

XML SPECIFICATION OF HYDRAULICS COMPONENTS

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Abstract: *Technical documentation in the field of hydraulics and pneumatics as well as in other fields of engineering today is mostly seen in electronic form. Basic advantage is in the fact that such documents can be easily distributed using computer networks and the Internet. This influences the formation of a mutual, easily available distributed base of knowledge which further on speeds the development of these fields. However, the use of electronic documents causes a huge problem – incompatibility of different formats. Very often a document written on one platform (MS Windows, Linux, Mac OS X) is not readable on another platform, or by a different program on the same platform, or even by a different version of the same program. To solve this problem, many software companies distribute free file viewers for their proprietary file formats. The other solution is the development of standardized non-proprietary file formats (HTML, OD, XML). This paper presents the use of Extensible Markup Language (XML) for the description of information structures and semantics about hydraulic components.*

Key words: XML, data exchange, axial-piston pump, parser, DOM, SAX

1. INTRODUCTION

Generally speaking, communication between two computers program can be viewed as data and metadata interchange. Data carry out raw (basic) information while metadata are information about data. They are used to facilitate the understanding, characteristics, and management usage of data. For example, numerical value 170.52 may have infinite different meaning. To make sense of and use this data, context is important, and can be provided by metadata. If we write down "P170.52" metadata "P" suggests that it's the pressure, or if we write down "Q170.52" we know that it is volumetric flow rate. In many cases we have to specify which unit we mean so we introduce metadata [bar] or [N/m²]. Even if we don't take into consideration different formats for numerical data (e.g. 170.52, 1.7052E2, 0.175052E3) the problem with different forms for metadata remains. For example, the same information can be marked up with "P170.52 bar", "P#170.52bar", "P170.52E5N/m²". Basically, a computer doesn't have the possibility to conclude that this is the same information. From its point of view, these are all different data.

Different forms of metadata are the basic cause of software applications incompatibility. For two applications to communicate it is necessary to adopt universal rules for data marking. XML is the program that makes it possible for us to define those rules. It allows us to define our own tags which must be organized according to certain general principles, but they are flexible in their meaning [1,2].

For example, for pressure we can introduce text mark up `<pressure>`. In that case the very name tells about the information. Despite that, tag `<pressure>` doesn't tell anything about information format, data and

metadata are included as strings of text, they only tell us that there is a piece of data called `<pressure>` and it's up to us to give the specific piece information specific meaning.

It is important to realize that XML is not markup language, but meta-markup language. In other words, XML describes the syntax that we use to create our own languages. Each specific XML-based markup language is called an XML application. Those are, e.g. Chemical Markup Language (CML), Mathematical Markup Language (MathML) or Bond Graph Markup Language (BGML).

2. DESCRIBING AXIAL-PITON PUMP WITH XML DOCUMENT

When we work with complex information it is necessary to arrange them in a specific way. While being modelled, the data are usually hierarchically grouped depending on the level of abstraction. There is a system on the highest level, then there are sub-systems on the next level, elements are found on the level beneath, etc. For example, a book consists of chapters, a chapter is broken down into sub-topics, and further broken down into paragraphs.

In figure Fig. 1 axial, fixed-displacement piston pump is shown. There are many information about it and it is usually better to group them into related subtopics, rather than to have all of them presented on the same level. This makes information easier to comprehend and more accessible.

The first step in forming XML data that describe the pump or any other component, is defining:

