



DynAmp

# Technical Bulletin

## NO. 742

### **TOPIC: REPORT OF THE MEASUREMENT ACCURACIES OF 178 INDIVIDUAL DC METERING SYSTEMS IN THE ELECTROCHEMICAL INDUSTRY**

File TEC742c

## INTRODUCTION

This report discusses the results of a two-year study of the accuracy's of electrochemical industry DC metering systems in the field. In response to requests from the field, DynAmp engineers designed a portable accuracy checking system. For two years DynAmp engineers employed this system in 20 electrochemical plants to investigate the accuracy of the existing metering systems.

## TEST PROCEDURE

Each element in the test system was calibrated against tertiary standards before and after a trip into the field. This measure assured valid results. The DynAmp current measuring assembly is a two-piece, non-contact head, with 0.2% accuracy. This was installed without interrupting production. DynAmp engineers recorded the current level indicated by the existing system and by the test system. For some test installations two-way radio was necessary to insure time correlation of the indications of the two systems. Multiple readings were averaged in cases where the bus current was fluctuating. If possible, indications were recorded for currents 10% above and below the nominal operating point to determine the error curve in its vicinity. A formal report accompanied all test results.

## TEST RESULTS

The test results are tabulated at the end of this bulletin. A total of 178 systems were investigated. Of this total 102 were shunts, 65 saturable reactors and 11 AC systems.

Of the 102 shunts, 22 had errors less than 1%, 21 were between 1% and 2%, 42 were between 2% and 5%, and 17 were above 5%.

Of the 65 saturable reactors, 9 had errors less than 1%, 13 were between 1% and 2%, 25 were between 2% and 5%, and 18 were above 5%.

Of the 11 AC systems, 1 was better than 1%, 2 were between 1% and 2%, 4 were between 2% and 5%, and 4 were above 5%.

## TEST SYSTEM

The test system consists of a two piece measuring head, a solid state metering unit, an accurate digital voltmeter and the necessary interconnecting cable. This system is a portable brother to the DynAmp DC current metering systems. The system is of proven accuracy with reference to NBS standards.

## CONCLUSIONS

Most of the systems investigated were rated at better than 1%. However, the test results shows few systems still at (or even near) their factory rated accuracies. Therefore, we can presume that of all open loop (no feedback) DC metering systems, most are degrading to unacceptable errors. The solution is to employ closed loop metering systems wherever possible.

## SUMMARY OF METERING ERRORS BY EQUIPMENT TYPE

ERROR MAGNITUDE	SHUNTS		SATURABLE REACTOR		PRIMARY AC METERING	
	QTY	PER CENT	QTY	PER CENT	QTY	PER CENT
Units with Error < 1%	22	22%	9	14%	1	9%
Units with Error 1% to 2%	21	21%	13	20%	2	18%
Units with Error 2% to 5%	42	41%	25	38%	4	36%
Units with Error > 5%	17	17%	18	38%	4	36%
Number of units tested	102		65		11	