Enabling step-change

For engineers: about the interoperability standard for process plants ISO 15926, and the data handover standard CFIHOS based on it.

ISO 15926 & CFIHOS

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Purpose

- Interoperability using standards:
  - For data integration
    - **ISO 15926**
  - For data handover from Engineering contractor to Owner/Operator
    - **CFIHOS**

      (Capital Facilities Information Handover Spec)
- Purpose:
  - Decrease risk by higher data quality and save cost.

ISO 15926 – what is it?

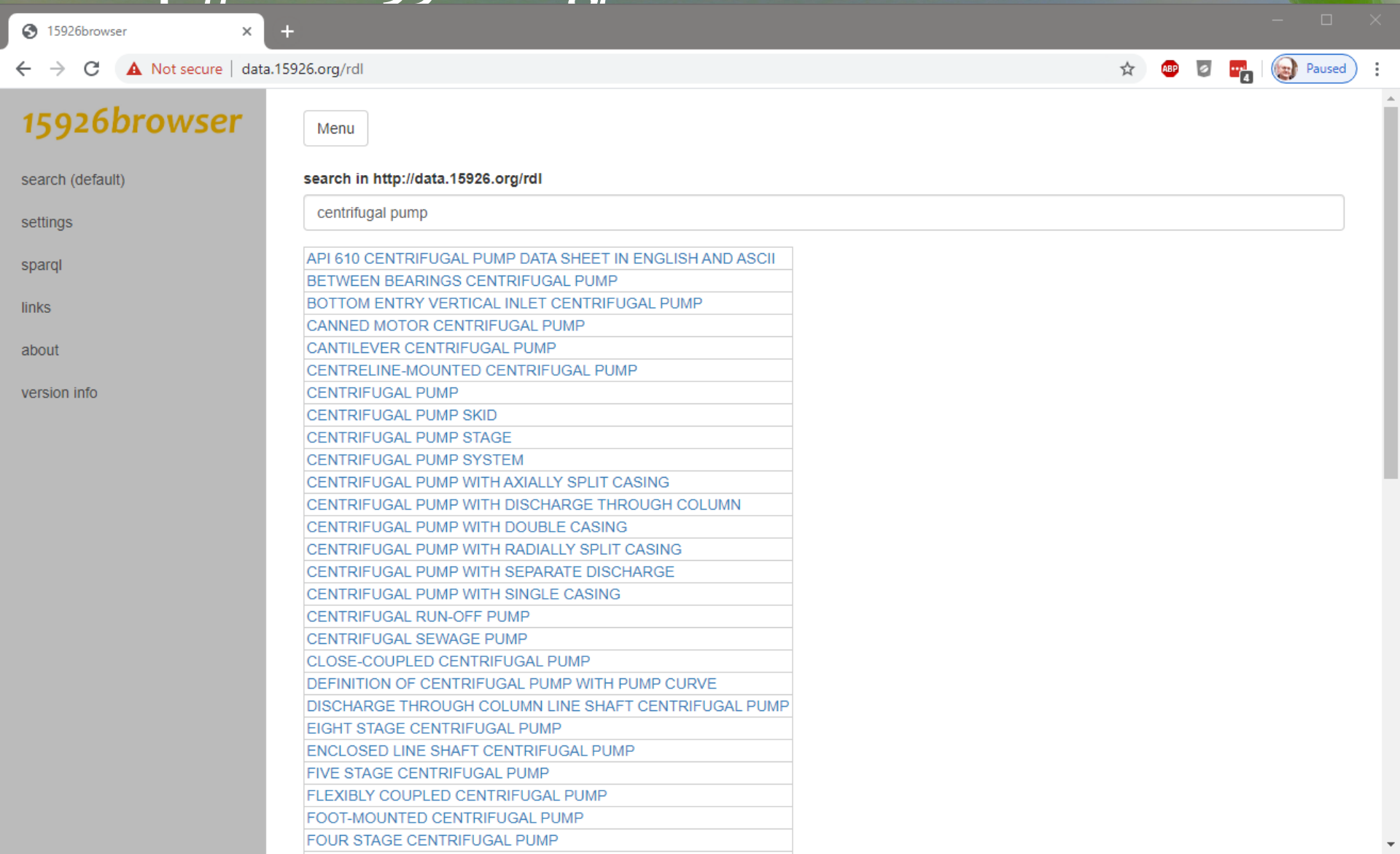
- International standard, ISO TC184-SC4 WG3 (industrial data related to discrete products);
- Neutral layer used for data integration;
- Federation of databases – Semantic Web technology;
- Interoperability standard;
- Interoperability meaning:
  "the ability of different types of computers, networks, operating systems, and applications to work together effectively, without prior communication, in order to exchange information in a useful and meaningful manner".

What is in ISO 15926?

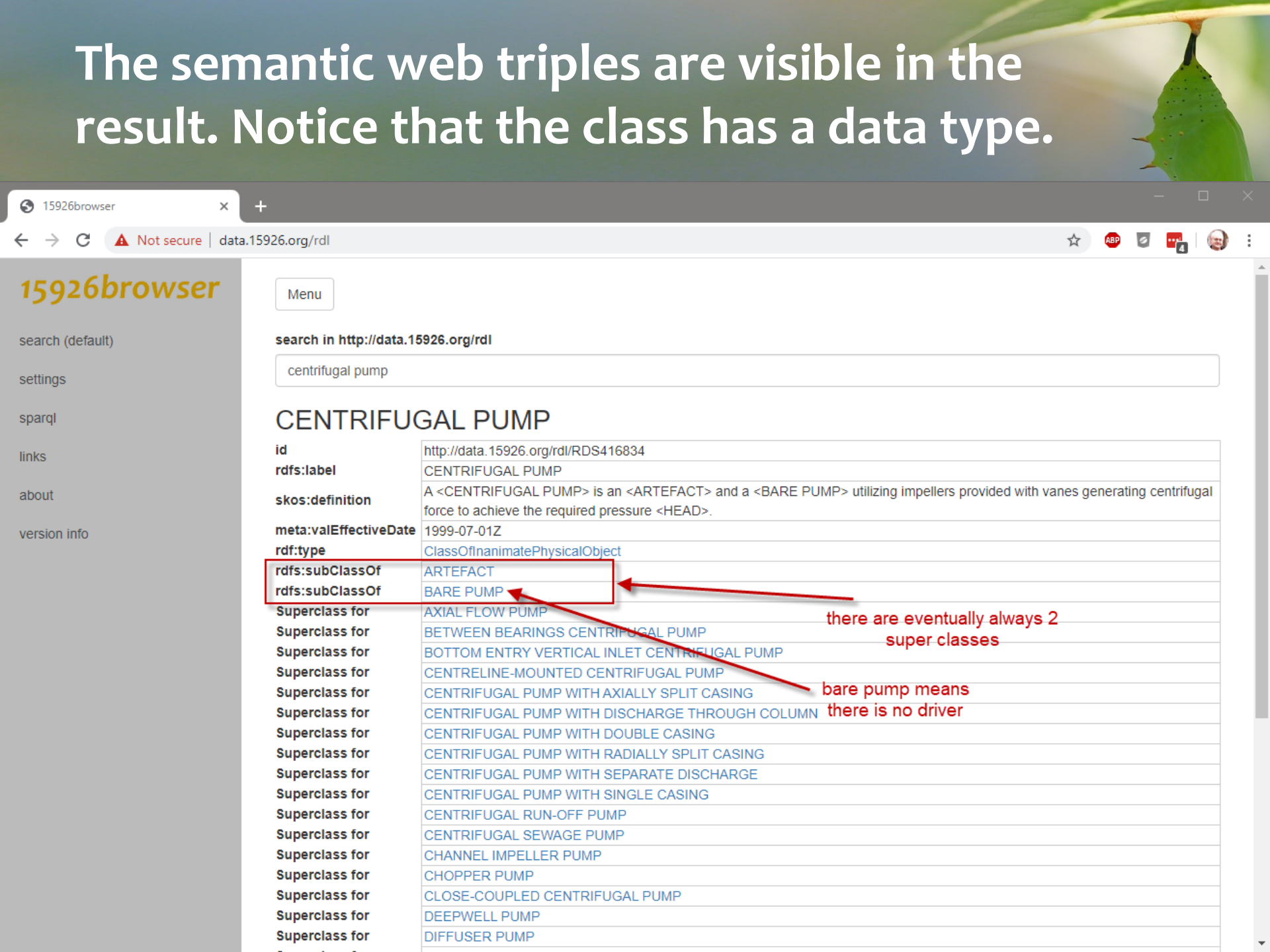
- Reference data library (RDL)
  - = A central online database
  - http://data.posccaesar.org/rdl
  - And also a work-in-progress data
  - http://data.15926.org/rdl

- Data integration and interoperability methodology
  - Open source software http://15926.tools

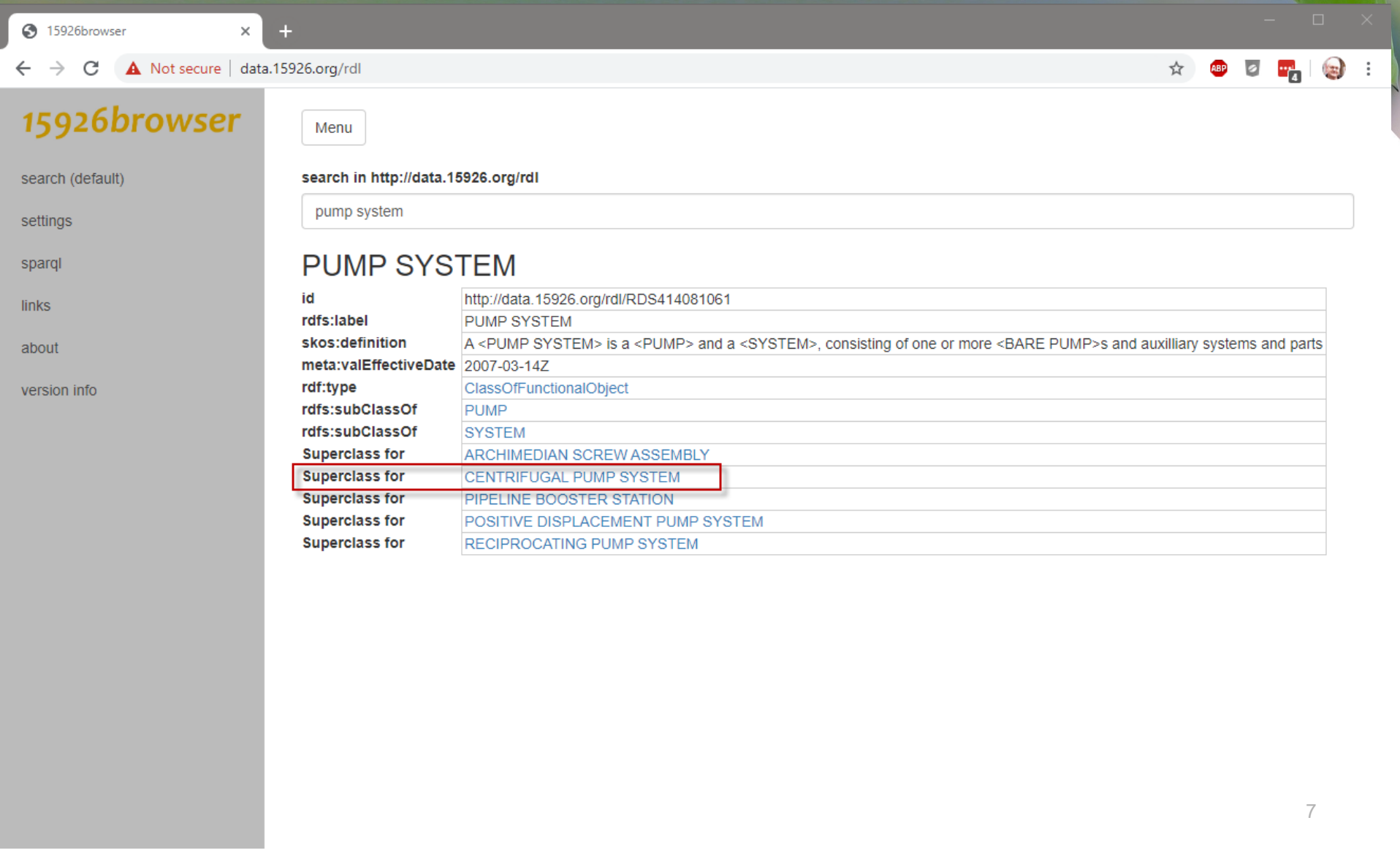
Demo – open browser and query a centrifugal pump class http://data.15926.org/rdl



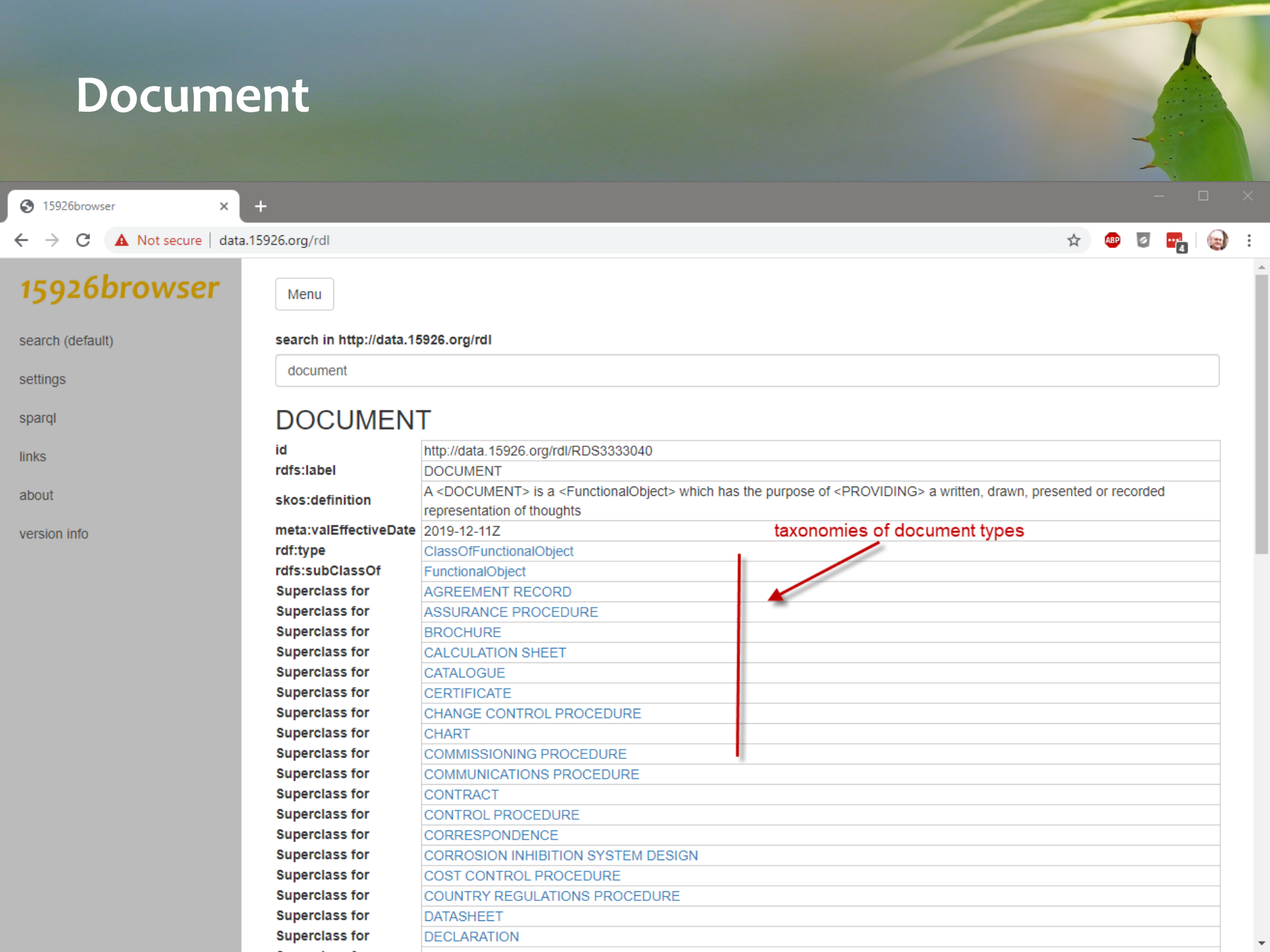
The semantic web triples are visible in the result. Notice that the class has a data type.



The pump system has all components



Document


15926browser
Not secure | data.15926.org/rdl
15926browser
search (default)
settings
sparql
links
about
version info
Menu
search in http://data.15926.org/rdl
document
DOCUMENT
id http://data.15926.org/rdl/RDS3333040
rdfs:label DOCUMENT
skos:definition A <DOCUMENT> is a <FunctionalObject> which has the purpose of <PROVIDING> a written, drawn, presented or recorded representation of thoughts
meta:valEffectiveDate 2019-12-11Z
rdf:type ClassOfFunctionalObject
rdfs:subClassOf FunctionalObject
Superclass for AGREEMENT RECORD
Superclass for ASSURANCE PROCEDURE
Superclass for BROCHURE
Superclass for CALCULATION SHEET
Superclass for CATALOGUE
Superclass for CERTIFICATE
Superclass for CHANGE CONTROL PROCEDURE
Superclass for CHART
Superclass for COMMISSIONING PROCEDURE
Superclass for COMMUNICATIONS PROCEDURE
Superclass for CONTRACT
Superclass for CONTROL PROCEDURE
Superclass for CORRESPONDENCE
Superclass for CORROSION INHIBITION SYSTEM DESIGN
Superclass for COST CONTROL PROCEDURE
Superclass for COUNTRY REGULATIONS PROCEDURE
Superclass for DATASHEET
Superclass for DECLARATION
taxonomies of document types

Datasheet

15926browser

search (default)

settings

sparql

links

about

version info

Menu

search in http://data.15926.org/rdl

document

DATASHEET

id	http://data.15926.org/rdl/RDS17987174
rdfs:label	DATASHEET
skos:definition	A <DATASHEET> is an <InformationObject> and a <DOCUMENT> with the purpose of <COMMUNICATING> <DATA>; it usually contains a set of defined fields within which <DATA> is supplied
meta:valEffectiveDate	2006-08-14Z
rdf:type	ClassOfInformationObject
rdfs:subClassOf	DOCUMENT
rdfs:subClassOf	InformationObject
Superclass for	AC GENERATOR DATA SHEET
Superclass for	CONVERTER DATA SHEET
Superclass for	HEAT AND MASS BALANCE SUMMARY
Superclass for	HIGH VOLTAGE SWITCHBOARD DATA SHEET
Superclass for	INDUCTION MOTOR DATA SHEET
Superclass for	INSTRUMENT DATA SHEET
Superclass for	INTEGRITY OPERATING ENVELOPE DATASHEET
Superclass for	LIGHTING PERFORMANCE DATASHEET
Superclass for	LOW VOLTAGE SWITCHBOARD DATA SHEET
Superclass for	MANUFACTURER DATASHEET
Superclass for	MATERIAL SAFETY DATASHEET
Superclass for	NOISE DATASHEET
Superclass for	POWER TRANSFORMER DATA SHEET
Superclass for	PROCESS DATA SHEET
Superclass for	PUMP DATA SHEET
Superclass for	STREAM DATA SHEET
Superclass for	THRUSTER DATA SHEET

Activities

15926browser

Not secure | data.15926.org/rdl

15926browser

- search (default)
- settings
- sparql
- links
- about
- version info

Menu

search in http://data.15926.org/rdl

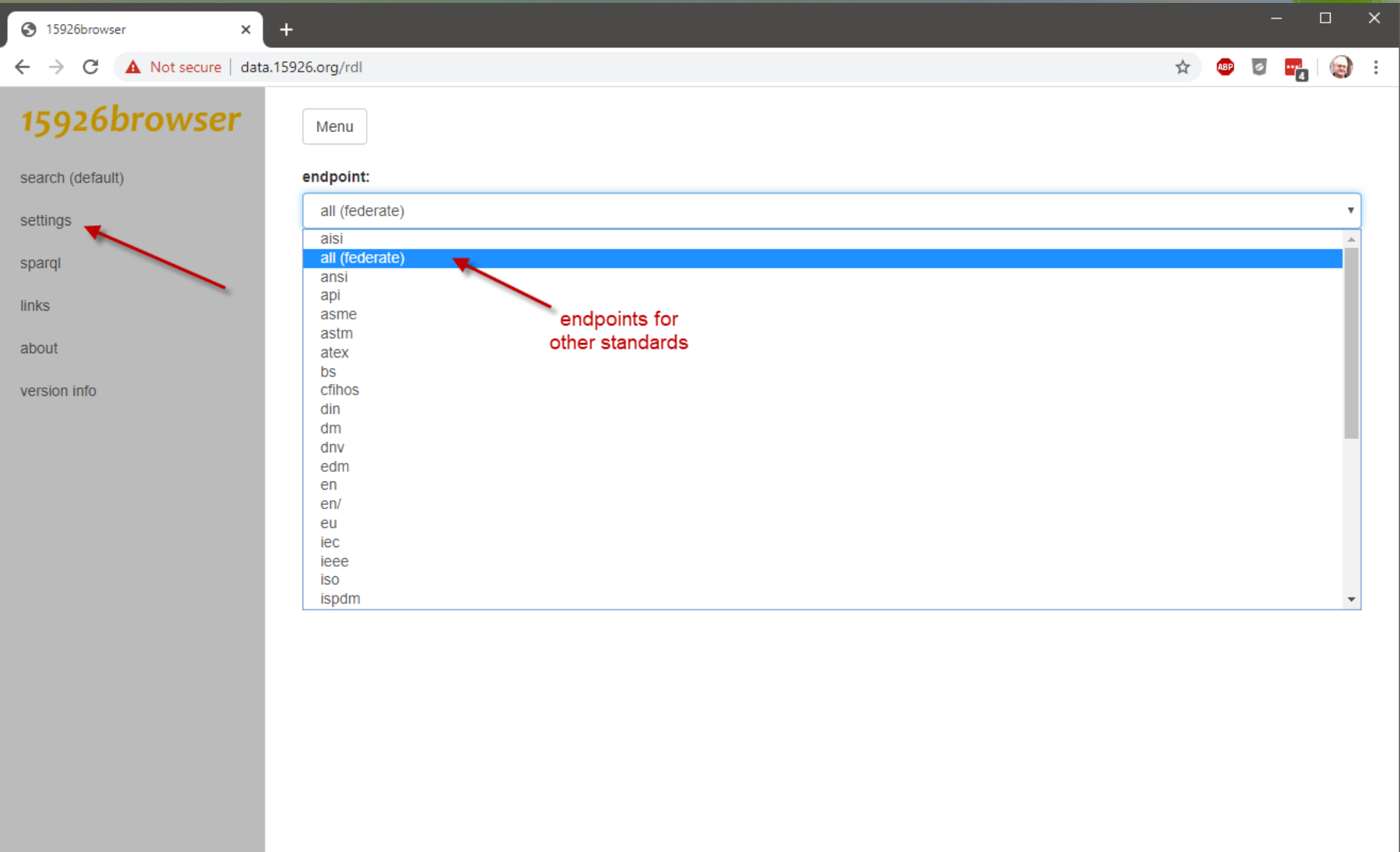
engineering

ENGINEERING

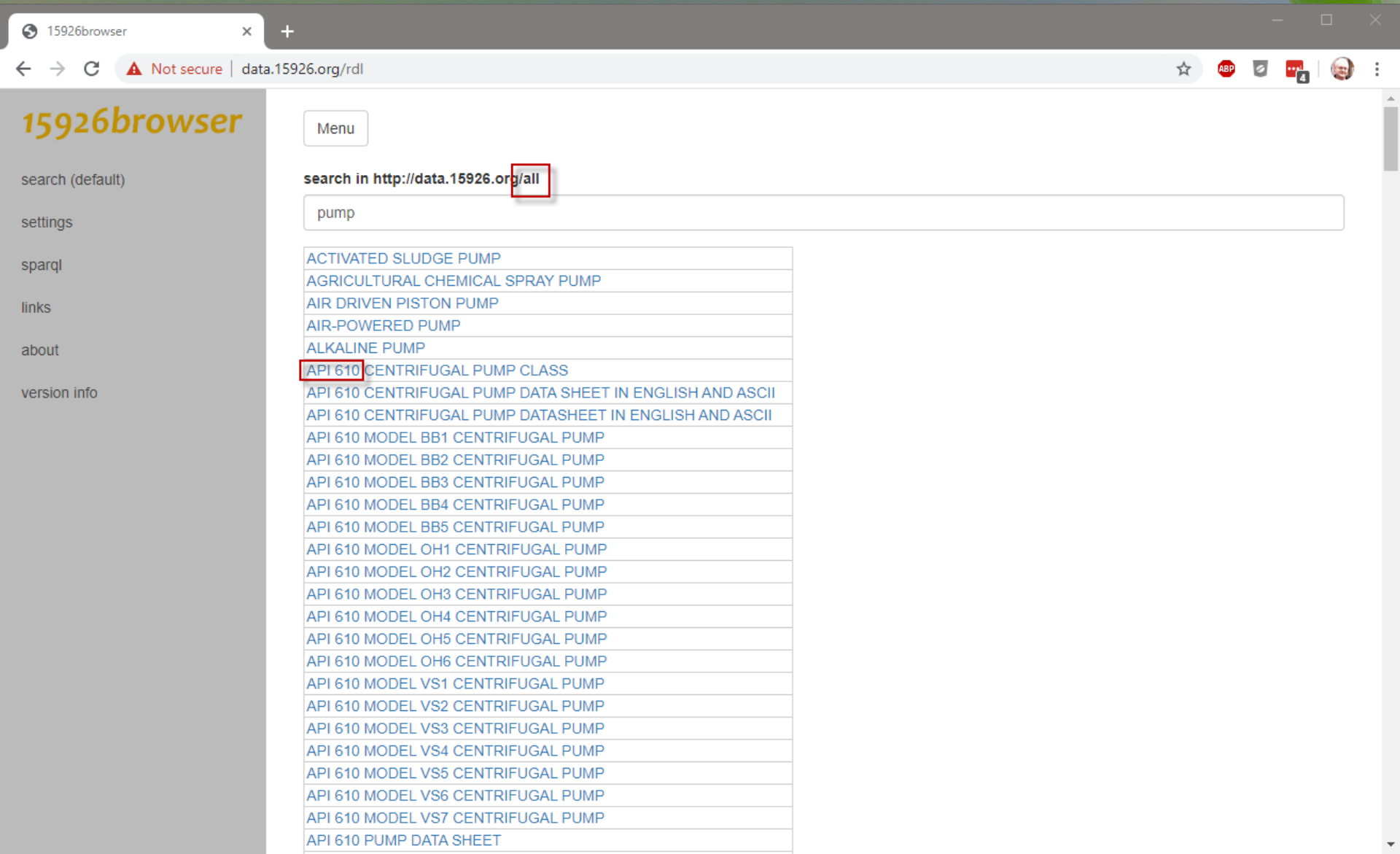
id	http://data.15926.org/rdl/RDS9675152
rdfs:label	ENGINEERING
skos:definition	<ENGINEERING> is the <Activity> of designing or producing by methods of technical sciences by which the properties of matter and the sources of energy in nature are made useful for mankind in structures, machines, and products
meta:valEffectiveDate	2006-09-04Z
rdfs:subClassOf	Activity
rdf:type	ClassOfActivity
Superclass for	ARCHITECTURAL ENGINEERING
Superclass for	BASIC ENGINEERING
Superclass for	CHEMICAL ENGINEERING
Superclass for	CIVIL ENGINEERING
Superclass for	COMPUTER AIDED ENGINEERING
Superclass for	CONCEPTUAL ENGINEERING
Superclass for	CONTROL SYSTEMS ENGINEERING
Superclass for	COST CONTROL AND PLANNING
Superclass for	DETAILED ENGINEERING
Superclass for	ELECTRICAL ENGINEERING
Superclass for	ENVIRONMENTAL ENGINEERING
Superclass for	GEOTECHNICAL AND FOUNDATION ENGINEERING
Superclass for	HVAC ENGINEERING
Superclass for	INFRASTRUCTURE ENGINEERING
Superclass for	MAINTENANCE ENGINEERING
Superclass for	MATERIALS AND CORROSION ENGINEERING
Superclass for	MECHANICAL ENGINEERING
Superclass for	OCEAN ENGINEERING

activities

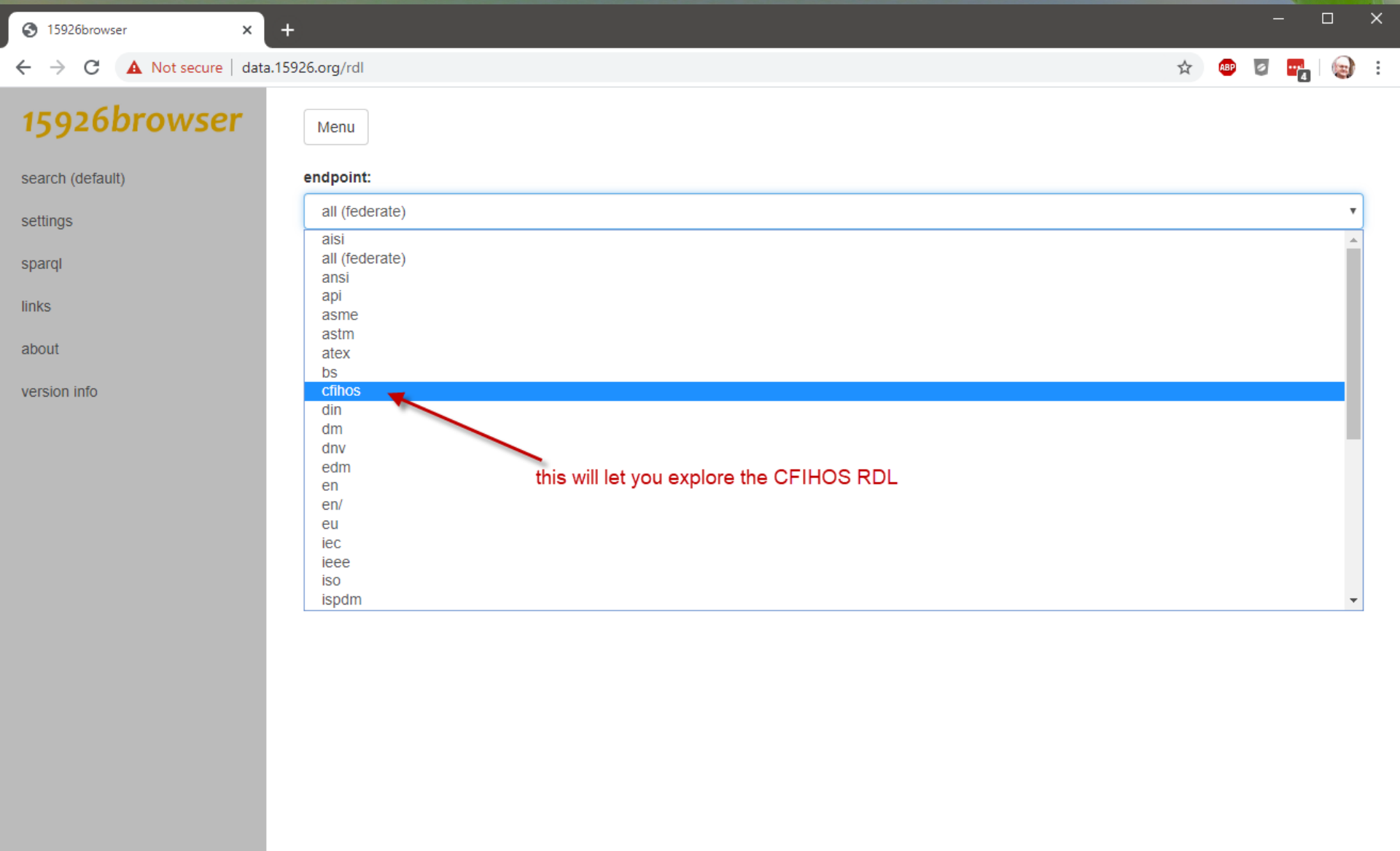
Next to /rdl there are other endpoints



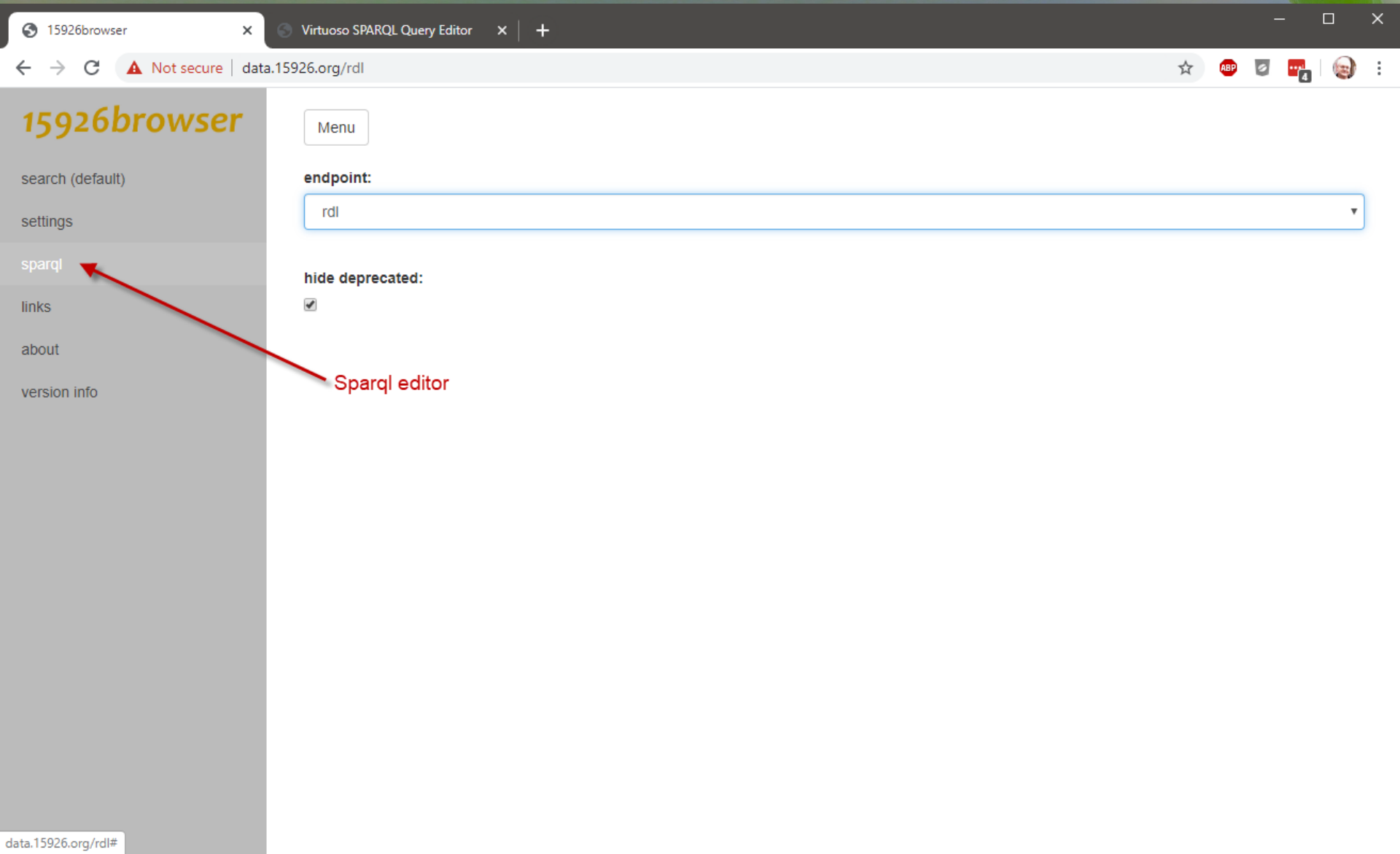
Exploring classes outside the core RDL



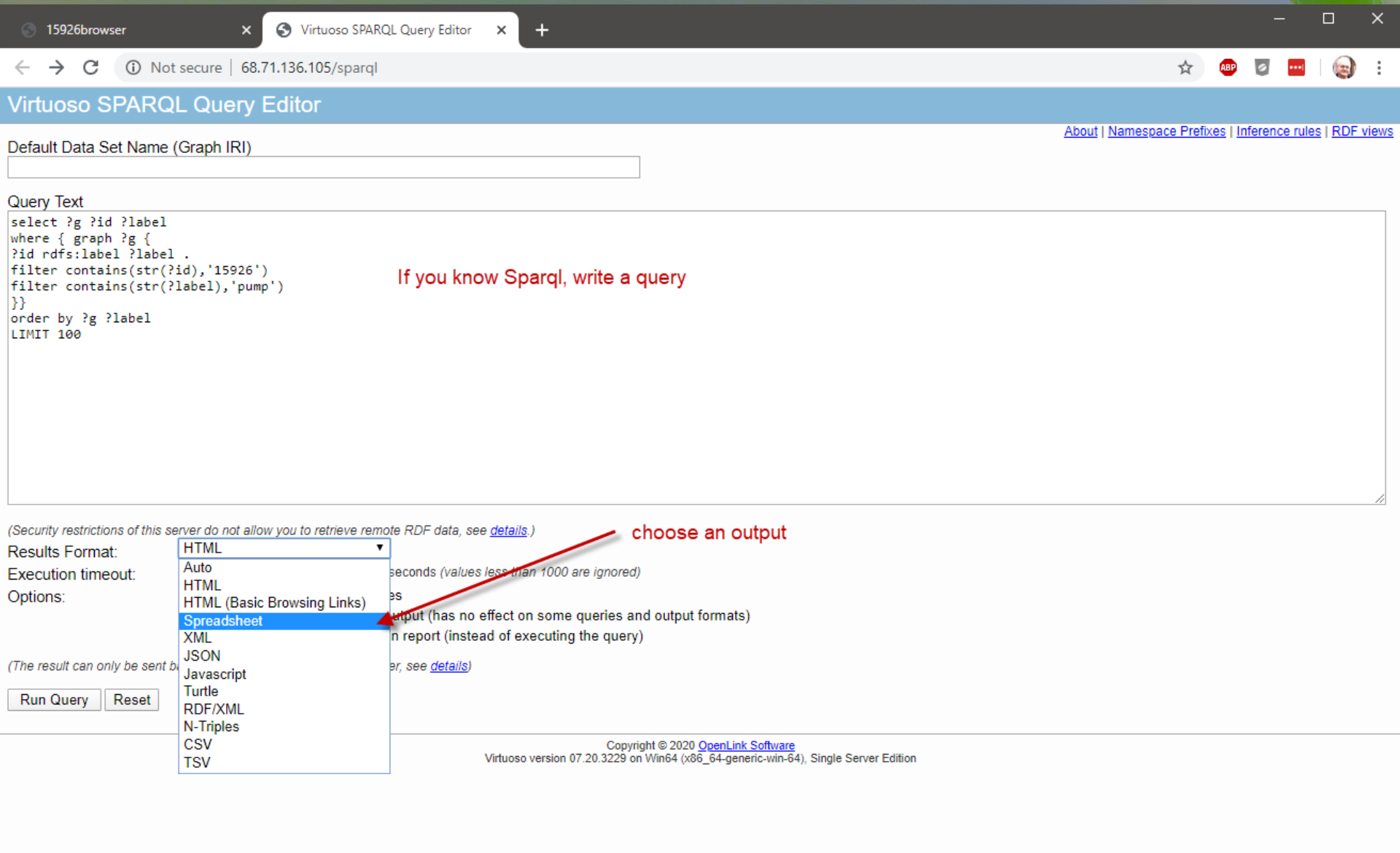
The CHIFOS RDL is in here 100%



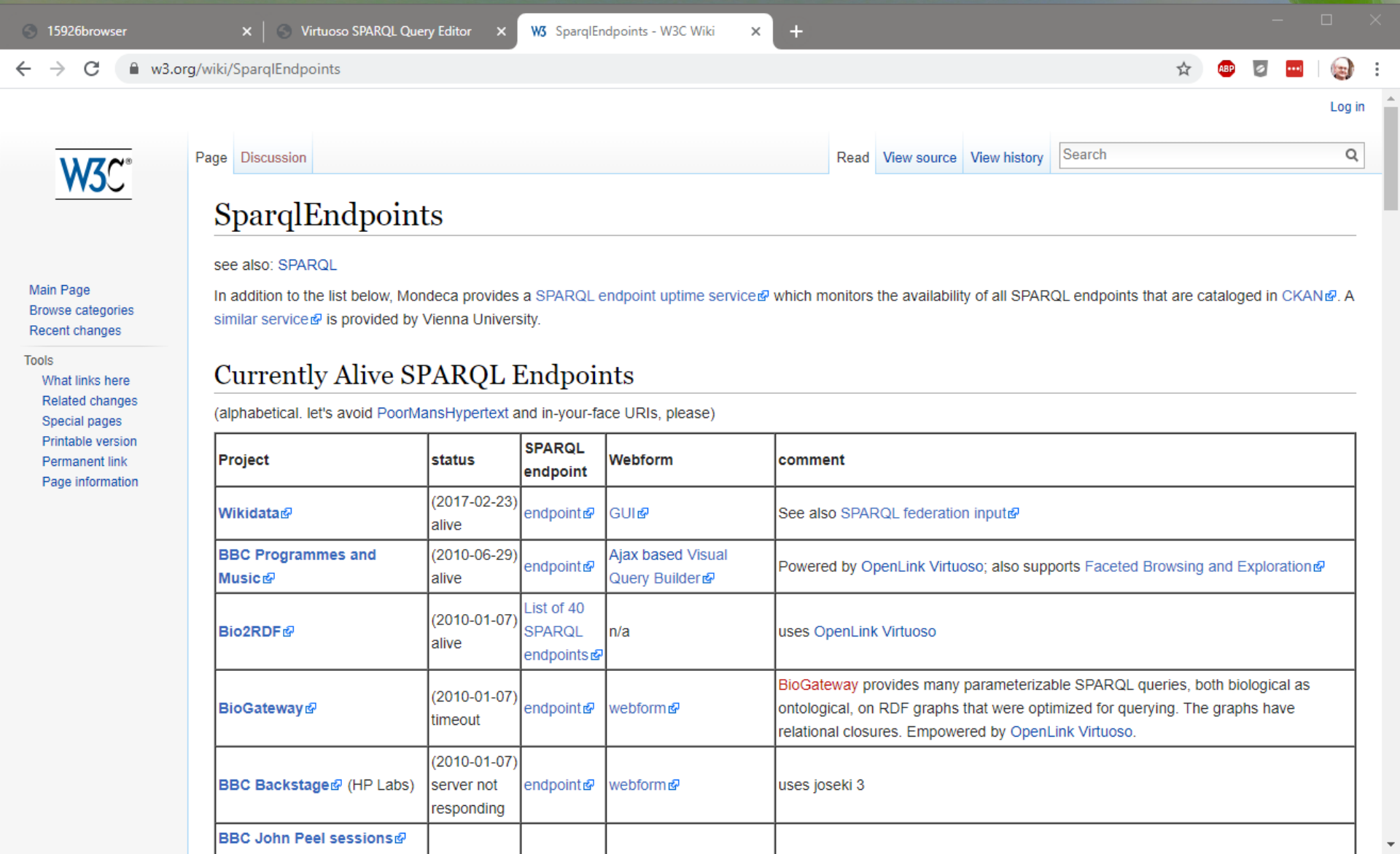
Try out the Sparql editor



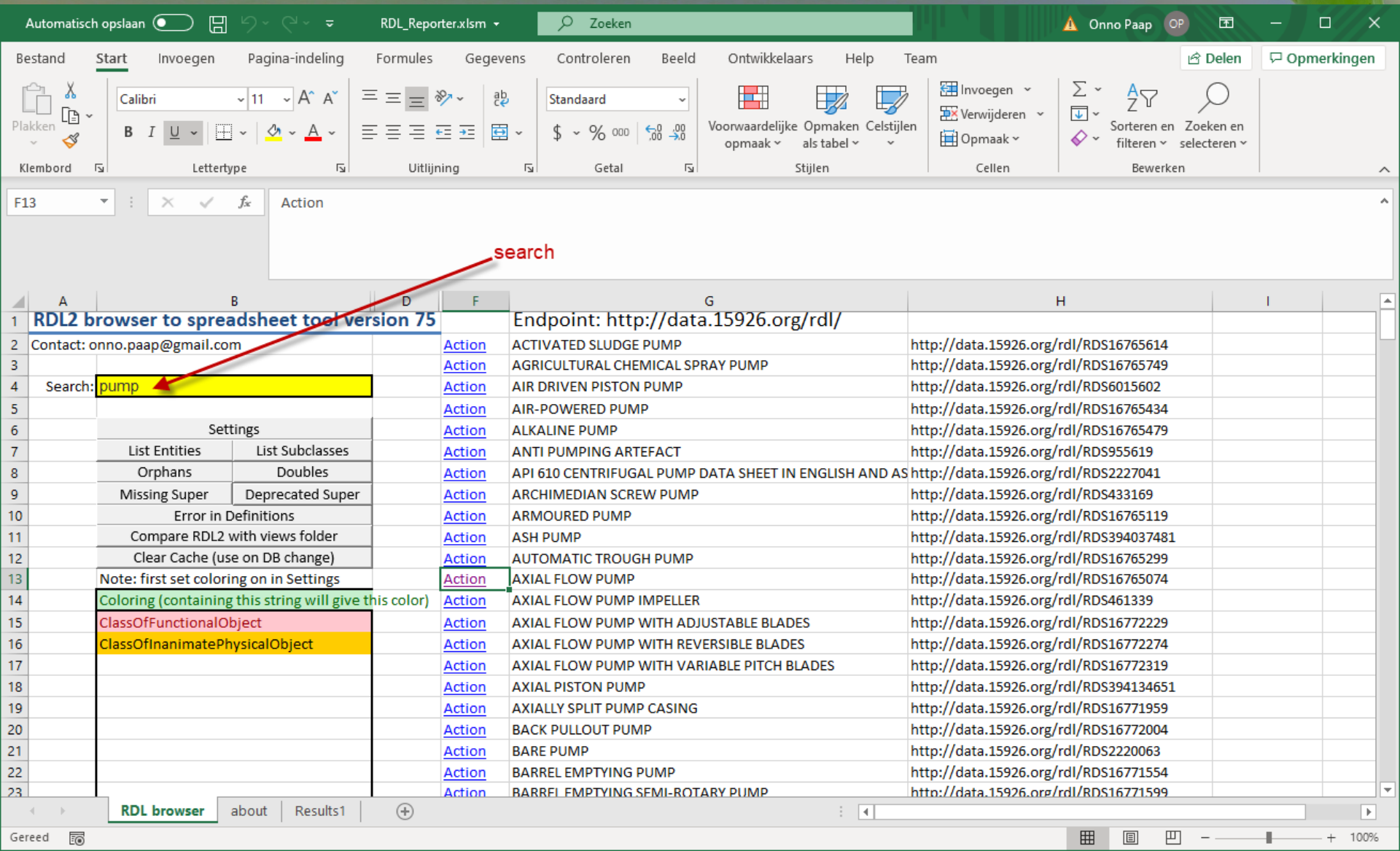
If you know what you're doing.



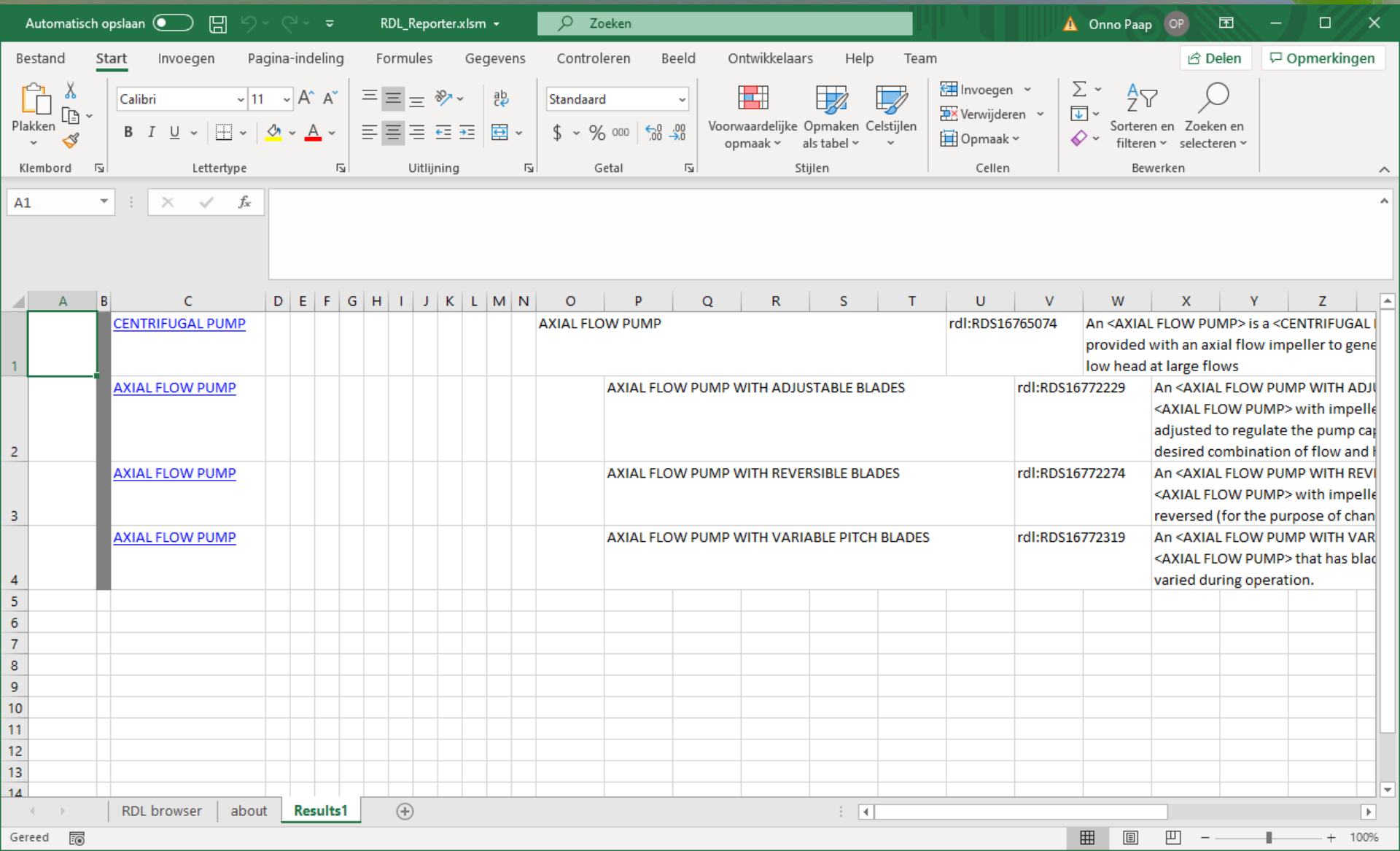
There are many other Sparql endpoints



Introducing RDL_Reporter.xlsm



Call up a taxonomy. Add classes. Send to MRAIL



1	CENTRIFUGAL PUMP	AXIAL FLOW PUMP		rdl:RDS16765074	An <AXIAL FLOW PUMP> is a <CENTRIFUGAL provided with an axial flow impeller to gene low head at large flows
2	AXIAL FLOW PUMP		AXIAL FLOW PUMP WITH ADJUSTABLE BLADES	rdl:RDS16772229	An <AXIAL FLOW PUMP WITH ADJ <AXIAL FLOW PUMP> with impelle adjusted to regulate the pump ca desired combination of flow and
3	AXIAL FLOW PUMP		AXIAL FLOW PUMP WITH REVERSIBLE BLADES	rdl:RDS16772274	An <AXIAL FLOW PUMP WITH REV <AXIAL FLOW PUMP> with impelle reversed (for the purpose of chan
4	AXIAL FLOW PUMP		AXIAL FLOW PUMP WITH VARIABLE PITCH BLADES	rdl:RDS16772319	An <AXIAL FLOW PUMP WITH VAR <AXIAL FLOW PUMP> that has blad varied during operation.

How big is it? And how are changes supported?

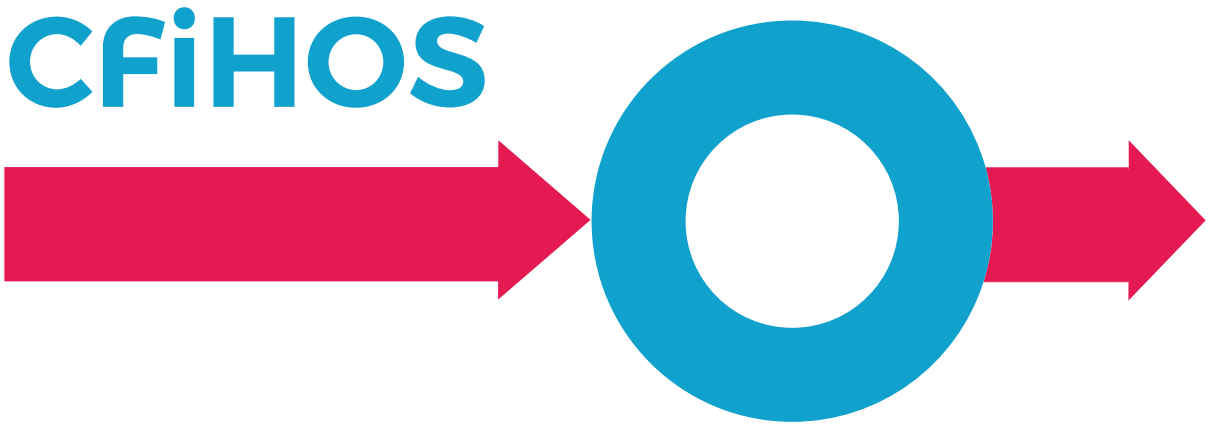
- The POSC Caesar library had 11,000 core classes for a long time.
- There is a team called MRAIL (Major RDL Action Items List) lead by POSC Caesar, expanding it. Now 20,000 classes including those of CFIHOS and DEXPI.
- Support will continue to go through this team, through change requests.

CFIHOS

Capital Facilities Information Handover Spec.

CFIHOS – what lead to the decision to start this?

- To create a standard for EPC contractor data handover
- The project:
  - The Shell Engineering Information Specification (EIS) Design and Engineering Practice was based on the EPISTLE handover guide, and approved as a Shell standard in 2004. It has undergone 3 revision, and has been used in 60+ projects and 10+ assets.
  - It was handed to USPI as seed standard for CFIHOS in 2012. The first version was approved for use in June 2014, version 1.4 was released in 2019.
  - Leadership over CFIHOS went over to IOGP



- Accenture
- Aker Solutions
- ASSAI, Software supplier
- Aucotec
- Autodesk GmbH
- AVEVA, Software supplier, UK
- Bechtel Corporation
- Bentley Systems Software supplier, UK
- BHGE, ITA
- BlueCielo, Software supplier, NL
- BP, Oil & Gas, UK
- CB&I
- Cenovus
- Chevron, Oil & Gas, UK/USA
- Covestro Deutschland AG
- Cure Maintenance Consultants, NL
- Dassault Systèmes
- Datum360, UK
- DMS Corporation
- DPS
- Eastman Chemical Company
- Evonik
- Equinor (Statoil)
- ExxonMobil, Oil & Gas, USA
- Fluor
- FNVI Limited
- Fujitsu Engineering Technologies
- Hexagon PPM, Software supplier, NL
- Honeywell Proces Solution
- JGC
- KAIST, Korea
- KBR
- KHNP, Hydro and Nuclear Industry Operator, Korea
- Kinsman Group LLC
- Kraken IM
- Kyungpook National University
- L&T Technology Services, India
- MatchIT
- McDermott Inc
- Mitsubishi Heavy Industries
- OpenText
- Opidis
- Petrofac, Engineering company, UK
- PETRONAS, Malaysia
- Phusion IM, UK
- Plant Resource Technology Ltd., China
- Reliance Industries Ltd.
- Repsol
- ReVisionz
- Saipem S.p.A, Italy
- SAP
- SBM Offshore
- Sellafield Limited
- Sharecat Solutions
- Shell Global Solutions International
- Siemens PLM Software
- Sirfull
- SNC-Lavalin
- Suncor
- Sweco Belgium
- Talent Swarm
- TechnipFMC
- Toshiba
- Total, oil and gaz France
- Unasys, UK
- Versatec Energy, Software supplier, NL
- Wood, Equipment supplier, UK
- Woodside
- Yokogawa Europe B.V.

What is in the CFIHOS package?

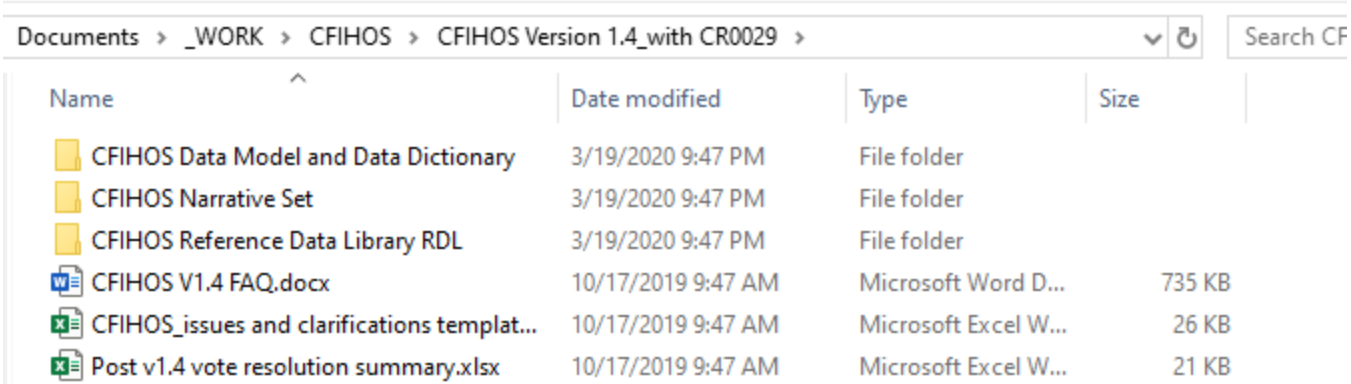
- **A technical specification document**
  Requirements, rules and principles for information handover

- **A dictionary** (Reference Data Library)
  Consistent naming equipment & documents, acc. ISO stds.

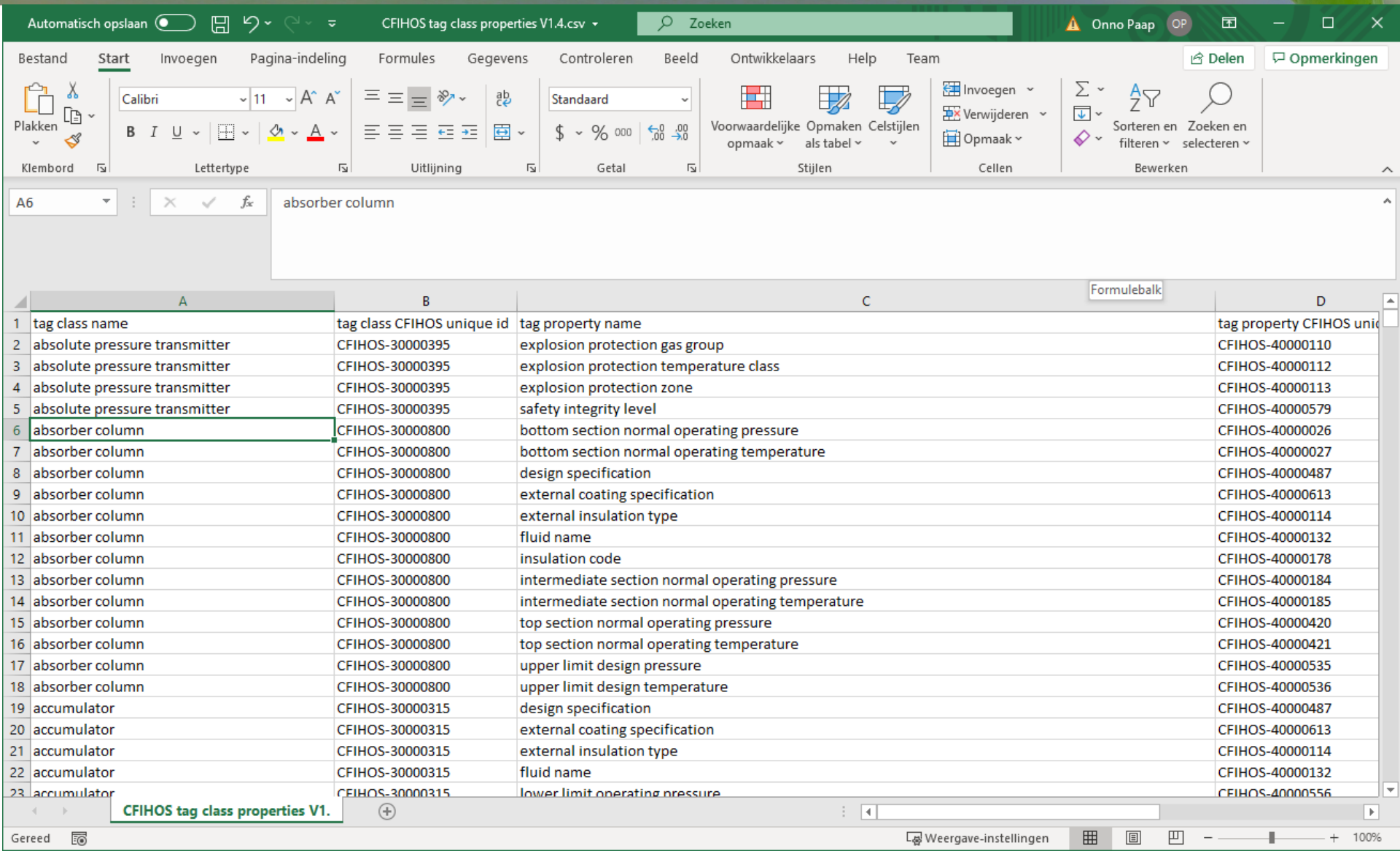
- **A data Model**
  For structuring data and documents about assets

- **A process & guidance document**
  Outlining implementation steps, do's & don'ts

- **A set of requirements for implementation software**
  Outlining the functional requirements for handover systems

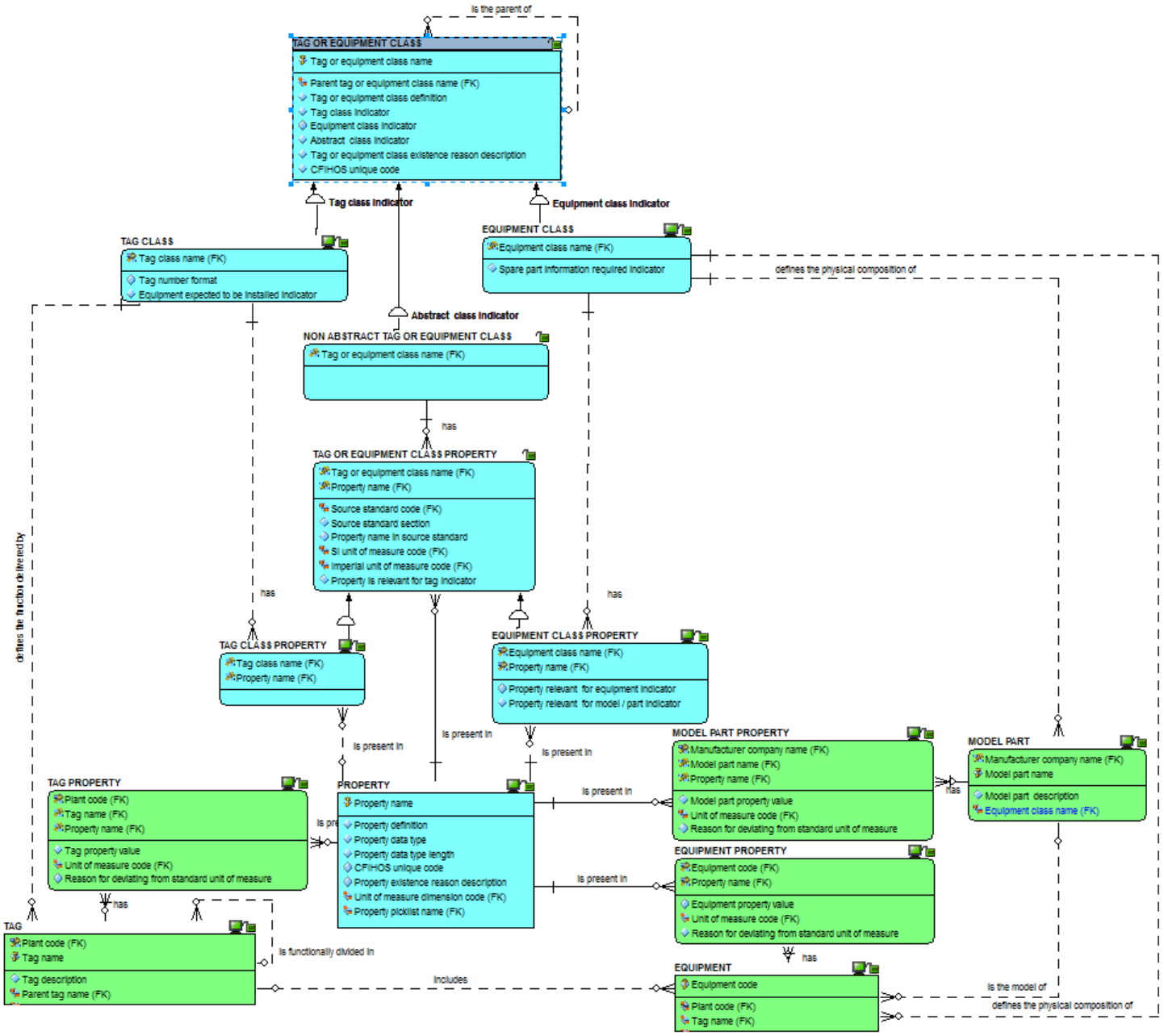


The CFIHOS RDL



	A	B	C	D
1	tag class name	tag class CFIHOS unique id	tag property name	tag property CFIHOS uni
2	absolute pressure transmitter	CFIHOS-30000395	explosion protection gas group	CFIHOS-40000110
3	absolute pressure transmitter	CFIHOS-30000395	explosion protection temperature class	CFIHOS-40000112
4	absolute pressure transmitter	CFIHOS-30000395	explosion protection zone	CFIHOS-40000113
5	absolute pressure transmitter	CFIHOS-30000395	safety integrity level	CFIHOS-40000579
6	absorber column	CFIHOS-30000800	bottom section normal operating pressure	CFIHOS-40000026
7	absorber column	CFIHOS-30000800	bottom section normal operating temperature	CFIHOS-40000027
8	absorber column	CFIHOS-30000800	design specification	CFIHOS-40000487
9	absorber column	CFIHOS-30000800	external coating specification	CFIHOS-40000613
10	absorber column	CFIHOS-30000800	external insulation type	CFIHOS-40000114
11	absorber column	CFIHOS-30000800	fluid name	CFIHOS-40000132
12	absorber column	CFIHOS-30000800	insulation code	CFIHOS-40000178
13	absorber column	CFIHOS-30000800	intermediate section normal operating pressure	CFIHOS-40000184
14	absorber column	CFIHOS-30000800	intermediate section normal operating temperature	CFIHOS-40000185
15	absorber column	CFIHOS-30000800	top section normal operating pressure	CFIHOS-40000420
16	absorber column	CFIHOS-30000800	top section normal operating temperature	CFIHOS-40000421
17	absorber column	CFIHOS-30000800	upper limit design pressure	CFIHOS-40000535
18	absorber column	CFIHOS-30000800	upper limit design temperature	CFIHOS-40000536
19	accumulator	CFIHOS-30000315	design specification	CFIHOS-40000487
20	accumulator	CFIHOS-30000315	external coating specification	CFIHOS-40000613
21	accumulator	CFIHOS-30000315	external insulation type	CFIHOS-40000114
22	accumulator	CFIHOS-30000315	fluid name	CFIHOS-40000132
23	accumulator	CFIHOS-30000315	lower limit operating pressure	CFIHOS-40000556

Property use : the attributes view



Conclusion

- The CFIHOS leadership
  - IOGP (international Oil and Gas Producers)
  - Project manager: Peter Townson pt@iogp.org
- The contract for EPC contractors
  - Will have CFIHOS in it
- Software for CFIHOS
  - Hexagon, AVEVA, Bently Systems and Datum360 sell commercial licenses
  - Open source public domain software is soon ready
- ISO 15926
  - POSC Caesar: Nils Sandsmark nils.sandsmark@posccaesar.org
  - Fluor: Onno Paap onno.paap@fluor.com