------------|
| All | 111 com. | 70 (63.1%) | 70 (63.1%) | 67 (60.4%) |
| Employees >= 301 people | 45 | 41 (91.1%) | 36 (80.0%) | 32 (71.1%) |
| Employees 101 - 300 people | 27 | 18 (66.7%) | 21 (77.8%) | 23 (85.2%) |
| Employees <= 100 people | 24 | 11 (45.8%) | 13 (54.2%) | 12 (50.0%) |
| Textile | 9 | 6 (66.7%) | 6 (66.7%) | 7 (77.8%) |
| Cement | 6 | 6 (100.0%) | 6 (100.0%) | 5 (83.3%) |
| Foods | 28 | 15 (53.6%) | 6 (21.4%) | 4 (14.3%) |
| Chemical | 28 | 20 (71.4%) | 18 (64.3%) | 18 (64.3%) |
| Metal | 17 | 8 (47.1%) | 11 (64.7%) | 8 (47.1%) |
| Electricity | 3 | 3 (100.0%) | 3 (100.0%) | 3 (100.0%) |
| Paper | 4 | 3 (75.0%) | 2 (50.0%) | 2 (50.0%) |
| Others | 16 | 7 (43.8%) | 8 (50.0%) | 8 (50.0%) |

The industries employing more employees have more specialists and engineers for testing and inspections. On the other hand, The percentage of industries employing skilled workers for testing and inspections is the highest in medium-scale industries having 101 to 300 employees. The percentages of industries having specialists in the fields of textile, cement, chemicals and electricity are

high, while the percentage is low in the food industry.

As for equipment for testing and inspection owned in each company, 61 companies (55.0%) answered "Satisfactory", and the percentage is higher than that of industries which said "Short" (34 companies, 30.6%). 60% or more of companies in the metal industry said "Short".

Also, 27 companies said "A portion of the jobs for testing and inspection are consigned to external parties", and the percentage is 24.3% of all. The percentage is high in the food and metal industries.

(2) Contents and current situation of implementation

The standards which respondent companies depend on are as follows.

| | |
|--|----------------------|
| "Standards of public or private organizations" | 7 companies (6.3%) |
| "Chilean national standards" | 61 companies (55.0%) |
| "Foreign standards or international standards" | 75 companies (67.6%) |
| "Others" | 19 companies (17.1%) |

Companies in the chemical industry generally depend on foreign and international standards, while companies in the textile, cement and foods industries depend on national standards at the same level as or a higher level than on foreign and international standards.

As for sections in production process where QC is carried out, the percentage of industries which answered that the QC are carried out in the final stage is the highest.

| | |
|-----------------------------------|----------------------|
| "Process to accept raw materials" | 75 companies (67.6%) |
| "Intermediate process" | 74 companies (66.7%) |
| "Final process" | 86 companies (77.5%) |

"Outside the production line" 32 companies (28.8%)

More than 60% of industries have independent laboratories for testing and inspection in their sites (plants).

"Have labo." 70 companies (63.1%)

"No labo." 35 companies (31.5%)

The percentage of industries having a laboratory in the chemical industry is around 80%.

Responses to a question as to their own technical level of testing and inspection are as follows.

"Very good" 30 companies (27.0%)

"Relatively good" 47 companies (42.3%)

"Good" 28 companies (25.2%)

"Bad" 2 companies (1.8%)

So it may be said that the companies are generally satisfied with their own technology. Self-evaluation is especially high in the cement and food industries.

(3) Education of employees

Responses to a question concerning education of employees for measurement control are as follows. Very few companies are providing education in this field.

"Outside seminar" 33 companies (29.7%)

"In-company seminar" 10 companies (9.0%)

"No course" 62 companies (55.6%)

ANNEX 8-1-(2) QUESTIONNAIRE TO CHILEAN COMPANIES

Please circle the appropriate items or specify your reply, if necessary.

(1) IDENTIFICATION OF YOUR COMPANY

101. Name of the company

Address

Telephone

102. Contact person

Position

103. Region: I. II. III. IV. V. VI. VII. VIII. IX. X. XI,
XII. Metropolitan

104. Year of establishment

1. 1970 or before
2. 1971 - 1980
3. 1981 - 1985
4. 1986 or later

105. Number of employees

1. Fewer than 20 people
2. 21 - 50 persons
3. 51 - 100 persons
4. 101 - 300 persons
5. More than 300 persons

106. Capital

1. Less than \$30,000,000
2. \$30,000,001 - \$150,000,000
3. \$150,000,001 - \$300,000,000

4. More than \$300,000,000

107. Production in 1990, if permissible

1. Less than \$40,000,000
2. \$40,000,001 - \$400,000,000
3. \$400,000,001 - \$2,000,000,000
4. More than \$2,000,000,000

107.a Profit/sales ratio

1. 0% or less
2. Up to 2.5%
3. Up to 5.0%
4. Up to 7.5%
5. Up to 10.0%
6. More than 10%

107.b Proportion of exports, in % of 1990 production

1. 0%
2. 1 - 10%
3. 11 - 25%
4. 26 - 50%
5. 51 - 75%
6. 76% or more

108. Type of business

1. Textile, manufacture
2. Cement
3. Food processing
4. Chemical
5. Metallurgy
6. Metallomechanical
7. Electric machinery
8. Electronic machinery and appliances
9. Nonelectric and nonelectronic machinery

10. Leather
11. Paper, pulp
12. Furniture
13. Wood processing
14. Others (please specify)

109. Relationship between your company and other foreign companies with whom you have contact
(Circle all applicable items.)

The foreign company is:

1. A supplier of raw materials
2. A supplier of parts and components
3. One of our clients
4. A market researcher who works for us as well as for an associate exporter
5. A company which provides us with technical assistance
6. A company with which technical assistance is shared
7. A joint venture
8. Others (please specify)

(2) QUESTIONNAIRE REGARDING NCh

INN has established approximately 2,000 Chilean Standards (NCh) up to this time.

The objectives of NCh are the following:

- 1) To improve the quality of products
- 2) To increase productivity
- 3) To protect the health and safety of consumers and to protect the environment

201. Are you familiar with NCh?

1. Yes, very
2. Yes, somewhat or only the initials

3. No
202. Do the standards established by your company take into account those of NCh?
1. Yes (as a basic model)
 2. Yes (as reference)
 3. No
203. What is the reason that you indicated "3" in Question 202? (If you answered 1 or 2 in 202, go on to Question 204.)
1. Do not know of the existence of the NCh Standards.
 2. Am not familiar with the pertinent NCh Standards.
 3. Am familiar with pertinent NCh Standards, but the level of quality of these is far too high to apply them.
 4. Am familiar with pertinent NCh Standards, but the level of quality of these is far too low to apply them.
 5. Other reason, explain.

Those who responded in the affirmative to Question 202 should please answer Questions 204 and 205.

204. How do you evaluate the NCh Standards which you use?
- A. General impression
 1. Very useful
 2. Useful
 3. Of little use
 4. Useless
 - B. Corresponds with the situation of the Chilean industrial sectors
 1. Greatly corresponds
 2. Corresponds
 3. Does not correspond
 4. Does not correspond at all

- C. Scope
- 1. Quite extensive
- 2. Relatively extensive
- 3. Somewhat limited
- 4. Too limited

- D. Facility of use
- 1. Easy to use
- 2. Relatively easy to use
- 3. Relatively difficult
- 4. Very difficult

- E. Level
- 1. Too high
- 2. Somewhat high
- 3. Appropriate
- 4. Somewhat low
- 5. Too low

- F. Information of Chilean Standards
- 1. Difficult to obtain information
- 2. Relatively easy to obtain information
- 3. Relatively difficult to obtain information
- 4. Very difficult to obtain information

205. What would you require of INN activities?
(Circle all applicable items.)

- 1. More information regarding NCh Standards
- 2. More NCh Standards publications
- 3. More comments from the industrial sectors should be considered during the drawing up of NCh Standards
- 4. NCh Standards should be established more promptly

206. Write requests or comments related to the drawing up of new NCh Standards, if any, (apart from those indicated in Questions 201 - 205).

(3) CERTIFICATION SYSTEM

There is a national system of certification run by INN. In addition, there are various other systems of certification operating in the country.

301. Were you aware of the national system of certification run by INN?

1. Yes (very well)
2. Yes (but not well)
3. No

302. Have you applied for a license to use a stamp of conformance (or quality), corresponding to any system of certification in operation in Chile?

1. Yes
2. No

302.a Indicate what system or organization

302.b Did you obtain the stamp?

1. Yes
2. No

303. In case unsuccessful, what was the reason for which the license was denied?

1. Insufficient quality-control activities
2. The quality of the products do not comply with NCh Standards or corresponding technical specifications
3. Others

304. Comments regarding the evaluation (auditors) carried out by the certifying organization handling the system

1. The criteria and procedures were impartial and approved
2. The evaluation was not just or appropriate due to unclear stipulations
3. The severe criteria and complicated applied were too difficult for my company

305. What is your opinion in regard to the auditors who carry out the evaluation of the company? Their knowledge and experience appear to be:

1. Sufficient
2. Relatively good
3. Not very good
4. Absolutely insufficient

306. What is your opinion in regard to the fees for evaluation?

1. Completely reasonable
2. Somewhat high
3. Far too high

307. What is your opinion regarding the system of certification and operation?

1. The system is well organized and its operation is excellent
2. The system is good but not the operation
3. Neither the system nor the operation are good

The following question should be answered by a company which responded negatively in 302.

308. Why haven't you presented an application for a seal of certification?

(Circle all applicable items.)

1. There were no pertinent NCh Standards which could be applied to your products

2. We did not expect to increase sales using the system of certification in effect
3. The system of certification in effect could not be clearly understood due to very complicated procedures
4. It was considered that our products would not be controlled with sufficient quality control and neither did the product have sufficient quality
5. NCh Standards were not used in our production
6. Our customers did not request it
7. Judging from the Chilean public's interest, we believe that the stamp of certification on the products did not add any merit

309. Other comments regarding the system of certification indicated previously, if any

(4) TOTAL QUALITY CONTROL.

In highly-industrialized countries, total quality-control activities have been diligently put into practice, in public as well as private corporations. The putting into practice of quality control improves the quality and reduces costs, and, as a result, the expansion of the market and prosperity of the company can be anticipated. Consequently, this also improves the national economic level.

401. To what extent has total quality control been introduced in your company and what is your opinion in regard to the importance of quality?

1. Total quality control has been introduced in each of the stages of all the company's activities, improving the quality
2. Total quality control has been partially introduced in our company
3. In spite of realizing the importance of improving quality, total quality control has not yet been introduced in our company

4. We do not consider it necessary to improve the quality.

The following question is directed toward those who circled 4 in 401.

402. What is the reason you do not consider it is necessary to improve the quality?

1. We can maintain a sufficient market share without implementing quality control in our company.
2. The Chilean customer's interest is centered on low prices rather on the quality of the products.
3. Others

The following questions are directed to those who circled 3 in 401.

403. What is the reason for which quality control was not introduced in your company?

1. We do not have the knowledge or facilities related to quality control.
2. The infrastructure and other technical conditions are not sufficient to introduce quality control.
3. The personnel and costs increase due to the introduction of quality control.
4. Personnel are not interested in quality control.
5. We have a pessimistic idea in regard to cooperation of personnel.
6. Others

The following questions (404 to 409) are directed toward companies who have introduced quality control.

404. What did you expect from the introduction of quality control?

(Circle the applicable items and evaluate each item circled from 1 to 4.)

| The Numbers (1 to 4) in reply to the questions (a to j) indicate these in the right column respectively | 1. Satisfactory 2. Unsatisfactory 3. Negative 4. Not clear at this time |
|---|--|
| a. Improve the level of quality of the products | (1 . 2 . 3 . 4) |
| b. Stabilize the level of quality of the products | (1 . 2 . 3 . 4) |
| c. Save raw materials for production | (1 . 2 . 3 . 4) |
| d. Reduce defects in the final stage | (1 . 2 . 3 . 4) |
| e. Reduce production costs | (1 . 2 . 3 . 4) |
| f. Reduce the time of delivery | (1 . 2 . 3 . 4) |
| g. Reduce complaints from customers | (1 . 2 . 3 . 4) |
| h. Reduce the number of employees | (1 . 2 . 3 . 4) |
| i. Increase sales | (1 . 2 . 3 . 4) |
| j. Others (indicate specific items) | (1 . 2 . 3 . 4) |

405. Who are the key persons or groups in charge of implementing your company's quality control?

1. Top directors
2. Middle management (directors, managers)
3. Quality-control engineers
4. Groups (for example, quality-control groups)
5. Others (indicate specifically)

406. What class of standard or specification is used for quality-control activities?

1. NCh Standards
2. Customers' specifications
3. Foreign standards
4. Own standards (company's standards/specifications)
5. Others (indicate specifically)

407. In your company, at what stage of the production are quality-control techniques applied?

1. Design stage
2. Subcontracts/supply
3. Production lines
4. Final production stage
5. Storage, shipment, packing stages

408. What quality-control techniques do you use in your company?

1. Check sheet
2. Histogram
3. Control charts
4. Scatter diagram
5. Pareto diagram
6. Cause and effect diagram
7. Stratification
8. Others (indicate specifically)

409. Do you have any quality-control educational program for the personnel of your company?

1. We have internal training courses for groups, organized and carried out at the worksite
2. We invite outside professors to hold seminars at the company
3. We invite trainees to attend seminars outside the company
4. We have no specific quality-control course

410. What would you ask the Chilean Government in regard to the promotion of total quality control?

1. Financial assistance to obtain test equipment
2. Increase the level of training seminars
3. National campaign for increasing public awareness in

regard to quality

4. Increase the level of NCh Standards
5. Improve the infrastructure of systems of certification

(5) INSPECTION AND TESTS

The inspection/tests and metrology are indispensable for carrying out quality control. Kindly respond to the following questions. (Circle applicable items.)

501. How many specialists in inspection/tests are there in your company?

1. Professionals (... persons)
2. Technicians (... persons)
3. Experts (... persons)

502. Are there sufficient inspection/test installations/equipment in your company?

1. Satisfactory
2. Lacking
3. Partially externally subcontracted

503. Do you periodically carry out the calibration of measuring equipment?

1. Yes. How frequently?
2. No

504. What are the inspection/test standards/specifications?

1. Standards of public or private associations (indicate specifically)
2. NCh Standards
3. Foreign standards (indicate specifically)
4. International standards

5. Others (Indicate specifically)

505. At what stage of your production lines do you apply the inspection/test techniques?

1. Material-acceptance stage
2. Intermediate stage
3. Final stage
4. Outside the production line

506. Do you have an independent test laboratory in your industry?

1. Yes
2. No

507. How do you evaluate the technical level of the inspection/test in your company?

1. Very good
2. Relatively good
3. Regular
4. Bad

508. Do you have an educational program for metrology control in your company?

1. We send trainees to outside metrology seminars
2. We have our own metrology seminars
3. We do not have any particular course

Thank you very much for your kind cooperation.

