RRR Type Approval in Europe

Calculation method (ISO 22628)

WORKSHOP WITH ARAI

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TWO ASPECTS OF VEHICLE RECYCLING

- Vehicle Recycling consists of 2 separate topics:
  - Type Approval
    - New vehicle Types
    - Recyclability Rate
    - Theory
  - Treatment of ELVs
    - ELVs
    - Recycling Rate
    - Practical

  The time gap between both topics is 15 years and more!!
TWO PARTS OF TYPE APPROVAL RECYCLABILITY

1. Preliminary Assessment of the OEM
   The competent authority ensures that the manufacturer has put into place satisfactory arrangements and procedures in accordance with Annex V to manage recyclability, material restrictions + parts marking
   Verification of the processes in regular intervals
   Certificate of Compliance

2. Type Approval of a new Vehicle Type
   Member states shall grant type approval only to such vehicles types that satisfy the requirements of this regulation
   Verification of vehicles types within type approval
   Type Approval Certificate

Type Approval RRR 2005/64/EC
TWO PARTS OF TYPE APPROVAL RECYCLABILITY

Type Approval RRR 2005/64/EC

Fulfillment 85% recyclability and 95% recoverability according to ISO 22628 for a new vehicle type.

Calculation for one representative vehicle

Calculation based on “Proven Technologies”.

Calculation based on OEM’s internal IT-systems.

Type Approval of a new Vehicle Type

Member states shall grant type approval only to such vehicles types that satisfy the requirements of this regulation.

Verification of vehicles types within type approval

Type Approval Certificate
DATA MANAGEMENT AND RECYCLABILITY

EXAMPLE VOLKSWAGEN AG PROCESS

Material data supply chain via IMDS

MISS System
Internal Material Information System

Input into VERON

Further internal data sources

Proven recycling technology list

ISO-22628-Annex A and 2005/64/EG Annex 2, 3

All processes (e.g. collecting/checking supplier data, calculating recyclability rates etc.) are documented in internal Volkswagen standards and processes and in contractual arrangements with the suppliers.

⇒ Different internal processes, tools and data sources for the different OEMs!
A typical vehicle consists of more than 3,000 parts which we have to take into account for the RRR calculation.
ISO 22 6 28 follows the principle of a four step calculation method settled in this standard:

1. **Pretreatment:** $m_p$
   (at ELV recycler)
   - All fluids
   - Batteries
   - Oil filters
   - LPG/CNG Tanks
   - Tyres
   - Catalytic Converters
CALCULATION METHOD OF ISO 22628

ISO 22628 follows the principle of a four step calculation method settled in this standard:

1. Dismantling: $m_D$
   (at ELV recycler)

   As declared by the OEM E.g.:
   - Recyclable parts e.g.:
     - Polymer parts
     - Glass parts
ISO 22628 follows the principle of a four step calculation method settled in this standard:

3. Metal separation: $m_M$ (at shredder operators)
   - Metals (Ferrous & Non-ferrous)
ISO 22 6 28 follows the principle of a four step calculation method settled in this standard:

4. Non-metallic residue treatment: $m_{Tr} + m_{Te}$ (at shredder operators)

- Glass
- Polymers
- Elastomers
- Other Materials
ISO 22628 follows the principle of a four step calculation method settled in this standard:

### Final calculation of recyclability rate

Reuse of ELV components and material recycling

\[
R_{\text{CYC}} = \frac{m_P + m_D + m_M + m_{Tr}}{m_V} \times 100
\]

### Final calculation of recoverability rate

All materials that can be reused and recycled + energy recovery

\[
R_{\text{COV}} = \frac{m_P + m_D + m_M + m_{Tr} + m_{Te}}{m_V} \times 100
\]
Materials of ELV can be used for recycling & energy recovery
SUMMARY AND CONCLUSIONS

• OEMs are calculating recyclability and recoverability targets on the basis of ISO 22 628 for new vehicle types.

• Basis for calculation: OEM internal IT-systems – supported by IMDS data (covering the supply chain).

• **All vehicle types** sold in Europe fulfill the requirements of type approval on recyclability.

• The two parts approach (Preliminary assessment and vehicle based type approval) for type approval recyclability has shown its practicability and are well established.

• Calculation based on a **common Proven Technologies List** agreed by global OEM’s and the European authorities.